

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

PART-II

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INSTRUCTIONS IN REGARD TO SUBMISSION OF TENDERS

NOTE: Tenderers should note that non-compliance of the following instructions will render the tender liable for rejection.

1. Address to which the tender is to be submitted:

The Chief Engineer, LIC of India, East Central Zonal Office, Engineering Department, Jeevan Deep Building (4th floor), Exhibition Road, Patna 800 001.

Tenderers are required to submit the tender in the following system:

First Part i.e. Pre-qualifying Bid containing duly filled-in Enrolment Form with supporting documents, credentials duly self attested by authorized signatory as detailed in the Enrolment form and Integrity Pact with Bank details shall be submitted in a sealed envelope duly superscribed as Envelope-1.

Second Part i.e. The EMD Bid shall contain EMD amount of Rs. 21,38,500.00 (Rupees twenty one lac thirty eight thousand five hundred) only in the form of Bank guarantee valid for one year from date of submission of tender as per enclosed proforma/Demand Draft/ Pay Order shall be put in a separate sealed envelope duly superscribed as Envelope-2

Third Part i.e. Financial Bid containing the filled-in Pre-Priced Schedule of Quantities including Part-I, Part-II of the Tender and signed drawings, shall be submitted in a separate sealed envelope duly superscribed as Envelope-3.

Envelope-1, Envelope-2 and Envelope-3 containing all documents as mentioned above shall be put in a **BIG ENVELOPE** duly sealed and superscribed with the following on the top of envelope.

“TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS’ QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR, CONTAINING ENVELOPE – 1, ENVELOPE-2 AND ENVELOPE - 3”.

Envelope 1 and Envelope-2 of the tender shall be opened first. Eligibility related documents of Tenderers who have submitted valid Earnest Money Deposit shall be evaluated and parties shall be qualified and disqualified by LIC of India. Financial Bid (Price Bid) will be opened only for qualified Tenderers. The date, time & place of opening of financial bid shall be intimated to all the qualified Tenderers and the financial bid (Envelope -3) shall be opened in presence of qualified tenderers or their authorized representatives.

2. Last date for receipt of tenders: **08.03.2016 up to 15.00 hours.**
3. **Tenderers should ensure that the tender is received before the date and time specified above.**
4. **Tenderer should fill in all the relevant blanks and put his signature on the relevant places as indicated below:**
 - a. **Letter from Contractor to Chief Engineer**
 - b. **Appendix to the “Conditions of Contract”**
 - c. **Appendix to the “General Instructions to the Contractors”**
 - d. **Last page of the General Preambles to Schedule of Quantities**

- e. **Every page of schedule of quantities and general summary.**
5. **The tender should be filled as follows:**
 - a. **The “Percentage Rate” column to be legibly filled in ink in both FIGURES AND WORDS.**
 - b. **All corrections to be initialed.**
 - c. **Each page of the Schedule of Quantities and the “General Summary” is to be signed by the Contractor.**
 - d. **Tenderer should note that he is to quote percentage below/above/at par in the “General Summary” page otherwise tender liable to be cancelled.**
6. No alterations or additions are to be made by the tenderer to the text or the Schedule of these tender papers. Any tenderer who proposes any alterations to any of the condition/s laid down or which proposes any other conditions of any description whatsoever is liable to be rejected.
7. The tenderer is required to check the numbers of the pages and should any be found missing or in duplicate, or the figure or writing indistinct, he must inform the Chief Engineer at once and have the same rectified. Should the tenderer be in doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform Chief Engineer in order that the correct meaning may be decided upon before the date for the submission of the tender.
8. No liability whatsoever will be admitted nor claim allowed in respect of errors in the submitted tender due to missing / duplicate pages, indistinct writing or any other error in the tender documents which should have been rectified in the manner described above.
9. Performa of Articles of Agreement (Annexure i) should not be filled in by the tenderer. **While the contract shall be deemed to have come into existence on issue of letter of acceptance to the successful tenderer, formal agreement shall be signed thereafter with the successful tenderer on non-judicial stamp paper of requisite value as per the Performa of Articles of Agreement.**
10. Earnest Money accompanying the tender will be accepted in the form of **CROSSED DEMAND DRAFT** of any of the Nationalized Banks / Approved Scheduled Banks drawn in favour of the **“LIFE INSURANCE CORPORATION OF INDIA”** payable at **PATNA** only, and not in favour of any other Authority or location. **The Earnest money can also be in form of Bank guarantee valid for one year from the date of submission of tender and shall be as per format enclosed.**
11. **The tender shall be accompanied by a certified true copy of Power of Attorney in favour of the signatory to the tender documents. If the tender is submitted on behalf of a firm, it must be signed either by all partners or person holding a valid power of attorney from all partners constituting the firm. The person signing the tender on behalf of another partner(s) or on**

behalf of a firm on Company shall attach with the Tender a proper Power of Attorney duly executed in his favour by such other person(s) or by all the partners in accordance with the Constitution of the Company / Articles of Association, stating that he has the authority to sign on behalf of such other person(s) of the firm or the Company as the case may be, in all matters pertaining to the contract including the Arbitration Clause.

12. Contractors are warned that Cash, or encashable Cheque, or Insurance Guarantee, or Fixed Deposit receipt in lieu of the aforementioned form of Earnest Money remittance will not be accepted.
13. The percentage rates mentioned in the tender copy will be taken as bonafide. When the percentage rates in figures and words are at variance, the percentage rate corresponding to the amount shall be taken as correct. In all other cases percentage rate in words will be taken in precedence over the rate in figures.
14. Tenders containing errors are liable to be considered non-bonafide at the discretion of the Chief Engineer
15. **Tenderer should note that tender should remain open for consideration for a minimum period of SIX MONTHS from the date fixed for the receipt of tenders.**
16. The Life Insurance Corporation of India reserves the right to accept any tender or to accept tenders in part; to reject any or all tenders without assigning reasons thereof.
17. Contractors should fill in "PERCENTAGE RATE" legibly in ink in both FIGURES and WORDS. Amounts mentioned in words shall be prefixed and suffixed by "Rs." and "only" respectively. Tenders containing the percentage rates only in figures are liable to be considered non-bonafide at the discretion of the Chief Engineer and entail forfeiture of Earnest Money Deposit.
18. If on check there are differences between the percentages rate given by the contractor in words and figures or in the amount worked out /amount quoted by him, the following shall be considered.
 - a) When there is a difference between the percentage rates in figures and in words, the percentage rates which correspond to the amounts worked out by the contractor, shall be taken as correct.
 - b) When the amount worked out by the contractor does not correspond with the percentage rate written either in figures or in words, then the percent rate quoted by the contractor in words shall be taken as correct.
 - c) When the percentage rate quoted by the contractor in figures and in words tallied but the amount is not worked out correctly, the percentage rate quoted by the contractor shall be taken as correct and not the amount.
 - d) **In the event nothing is quoted (at per/above/below) by the contractor, the tender is considered as non-bonafide.**

LIFE INSURANCE CORPORATION OF INDIA

LETTER TO CONTRACTOR FROM CHIEF ENGINEER

To,

Dear Sir / Sirs,

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

- 1) The tender should be submitted to the **Chief Engineer, LIC of India, East Central Zonal Office, Engineering Department, Jeevan Deep Building, Exhibition Road, Patna – 800001** by following the procedures as explained in the **INSTRUCTION IN REGARD TO SUBMISSION OF TENDERS**
- 2) **Drawings provided shall form part of the financial bid and the same shall be signed and put along with financial bid. Signed drawings are considered as part of financial bid.**
- 3) The sealed tenders containing the details as explained in **Instruction in regard to submission of tenders** will be received at the office of Chief Engineer, LIC of India, East Central Zonal Office, Jeevan Deep Building, Exhibition Road, Patna -800001 on or before **15.00 Hours** on **08.03.2016** and Envelope -1 and Envelope-2 of the tender document will be opened on **08.03.2016 At 15.30 hours** in presence of contractors or accredited representatives who attend. Tenderer should ensure that their tender is received before the date and time specified as no consideration whatsoever shall be given for postal or any kind of delays. Tenders received late shall be rejected.
- 4) If tender is delivered by hand, tenderer must ensure that the date and time of receipt is endorsed on the tender envelope by the A.O. or any other Officer of the Department approved by the SE / EE (Planning) and thereafter the tender is deposited in the tender box by the tenderer or his representative.
- 5) The Life Insurance Corporation of India does not bind itself to accept the lowest or any tender.

Yours faithfully,

CHIEF ENGINEER

LETTER FROM CONTRACTOR TO CHIEF ENGINEER

Date: _____

To,

The Chief Engineer
Life Insurance Corporation of India
East Central Zonal Office, Patna.

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

Dear Sir,

1. Having examined and understood the Specifications of the materials for its supply at the site of work as well as for labour for all types of work including specialized work, Conditions of Contract and General Instructions relating to Part-I of tender and Schedule of Quantities relating to the above work of PART II of the tender and the drawings and other related terms and conditions including **SPECIAL CONDITIONS**, amendments etc. and having visited and examined the site of the proposed works and having acquired the requisite information relating thereto as affecting the tender invited by you on behalf of the Life Insurance Corporation of India, I/We, the undersigned hereby offer to construct, execute, complete and maintain the proposed works on Percentage rate basis in strict accordance with the Contract Conditions and Specifications for the sum of **Rs** _____ / **(Rupees** _____ **only)** or such other sums as may be ascertained in accordance with the said Conditions.

2. I/We, undertake to complete and deliver the whole of the works within a period as specified in Appendix to the Conditions of Contract from the date of issue of intimation from you that the tender has been accepted and upon receiving possession of the site. **I/We shall obtain the revalidation Building Plans of the proposed construction from appropriate authority/authorities and shall obtain a fresh "no objection" certificate from Airport Authority as and when it is required. I/We shall obtain the electrical load sanction and associated estimate for the proposed construction from the appropriate Authority/Authorities. After completion of the proposed construction, I/We shall obtain the occupation/occupancy certificate from appropriate Authority/Authorities and shall carry out all that necessary to obtain the occupation/occupancy certificate from appropriate Authority/Authorities. Our quoted amount is inclusive of delivering all above requirements i.e. obtaining revalidation of Building Plans from appropriate authority/authorities, obtaining a fresh "no objection" certificate from Airport Authority, obtaining electrical load sanction and estimate from appropriate Authority/Authorities and obtaining occupation/occupancy certificate from appropriate Authority/Authorities etc. I/We shall be under the obligation to pay the sum as stated in the Appendix to the Conditions of Contract for every day that the works shall remain incomplete, damages as compensation subject to the Conditions of Contract relating to extension of time.**

3. I/We, enclose herewith my/our tender along with **Earnest Money Remittance of Rs. 21,38,500.00 (Rupees twenty one lac thirty eight thousand five hundred) only** in the form of **CROSSED DEMAND DRAFT/PAY ORDER PAYABLE at PATNA/Bank guarantee of that amount**. I/We, hereby agree that this sum shall be forfeited by the Life Insurance Corporation of India in the event of my/our tender being accepted and I/We fail to execute the Contract when called upon to do so. I/We, note that earnest money remittance in form of other than crossed demand draft/pay order on a nationalized/scheduled bank payable at Patna/bank guarantee of that amount shall not be accepted.

4. In the event of the tender being accepted, I/We, agree to deposit the Security Deposit amounting to Rs. **46,73,100.00** (Rupees forty six lakh seventy three thousand one hundred only) in the form of Bank Guarantee from any Nationalized/Scheduled Bank preferably at place of work site or Zonal Headquarter of LIC within whose jurisdiction the work falls or where a Branch/Division of the Corporation exist as per specimen given in Annexure 'B' to Conditions of Contract, in the manner as described herewith. Within 21 days of acceptance of tender, I/We shall deposit the security deposit in form of Bank Guarantee for an amount of Rs.23,36,550.00 (i.e. 50% of security) valid for 30 (thirty) months (24 months completion period + 6 months claim period). I/We understand that the Bank Guarantee/ Demand Draft towards EMD shall be refunded after submission of above Bank Guarantee. On revalidation of building plans, I/We shall submit another Bank Guarantee for an amount of Rs.23,36,550.00 (i.e. 50% of security) valid for balance period of work plus defect liability period of 12 months plus claim period of 6 months. I/We understand that the first Bank Guarantee towards security deposit shall be refunded after virtual completion of the work or it shall be refunded after completion of demolition work if the revalidation plan is not forthcoming, The second Bank guarantee towards security deposit which is taken after revalidation of plan shall be refunded after defect liability period. The Bank Guarantees shall be extended accordingly in case of time extension.

5. I/We, agree to furnish a lump sum Performance Guarantee amounting to Rs. **53,46,100.00** (Rupees fifty three lakh forty six thousand one hundred only) in the form of Bank Guarantee from any Nationalized/Scheduled Bank preferably at place of work site or Zonal Headquarter of LIC within whose jurisdiction the work falls (i.e. **Patna**) or where a Branch/Division of the Corporation exist, as per specimen given in Annexure 'C' to Conditions of Contract, within 20 days from the revalidation of Building plans from appropriate Authority/Authorities as mentioned in SPECIAL CONDITIONS (from page no 12 to 15) of Part-II of tender.

6. I/We, note that the Earnest Money Deposit of **Rs. 21,38,500.00** would be refunded to me/us.

- a. On expiry of the validity of the tender or earlier at the discretion of Chief Engineer in case my/our tender is not accepted and
- b. In case my/our tender is accepted, after I/We, furnish Bank Guarantee as mentioned above.

Yours faithfully,

(SIGNATURE OF THE CONTRACTOR)

Name and Seal
NAME OF THE PARTNER OF THE FIRM OR
NAME OF THE PERSON HAVING POWER OF
ATTORNEY TO SIGN THE CONTRACT
(CERTIFIED TRUE COPY OF THE POWER
OF ATTORNEY SHOULD BE ATTACHED)

APPENDIX TO CONDITIONS OF CONTRACT

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ESTIMATED TENDER AMOUNT : Rs. 10,69,20,326.00
 PERIOD FOR COMPLETION : 24 (Twenty four) Months
 EARNEST MONEY DEPOSIT: : Rs.21,38,500.00

Sl.No.	Clause No. of Conditions of Contract of PART-I of Tender	Other Clauses of the Tender to be Referred	Description	Remarks
1	11	---	Non deployment of Engineer by the contractor at construction site.	Non-deployment of Engineer at construction site by the contractor shall attract recovery per month per Engineer Rs. 40,000.00
2	13	---	Date of Commencement	1. Either 21 (twenty-one) days from the date of acceptance letter issued to the contractor OR 2. The day on which contractor is instructed to take possession of the site, whichever is earlier.
3	13 & 26	Clause No.- 4, Clause No.- 5 & Clause No.- 8 of SPECIAL CONDITIONS of Part-II of Tender	Date of completion	24 (Twenty four) months from the date of commencement
4	19	---	Liquidated damages	Quantum of liquidated damages 0.5% of contract sum per week subject to a maximum of 7.5% of contract sum.
5	21	---	Period of final measurement	60 (sixty) days from the date of completion of the contract.
6	22	Clause No.-8 of SPECIAL CONDITIONS of Part-II of Tender	Interim certificate	Rs.44,55,000.00
7	22	---	Period of honoring interim certificate (Payment of R.A. Bill)	20 (Twenty) days.
8	22	---	Period of honoring final certificate. (Payment of Final Bill)	90 days from the date of submission of final bill with details.

Sl.No.	Clause No. of Conditions of Contract of PART-I of Tender	Other Clauses of the Tender to be Referred	Description	Remarks
9	35	Clause No. i 7 of SPECIAL CONDITIONS of Part-II of Tender	a) Security Deposit b) Performance Guarantee	a) Rs. 46,73,100.00 (Rupees forty six lakh seventy three thousand one hundred only) b) Rs. 53,46,100.00 (Rupees fifty three lakh forty six thousand one hundred only)
10	35	---	Recovery of Security Deposit	Total amount of security deposit works out to Rs.46,73,100.00 . Within 21 days of acceptance of tender, the contractor has to deposit the security deposit in form of Bank Guarantee for an amount of Rs.23,36,550.00 (i.e. 50% of security) valid for 30 (thirty) months (24 months completion period + 6 months claim period). The Bank Guarantee/ Demand Draft towards EMD shall be refunded after submission of above Bank Guarantee. On revalidation of building plans, the contractor shall submit another Bank Guarantee for an amount of Rs.23,36,550.00 (i.e. 50% of security) valid for balance period of work plus defect liability period of 12 months plus claim period of 6 months. The first Bank Guarantee towards security deposit shall be refunded after virtual completion of the work or it shall be refunded after completion of demolition work if the revalidation plan is not forthcoming, The second Bank guarantee towards security deposit which is taken after revalidation of plan shall be refunded after defect liability period. The Bank Guarantees shall be extended accordingly in case of time extension.
11	37	---	Interest on Lump sum Advance	10.00 % per annum(Simple Interest)
12	17.5	Clause No.- 6 of SPECIAL CONDITIONS of Part-II of Tender	Contractor's All Risk Policy inclusive of Third Party Liability	7.5% of contract value. Initially till the revalidation of building plans is obtained, the contract value shall be decided based on demolition work only. After revalidation of building plans, the contract value shall be accepted tender amount minus value of demolition work already carried out..
13	17.6	Clause No.- 6 of SPECIAL CONDITIONS of Part-II of Tender	Workman's Compensation Policy	As per requirement of prevalent Laws.

SIGNATURE OF THE CONTRACTOR)

NO CLAIM CERTIFICATE CUM RECEIPT

(To be given on Contractor's letterhead)

₹Received Rupees _____

(Rupees _____) being the amount against my/our final
bill dated _____ for _____ (Name of Work) in full and final settlement of bill.

CONTRACTOR

(Signature of Contractor on Revenue stamp)

Rubber stamp/seal of the contractor /company

APPENDIX TO GENERAL INSTRUCTIONS TO CONTRACTORS

CLAUSE NO.2 OF CONDITIONS OF CONTRACT:

Name and Location of the proposed work:

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

LOCATION: Municipal Plot No. – 865/1290 & 865, Sheet No. -29, Thana No. -137, Ward No. – 2, Circle No. – 6, Mauja – Maharampur, Fraser Road, Zone- Central Zone, P.S. – Gandhi Maidan, Dist. – Patna, Bihar.

(SIGNATURE OF THE CONTRACTOR)

SPECIAL CONDITIONS:

1. PHOTOGRAPHS AND VIDEOS OF THE CONSTRUCTION WORK

- 1.1 The contractor shall submit photographs and videos of the following stages of the work:
- a. The plot before the start of construction showing any localized depression, rock outcrop, if any and any other things which affect construction.
 - b. Excavated pits and demolition of existing foundation.
 - c. Piling work which includes boring, reinforcement details, lowering of reinforcement and concreting. Apart from photographs, a short video of 10 minutes shall be taken illustrating entire piling process.
 - d. Load test of pile. Apart from photographs, a short video of 10 minutes shall be taken illustrating entire process of load testing of pile (both Initial test & Routine test).
 - e. Filling of excavated pit after demolition of foundation work is over.
 - f. Reinforcement and concreting of pile caps.
 - g. Shuttering and reinforcement details floor wise before laying of concrete and photographs during concreting and after laying of concrete including curing.
 - h. Completion stage of masonry work before plastering.
 - i. External filling and compaction process.
 - j. Water proofing of terrace and testing. Toilet water proofing, testing of internal water supply line before concealing the same.
 - k. After plastering but before painting.
 - l. Completed building before handing over the building.

The photographs and videos shall be submitted in CD / DVD / Pen Drive.

- 1.2 One or more photographs shall be taken to have complete clear views of the project as directed by Corporation's Engineer. **The further stage of work shall proceed only on confirmation of such photographs and videos (as mentioned above clause 1.1) seen by LIC Engineers (concerned Executive Engineer/Superintending Engineer and Dy.Chief Engineer under whose jurisdiction the project comes) and a written site instructions obtained in this regard. The concerned Engineers shall also put up to the Chief Engineer the said stage wise photographs and confirmation conveyed to the contractor.**
- 1.3 The quoted rates shall include for the same and nothing extra is payable to contractor on this account.

2. TESTING OF MATERIALS

During the progress of work, tests as prescribed below for various materials of construction shall be conducted as per the frequency noted in the table below. Contractor's attention is also drawn to Clause 9 of Conditions of Contract as well as Clause 9 of General Preambles to Schedule of Quantities.

Following charts to be followed for the frequency of tests:

TABLE-A

Sl. No.	Materials	Test	Frequency
1.	Water	Chemicals & Physical properties for water	One test per source before commencement of work
2.	Sand (Fine Aggregates)	a) Slit content(field test) b) Gradation c) Bulking (Field test)	This is a routine test and should be carried out for sand for each consignment. Every 45 Cum or part thereof or whenever moisture content is doubtful.
3.	Stone (Coarse Aggregate)	a) Aggregate crushing value b) Gradation	One in beginning of stacking of materials thereafter for every change of source. Every consignment.
4.	Cement	a) Initial and final setting time b) Compressive strength	One in beginning of stacking of materials thereafter for every change of source. One test for 100 tones or part there of and for every change of brand of cement if the cement is used for structural work
5.	Steel	1. Tensile strength a) Ultimate tensile stress b) Yield stress c) % Elongation	One test per category for every consignment used in work.
6.	Brick	a) Water absorption b) Efflorescence c) Compressive strength	One test for every 200000 Nos. or part there of and for every change of brand (set of 5 bricks)
7.	Timber	a) Moisture content b) Specific gravity c) Species in sample of teak wood	One test for every 30cum or part thereof.
8.	Anodized coating of aluminum	Thickness of Anodic Coating.	One Test for material costing Rs.8.00 Lac or part thereof.
9.	Marble mosaic tiles	a) Wet Transverse Strength b) Water Absorption c) Abrasion Test	One test for every 1 lakh tiles or part thereof.
10.	Flush Door	End Immersion Knife Adhesion	Destructive test based on no. of shutter. 1-100 one test 101-200 two test 201-500 three test 500 & above four test

Sl. No.	Materials	Test	Frequency
11.	Ceramic Tiles / Vitrified Tiles	Water absorption Crazing Test	One test for every 5000 nos. or part thereof.
12.	Marble	Moisture Absorption test	One test for every 800 sq.mt. or part thereof.
13.	Panel Door Shutter	a) Physical Test b) Glue Adhesion Test	One test from each lot. One test from each lot.
14.	Particle Board	a) Identification (Physical verification) b) Dimensional Tolerance	One test from each lot. One test from each lot.
15.	Sand Stone	Water Absorption	Frequency of test as specified by CPWD

- The validity of approved building plans of the project has expired on 22nd July 2015 and LIC of India has applied to Patna Municipal Corporation for necessary revalidation building plans on 14/07/2015. The contractor is required to get the revalidation building plans of the proposed construction from appropriate authority / authorities. Similarly the validity of "No Objection" certificate obtained from Airport Authority for the said construction expires on 8th April,2017. As per the said "No Objection" certificate of Airport Authority if the construction of building is not completed within 8th April,2017, a fresh "No Objection" certificate is required to be obtained from Airport Authority. The construction of building is not likely to be completed by 8th April,2017. Hence the contractor shall obtain a fresh "No Objection" certificate from Airport Authority as when it required i.e. on or before 8th April,2017. The quoted tender amount shall be inclusive all expenses for getting the revalidation of building plans from the appropriate authority / authorities and for getting the "no objection certificate" from Airport Authority when it is due. However, any official fees required to be paid in this regard shall be paid / reimbursed by LIC of India.
- The date completion of the work shall be 24 months from the date of commencement. The contractor shall commence the work with demolition of existing foundation the bottom of which lays approximately 4.0m below existing ground level. ITEM NOs 1.01 to 1.08 of schedule of quantities of the tender define the demolition work and the contractor has to execute those items as per required quantities based on site condition in order to complete the demolition work.
- Out of total time period of 24 months to complete the project in all respect, the time period for getting revalidation of the building plans from the appropriate authority / authorities is either six months from date of commencement or till existing foundation of old buildings is demolished whichever is earlier.
- Till the revalidation of building plans are obtained from appropriate authority / authorities the contractor is permitted to take insurance policies considering demolition works (ITEM NOs 1.01 to 1.08 of schedule of quantities of the tender) only. But once the building plans are revalidated by appropriate authority / authorities, the contractor is required to take insurance policies for the entire scope of work

- minus demolition works already carried out. However the labour license is required to be taken in totality for the contract right from the date of commencement of work i.e. before demolition work starts.
7. The performance guarantee of required amount in the prescribed format as stipulated elsewhere in tender shall be deposited by the contractor within 20 days from the day the building plans are revalidated by appropriate authority / authorities.
 8. Though time period for getting revalidation of building plans by appropriate authority / authorities is stipulated as either six months from date of commencement or till existing foundation of old buildings is demolished whichever is earlier, the Chief Engineer of the Employer after being convinced of reasons for delay in getting the revalidation of building plans may extend time period for getting revalidation of building plans by additional two months on the request of the contractor. If the revalidation of building plans from appropriate authority / authorities is not forthcoming in stipulated time period including additional two months extended period, the tender shall determined as per Clause - 33 of Part-I of tender. In any case the contractor has to complete the demolition of existing foundation (ITEM NOS 1.01 to 1.08 of the schedule of quantities) before contract is determined as per Clause-33 of Part-I of tender due to reason that revalidation of Building plans is not forthcoming.
 9. Electricity Load Sanction: The total Electrical load requirement for 27 nos. Quarters and other Electrical facilities shall be 190 KW (237.50 KVA). The contractor will be required to submit required drawings and application and obtain Electrical load sanction from local Electricity Authority for which all officials fees shall be paid/reimbursed by LIC of India.
 10. The contractor shall obtain the occupancy/occupation certificate and shall carryout all that necessary to obtain the occupancy/occupation certificate. The quoted tender amount shall be inclusive of all expenses for obtaining the occupancy/occupation certificate and other allied works relating to obtaining occupancy/occupation certificate from appropriate authority/authorities. However, any official fees required to be paid in this regard shall be paid/reimbursed by LIC of India. The contractor shall take all appropriate measures to get all necessary approvals from local Authorities as required by them for stage-wise construction viz getting the set back of building checked at plinth level, obtaining/submitting DPC certificate from Competent person so that uninterrupted progress is maintained. The contractor will be required to follow it up with the local Authorities, liasioning it properly for early approval. All administrative support will be extended by LIC of India. During construction of the building the entire premises shall be covered by protective measures to ensure pollution free atmosphere (including noise pollution) in the surrounding and inconvenience to general public should not be made by the construction.
 11. The contractor has to make his own arrangement for water to be used for construction work by following the rules, regulation and directives of local authorities. The water has to be tested to determine its suitability for concreting and construction work.

(SIGNATURE OF THE CONTRACTOR)

GENERAL PREAMBLES TO SCHEDULE OF QUANTITIES

These preambles apply to all the sections of the "Schedule of Quantities".

1. RATE TO COVER:

- 1.1 The rates quoted by the Contractor shall be held to include for providing and fixing, all conveyance and delivery, loading & unloading, carrying in, storing, hoisting, all labour, setting, fitting and fixing in position, making straight, cutting, waste, return of packing and all materials and labour and everything else necessary for the proper completion of each item of work to the approval of Corporation's Engineer and for Establishment Charges, overheads and profits. The Contractor shall provide at his expense all labour, materials and things required by the Corporation's Engineer for testing and measuring the work, for weighing, testing the efficiency of any portion of the work, all planking, gangways etc. necessary for affording access to every part of the work except where specifically stated otherwise.
- 1.2 The Contractor should also cover in his rates for the method of work, cost of materials, labour etc., to comply with the "Trade Specifications", General Instructions to Contractor", "Conditions of Contract", "Special Conditions", (if any), and all documents of this contract.
- 1.3 All the materials or procedures or specifications for work, unless otherwise stated, shall conform to the current Indian Standard whether or not specific mention is made thereof. The Contractor shall be responsible for and shall replace or make good at his own expense, any materials lost or damaged, or of quality not approved, temporarily disturbed roads, pavements, approaches, gates, walls or any such dismantling carried out to execute the work.
- 1.4 All rates quoted shall include for Supplying and fixing although the same may not have been mentioned in the item of the Schedule of Quantities. Words "Providing and Fixing where used shall have same meaning as "Supplying and Fixing".
- 1.5 **Rates quoted shall include for hoisting to any height and the work at all levels and lifting of materials shall not form any criterion for any extra claims, except where otherwise specified.**

2. ANCILLARY WORKS:

- 2.1 The Contractor shall have to carry out all ancillary and connected work within and near vicinity of the plot of the proposed work and inside the Building if ordered to do so by the Chief Engineer at the rates quoted in the Schedule of Quantities, at any time during the currency of this Contract including extension of time, if any granted.

3. PRICE FLUCTUATION / VARIATION:

- 3.1 Rates quoted by the Contractor shall be firm throughout the currency of the Contract including extensions of time, if any granted. No price adjustment due to variation in cost of materials or labour or any variation under any State or Central Legislation or any other reason whatsoever shall be allowed, except as stated in relevant clauses below with regard to variation in price on materials & labour and price fluctuation in Cement & Steel.

4. CEMENT:

CONTRACTOR'S QUOTED RATES:

- 4.1 Contractor shall quote his rates for various relevant items in the tender on the basis of provisions of this clause detailed hereunder and on the basis of the price of cement at site of work as mentioned in Annexure attached herewith (hereinafter called the Basic Price of Cement).

APPROVAL OF SOURCE OF PURCHASE AND PRICE:

- 4.2 Contractor shall purchase cement from approved reputed cement manufacturers such as ACC, UltraTech, J. P. Rewa, Vikram, Shree Cement, Birla Jute, CCI, Madras cement, Chettinad cement, India cement etc. as approved by Ministry of Industry, Govt. of India and having license to use ISI Certification mark for their products and from C&F agents and authorized dealers (with dealership certificate). Cement shall be Ordinary Portland Cement 33 / 43 Grade of fresh manufacture conforming to IS: 269/ IS: 8112 respectively; Portland Pozzolana Cement: IS: 1489 (Part 2): 1991; Portland Slag Cement: IS: 455 (1989) or relevant Indian Standards (latest revision). Cement shall be purchased and transported to the work site by the contractor in bulk quantity required to achieve desired progress in next 3 months, from the above source of purchase (including brand of cement). At the time of starting the work, the request for approval shall be submitted within 15 days of receipt of tender acceptance letter. The contractor shall intimate the EE/SE the quantity of cement being procured, with the names, full addresses and telephone numbers of cement suppliers. For subsequent approvals the contractors shall approach Employer's Engineer at site at least 20 days in advance of the desired date of delivery of cement. The contractor shall submit his request for the approval through Employer's Engineer at site with one copy of the letter to EE/SE. The contractor's request letter shall mention the quantity of cement to be/ being purchased and also the quantity of cement in stock at site on the date of submitting the request.

BASIC PRICE OF CEMENT:

- 4.3 The basic price of cement stated in Annexure is inclusive of all costs upto the site of work, including purchase price, all levies and duties including excise duty, sales tax, octroi / town duty, transportation charges including loading and unloading charges at all points (except unloading at site), transit insurance and any other expenses (*expenditure*) not mentioned above but required etc. and shall be included by the contractor in his quoted rates. All other costs such as unloading the

cement at site, handling, stacking, storage, providing watch and ward arrangements, loss due to pilferage, theft, damages if any including cement which may become unfit for consumption due to prolonged storage or due to rains etc. shall be to contractor's account and shall be included by the contractor in rates quoted in the tender.

QUALITY OF CEMENT:

- 4.4 The contractor shall satisfy himself that the cement arriving at site is ordinary port-land cement conforming to the requirement of IS: 269/8112 for 33 / 43 Grade respectively; Portland Pozzolana Cement: IS: 1489 (Part 2); Portland Slag Cement: IS: 455 (1989) or relevant Indian Standard and shall procure Manufacturer's Certificate to this effect. In case the contractor has any doubt regarding the quality of cement, it is up to him to have it tested at his own cost and make sure before incorporation in the works that the cement is of right quality. Each consignment of cement supplied should have Test Certificate of the Manufacturer.

PAYMENT DUE TO VARIATION ON PRICE OF CEMENT

- 4.5 If after submission of the tender, the price of Cement specified in Annexure 1 increases/ decreases beyond the price(s) prevailing at the time of the last stipulated date for receipt of tenders including Tender opening extensions, if any for the work, then the variation in amount shall accordingly be paid and that any such variations shall be effected only for stipulated period of Contract including the justified contract period extended without imposition of liquidated clauses.

However for work done/during the justified period extended as above, it will be limited to indices prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less. In case of extension granted with imposition of liquidated damage, no price variation shall be allowed during extended period but recovery due to price variation shall be effected.

The increase/decrease in prices of cement, shall be determined by the Price indices as published by Economic Advisor to Government of India, Ministry of Commerce and Industry and base price for cement, as indicated in Annexure 2 as valid on the last stipulated date of receipt of tender, including extension if any and for the period under consideration.

The amount will be worked out as per the formula given below for individual material:-

Adjustment for component of cement.

$$V = P \times Q \times \frac{CI - C_{lo}}{C_{lo}}$$

Where,

V = Variation in Cement cost i.e. increase or decrease in the amount to be paid or recovered.

P = Base Price of cement as indicated in Annexure 2 as valid at the time of the last stipulated date of receipt of tender including extensions, if any.

Q = Quantity of Cement consumed in the works since previous bill.

Clo = All India Whole Sale Price index for cement, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India as valid on the last stipulated date of receipt of tenders including extensions, if any.

CI = All India Whole Sale Price index for cement, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India for period under consideration.

CONTRACTOR'S OTHER RESPONSIBILITIES / LIABILITIES:

4.6

- (i) Contractor shall comply with all requirements/procedures etc. that may be stipulated if any, by Government /controlling authority from time to time and accordingly obtain the requisite supply of cement for the work.
- (ii) Even though the source of cement is approved by the employer but the employer shall not be responsible for quality of cement or any loss/ damage in transit, delays due to non-availability of cement with the factory / C&F agents /authorized dealers and/or required transport etc. The contractor shall not be entitled to make any claim and Extension of time or Cost on the employer on such grounds.
- (iii) Cement shall be kept in custody of the contractor at site. The contractor shall be responsible for the safety of the cement by providing watch and ward as is necessary and directed. In case any cement is damaged, unaccounted for or lost due to pilferage or any other reason either in transit or at site, the accountability will be with contractor. If any quantity of cement is found in excess of requirement or left over after completion of the work, same shall not be removed from site without the written permission of the Engineer-in-charge.
- (iv) The contractor shall maintain a stock register at the site and shall record therein the receipt and consumption of cement, the same day it is received or consumed. He shall also get the entries in the register for receipt and consumption of cement countersigned by Employer's Site Engineer, on the same day cement is received or consumed.
- (v) Pozzolana/ Slag cement shall be used only if specifically permitted by the Chief Engineer. The Chief Engineer reserves the right not to allow the use of Pozzolana/ Slag cement. In case Pozzolana / Slag cement is used, the Contractor shall have to observe increased periods for striking form and additional period of one week for curing for which no claim shall be entertained.
- (vi) The cement shall be got tested by the Engineer-in-charge of employer as and when new consignment comes and there is change in manufacturer's brand. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. The cost of tests shall be borne by the contractor/Department in the manner indicated below:-
 - (a) By the contractor, if the results show that the cement does not conform to relevant BIS codes.
 - (b) By the Department, if the results show that the cement conforms to relevant BIS codes.

(vii) The contractor is allowed to use reasonable quantity from the cement brought at site for constructing temporary water storage tank to store water for construction, site office and godowns at site. The quantity used for this purpose shall not be account for payment due to price variation defined elsewhere.

(viii) The actual issue and consumption of cement on work shall be regulated and proper accounts maintained. The theoretical consumption of cement shall be worked out as per procedure prescribed elsewhere in the contract. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment shall be made.

(ix) If the work executed is not conforming to acceptable standard as prescribed in the tender elsewhere, the work will not be considered for payment.

The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-charge. If he does not do so within 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.

Chief Engineer may change the brand of Cement depending upon availability in local market, if needed. Instructions in this respect can be issued by them at regular intervals. The name of manufacturers should be finalized after taking into consideration the suggestions of contractors during pre bid meeting, if any.

Similar conditions for cement of other types like slag cement etc. may be incorporated wherever required by the authority by providing for relevant BIS Codes, suitable brands of cement and instructions issued by the department.

**MILD STEEL BARS AND HIGH STRENGTH DEFORMED BARS FOR REINFORCEMENT IN R.C.C.
WORK TO BE SUPPLIED BY CONTRACTOR:**

5. CONTRACTOR'S QUOTED RATES:

5.1 Contractor shall quote his rates for relevant items in the tender on the basis of provisions of this clause detailed hereunder and on the basis of price of steel at site of work as mentioned in Annexure "P" attached herewith (hereinafter called the Basic Price of Steel).

5.2 APPROVAL OF SOURCE OF PURCHASE

- (1) **The contractor shall procure TMT bars of Fe415/ Fe500 grade (the grade to be procured is to be specified) from primary producers such as SAIL or TISCO or RINL as approved by Ministry of Steel.** The TMT bars procured from primary producers shall conform to manufacturer's specifications. In case of non-availability of steel from primary producers, the approving authority may permit use of TMT reinforcement bars procured from secondary producers. In such cases following action is to be followed:
 - (a) The grade of the steel such as Fe415/Fe500 or other grade to be procured is to be specified as per BIS 1786 /2008.
 - (b) The secondary producers must have valid BIS license to produce HSD bars conforming to IS 1786: 2008. In addition to BIS license, the secondary producer must have valid license from either of the firms Tempcore, Thermex, Evcon Turbo & Turbo Quench to produce TMT Bars.
 - (c) The TMT bars procured from primary producers shall conform to manufacturer's specifications.
 - (d) The TMT bars procured from secondary producers shall conform to the specifications as laid by Tempcore, Thermex, Evcon Turbo & Turbo Quench as the case may be.
 - (e) TMT bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008/2012 pertaining to Fe415D or Fe 500D grade of steel as specified in the tender (while preparing Tender the grade of the steel to be specified).
- (2) The contractor shall have to obtain and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.
- (3) Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under para (1)(d) & (1)(e) above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time or written orders from the Engineer-in-Charge to do so.
- (4) **The steel reinforcement bars shall be brought to the site in bulk supply required to achieve desired progress of the work in next 3 months, from the above source of purchase (including brand of steel) as decided by the Engineer-in-charge. At the time of starting the work, the request for approval shall be submitted within 15 days of receipt of tender acceptance letter. The contractor shall intimate the EE/SE the quantity of steel being procured, with the names, full addresses, and telephone numbers of steel suppliers. For subsequent approvals the contractors shall approach Employer's Engineer at site at least 20 days in advance of the desired date of delivery of steel. The contractor shall submit his request for the approval through Employer's Engineer at site with one copy of the letter to EE/SE. The contractor's request letter shall mention the quantity of steel to be/ being purchased and also the quantity of steel in stock at site on the date of submitting the request.**

- (5) The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- (6) For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified in the tender.

BASIC PRICE OF STEEL:

- 5.3 The basic price of steel stated in Annexure D is inclusive of all costs upto the site of work, including purchase price, all levies and duties including excise duty, sales tax, octroi / town duty, transportation charges including loading and unloading charges at all points (except unloading at site), transit insurance, and any other expenses (*expenditure*) not mentioned above but required etc. and shall be included by the contractor in his quoted rates. All other costs such as unloading the steel at site, handling, stacking, storage, providing watch and ward arrangements, loss due to pilferage, thefts or any other reasons shall also be to contractor's account and shall be included by the contractor in rates quoted in the tender.

QUALITY OF STEEL:

- 5.4 The contractor shall satisfy himself that the steel arriving at site is TMT bars of Fe415/ Fe500 grade as per BIS 1786-2008/ 2012 or other grade bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008/ 2012 pertaining to Fe 415D or Fe 500D grade of steel as specified in the tender and shall be supported by test certificate from the suppliers. In case the contractor has any doubt regarding the quality of steel, it is up to him to have it tested at his own cost and make sure before incorporation in the works that the steel is of right quality. Each consignment of steel supplied should have Test Certificate of the Manufacturer.

CONTRACTOR'S OTHER RESPONSIBILITIES/LIABILITIES

- (i) Contractor shall comply with all requirements/procedures etc. that may be stipulated if any, by Government /controlling authority from time to time and accordingly obtain the requisite supply of steel for the work.
- (ii) Even if the source of steel is approved by the employer, the employer shall not be responsible for quality of steel, correctness of diameter/ size or any loss /damage in transit, delays due to non-availability of steel with the manufacturer/suppliers and/or required transport etc. The contractor shall not be entitled to make any claim & Extension of Time or Cost on the employer on such grounds.

- (iii) The contractor shall be responsible for proper storing arrangement at site. Steel shall be kept in custody of the contractor at site. The contractor shall be responsible for the safety of the steel by providing watch and ward as is necessary and directed. In case any steel is damaged, unaccounted for or lost due to pilferage or any other reasons either in transit or at site, the accountability will be with contractor. If any quantity of steel is found in excess of requirement or left over after completion of the work, same shall not be removed from site without the written permission of the Engineer-in-charge.
- (iv) **The contractor shall maintain a stock register at the site and shall record therein the receipt and consumption of steel (category wise), the same day it is received or consumed. He shall also get the entries in the register for receipt and consumption of steel countersigned by Employer's Site Engineer, on the same day steel is received or consumed.**
- (v) The wastage shall be to contractor's account and shall be taken away by the contractors after obtaining written permission from the **Engineer-in-charge** and the rates quoted shall allow for the same.
- (vi) The payment of steel reinforcement shall be made on weight worked out on the basis of measurement of lengths of various categories as incorporated in the work and sectional weights mentioned in tender.
- (vii) The contractor shall obtain a test certificate from the manufacturer for the lot of steel purchased for the work. The employer's site Engineer may also order testing of steel when new consignment comes and / or there is change in manufacturer's brand, by the contractor before allowing its use in the work irrespective of the test certificate and in such case the contractor shall supply free of charge the steel required for testing including its transportation cost to testing laboratories. The cost of tests shall be borne by the contractor/Department in the manner indicated below but not any other incidental expenses for arranging the testing, which shall be to contractor's account and included in quoted rates:-
 - a. By the contractor, if the results show that the steel does not conform to relevant BIS codes.
 - b. By the Department, if the results show that the steel conforms to relevant BIS codes.
- (viii) The actual issue and consumption of steel on work shall be regulated and proper accounts maintained. The theoretical consumption of steel shall be worked out as per procedure prescribed elsewhere in the contract. In case the steel consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment shall be made.
- (ix) The substitution of any category of steel shown in drawing with any other category of steel shall be done only if permitted by the EE/SE in writing.
- (x) The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

6.0 PAYMENT DUE TO VARIATION IN PRICE OF STEEL

If after submission of the tender, the price of Steel specified in Annexure 1 increases/ decreases beyond the price(s) prevailing at the time of the last stipulated date for receipt of tenders including Tender opening extensions, if any for the work, then the variation in amount shall accordingly be paid and that any such variations shall be effected only for stipulated period of Contract including the justified contract period extended without imposition of liquidated clauses.

However, for work done/during the justified period extended as above, it will be limited to indices prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less. If the extension is granted with imposition of liquidated damage, no price variation shall be paid but recovery due to price variation shall be effected.

The increase/decrease in prices of steel, shall be determined by the Price indices as published by Economic Advisor to Government of India, Ministry of Steel and base price for steel, as indicated in Annexure 2 as valid on the last stipulated date of receipt of tender, including extension if any and for the period under consideration.

The amount will be worked out as per the formula given below for individual material:-

Adjustment for component of steel.

$$V = P \times Q \times \frac{CI - C_{lo}}{C_{lo}}$$

Where,

V = Variation in Steel cost i.e. increase or decrease in the amount to be paid or recovered.

P = Base Price of steel as indicated in Annexure 2 as valid at the time of the last stipulated date of receipt of tender including extensions, if any.

Q = Quantity of Steel consumed in the worksite i.e. as measured and recorded since previous bill. Wastage if any, to be on contractor's account.

C_{lo} = All India Whole Sale Price index for steel, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India as valid on the last stipulated date of receipt of tenders including extensions, if any.

CI = All India Whole Sale Price index for steel, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India for period under consideration.

6. WASTAGE OF CEMENT AND STEEL:

6.1 The wastage of Cement and Steel shall be to the contractor's Account and the rates quoted shall allow for the same.

7. BALANCE STOCK OF CEMENT / STEEL ON COMPLETION OF JOB:

7.1 Irrespective of what is mentioned anywhere else in this tender the surplus stock of Cement/Steel remaining at the site on completion of work, shall be the property of the Contractor. However, he shall remove the surplus stock only after furnishing the necessary details of such stock in writing to the Corporation's Engineer who shall give approval after satisfying himself that the amount advanced for the above stock has been fully recovered.

8. STEEL OTHER THAN USED FOR REINFORCEMENT:

8.1 Rolled steel sections such as angles, joists, channels, flats etc. and mild steel used for M.S. Grills, railing, gates and M.S. Plates etc., shall be procured by the Contractor and Annexure "P" will not apply for cost of these items.

9. TESTING OF MATERIALS INCLUDING CEMENT AND STEEL:

9.1 Testing of all materials including cement & steel during the progress of work shall be as per frequency given in Table A, clause 2 of Special Conditions.

9.2 Contractor shall facilitate testing of materials viz, cement, steel, cubes and any other material as per the frequency/sampling mentioned in Table-A, clause-2 of Special conditions. Contractor shall also facilitate testing of any material to be incorporated in work even if it is not specifically mentioned. The testing charge against invoice shall be directly remitted by the Corporation to the test house. If the material fails to conform to the Standards (BIS), the test charges shall be recovered from Contractor's bill.

9.3 For all other materials listed in Special conditions, expenses towards testing shall be borne by LIC. If the material fails to conform to the Standards (BIS), the test charge shall be recovered from Contractor's bill.

9.4 The Corporation's Engineer may get tested any material to be incorporated in work even if it is not specifically mentioned. In all such cases, testing charges will be borne by LIC. If the material fails to conform to the Standards (BIS), the test charges shall be recovered from Contractor's bill.

9.5 For all tests, incidental charges such as cutting, loading, unloading, casting wherever applicable such as mortar briquettes/cubes and facilitating in transportation including materials required for testing shall be borne by the contractor.

Above stipulations (9.1, 9.2, 9.3, 9.4 and 9.5) supersede any other conditions /stipulations pertaining to testing of materials mentioned elsewhere in this tender.

10. "PRINCIPAL MAKE/S OR OTHER EQUAL AND APPROVED" FOR MATERIALS / PRODUCTS:

- 10.1 The Contractor shall note that materials having ISI monogram shall primarily be used in the work. If in the tender "Certain Principal Make / Makes or other equal and approved of any material / Product is mentioned in any item or Trade Preambles relating to the particular items in its respective Trade Schedule, the Contractor shall have to use the Principal Make/Makes specified in the relevant item or the trade Preambles. In case the specified particular Principal make / makes of the materials product is/are not readily available, the Contractor shall take prior permission and approval of the Chief Engineer in writing before use of the alternative equivalent make of the Material / Product.
- 10.2 All principal makes specified for any item shall be treated at par as per the accepted quoted rate.
- 10.3 Use of the make other than the Principal Make/Makes (which shall be treated as an Equivalent make) shall be at the discretion of the Chief Engineer and such Make/Makes shall be used after the approval of the Chief Engineer.
- 10.4 In such cases the Contractor will not be paid any extra payment over the accepted quoted rate in any case. However if it is ascertained that the price of approved Equivalent Make or the Material/product is lower than that for the Principal Make/Makes of the same material / product the difference of the price shall be payable by the contractor to LIC. Such difference of price shall be suitably decided by the Chief Engineer whose decision shall be final and binding to the Contractor in this regard.

11. ADJUSTMENT IN PRICES OF MATERIALS AND LABOUR (OTHER THAN CEMENT & STEEL):

- 11.1 Adjustment in price of material, labour shall apply to original civil work for construction of building which may include piling, plumbing & sanitary work, electrical installations and which shall have a stipulated completion period of more than six months. **The adjustment in prices under this clause shall not apply to works such as tube-well, lifts and substation equipment, interior work, repair & maintenance contracts unless otherwise specified.**
- 11.2 Adjustment in prices of material & labour shall be allowed on the basis of clause-11.6 subject to the condition given below.
- 11.3 Adjustment shall be made only for tender items and deviated items for the stipulated contract period.

11.4 & 11.5

In case of extension of time, the escalation is paid as follows:

- a) When there is authorized extension i.e. no imposition of Liquidated Damage, escalation may be paid for the extended period with prevailing index.

- b) Extension granted but with imposition of Liquidated damages: The escalation may be paid by considering index as that prevailing on scheduled date of completion or that prevailing on the date of billing during the extended period of contract whichever is lower .
- c) Extension granted due to failure on the part of the contractor but due to reasons beyond his control The Department has taken a lenient view for not imposing Liquidated Damages, no escalation shall be paid whatsoever after scheduled date of completion.

ADJUSTMENT OF MATERIALS:

- 11.6 For the purpose of adjustment in price of materials, the component shall be 60% of the value of work done upto a given stage. While computing the adjustment, the cost of cement, steel or any other materials for which basic price has been stipulated in the tender shall be deducted from the component worked out at 60% of the value of work. The cement and steel as covered under Clauses 4 and 5 of the General Preambles to schedule of quantities shall be excluded from the purview of the adjustment.

$$V_m = \{60/100 (R_n - R_{n-1}) + C_m - M_{n-1} + M_n\} \times (W - W_0) / W_0,$$

Where,

V_m = Variation in price for materials i.e. increase or decrease in the amount in rupees to be paid or recovered.

R_n = Total value of work done (excluding prime cost items, extra items, and advance on materials at site upto the period under reckoning) on the basis of accepted tender rates. The deviated items worked out fully on the basis of rates prevailing at the time of last date of receipt of tender to be included.

C_m = Total value of cement and steel at basic price stipulated in the tender and shall comprise of C & S as explained below and any other material which basic price is mentioned:

C = Cost of cement used in the work and recorded for any specific bill period under reference and worked out at basic price stipulated in Annexure attached in the tender.

S = Cost of steel for reinforcement (covered under Clause 5.1 AND 5.2 of the General Preambles to schedule of quantities) used in the work and recorded for any specific bill period under reference and worked out at issue price / basic price stipulated in the tender.

R_{n-1} = Total value of work done (excluding prime cost items, extra items and advance on materials at site) considered in the bill prior to the period under reckoning. The deviated items and such other items shall be considered as per R_n above.

M_n = Advance being allowed in the bill under consideration against materials at site (other than cement and steel)

M_{n-1} = Advance allowed in the bill prior to the period under scrutiny against materials at site (other than cement and steel)

W_0 = All India Wholesale Price Index for all commodities (Base = 100; Year 2004-05) as prevailing on the last day for submission of tender (including extended date, if any).

W = Average All India Wholesale Price Index for all commodities Base = 100; year 2004-05; as published in the RBI Bulletin for the period of the bill under consideration viz. from the date of previous bill (date of commencement in case of first bill) to date of current bill (date of virtual completion in case of final bill or any earlier cut off date as fixed).

- 11.7 The adjustment on materials is worked out on the basis that material component in the building construction work is 60% of the value of work done, the rest being labour and profit. But in the initial stages of construction work, it might so happen that the cost of materials used exceeds 60% which is taken as an average and therefore adjustment gets worked out on negative side even though the economic index might have gone up. In such cases, the negative adjustment shall also have to be made in the bill.

ADJUSTMENT ON LABOUR:

- 11.8 The contractor shall pay wages to the skilled and unskilled labour not less than the rates prescribed under the minimum wages act and as stated in clause no.18 of the General Instructions to contractors for Builders's work. Variation in prices of labour shall be worked out by applying the following formula and necessary payment/ recovery made:

$$VL = 25 / 100 \times (R_n - R_{n-1}) \times (I - I_0) / I_0$$

VL = Variation in price for labour i.e. increase or decrease in the amount in rupees to be paid or recovered

I = Average All India Consumer Price Index for Industrial Workers (base 100 year - 2001) declared by Labour Bureau, Govt. of India, as published in Reserve Bank of India Bulletin during the period under reckoning.

Average All India Consumer Price Index for Industrial Workers for the period of the bill under consideration viz. from date of previous bill (date of commencement in case of first bill) to date of current bill (date of virtual completion in case of final bill or any earlier cut off date as fixed)

I_0 = All India Consumer Price Index for Industrial workers (base 100-year 2001) ruling on the last date of submission of tender (including extended date, if any)

R_n = As defined under 11.6 above

R_{n-1} = As defined under 11.6 above

- 11.9 If the last date for submission of tender / date of bill is between 1st to 15th of a particular month the relevant economic index (W, W_0 , I, I_0) for the previous month is to be considered. However, if the last date of submission of tender / date of bill is between 16th and end of month, the relevant economic index for the month shall be reckoned while calculating the material / labour price adjustment.

NOTE: 1) The adjustment in prices of Materials and Labour shall be considered /effected only when the Contractor submits authentic data for prevailing indices along with the RA/Final Bill. The Employer reserves the right to set aside certain amount from the Bill if the Contractor does not submit the authentic data of prevailing indices along with the bill.

- 2) For adjustment in prices of materials & labour the indices (WPI / CPI) published by RBI as mentioned above which are available as on the date of submission of final bill (final /

provisional indices) will only be considered for settlement of final bill . No further review will be done, even if there are variations in indices (WPI / CPI) after the final bill is settled.

- 3) In case during the period of contract, the base years for publishing Economic Indices are changed as per statute, then the revised indices will be considered as per the published data available at the time of settling the bill/s.

12. ADJUSTMENT OF PRICE AND LABOUR FOR LIFT WORKS: (ITEM NO 17.01 OF SHEDULE OF QUANTITIES)

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices and the wholesale price index numbers for metal products and all India average consumer price index number for industrial workers as specified in the adjustment clause given below. In case of any variation in these indices, the price payable shall be subject to adjustment up or down, in accordance with the following formula:

$$P = P_0 / 100 \{ 15 + 55(MP/MP_0) + 15(W_0(D)/W_0) + 15(W_0(I)/W_0) \}$$

Wherein,

P=Price payable as adjusted in accordance with the above formula.

P₀ = Price quoted.

MP₀=Wholesale price index number of metal products. This index number is as applicable on the month, four months prior to the date of tendering.

W₀=All India average consumer price index for Industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt of India(Base 2001=100).This index number is as applicable for the month four month prior to date of tendering.

For example, if the date of tendering falls in the month of December 2015, the applicable wholesale price index number for metal products (MP₀) and all India average consumer price index number (W₀) should be for the month of August 2015.

MP=Wholesale price index number for metal products. This index number is as applicable on the month, four months prior to the date of delivery.

W₀(D) = All India average consumer price index number for Industrial workers (Base 2001=100),as published by labour bureau, Ministry of Labour, Govt of India. This index number is as applicable for the month, four months prior to the date of delivery of manufactured material.

W₀(I) = All India average consumer price index number for Industrial workers,(Base 2001=100) as published by labour bureau, Ministry of labour, Govt.of India. This index number is as applicable for the month, four months prior to the date of completion of installation work.

The date of delivery is the date on which the manufactured material with its entire components are available at site and ready for inspection by Corporation Engineer or the contracted delivery date i.e. six month before the scheduled date of completion of the entire project whichever is earlier.

The date of completion of installation is the date on which the lift work is notified as being completed and ready for testing or two months before the scheduled date of completion of the entire project whichever is earlier.

Wholesale price index number for metal products is as published by the office of Economic adviser, Ministry of Commerce and Industry, Govt of India with Base = 100; Year 2004-05.

(SIGNATURE OF THE CONTRACTOR)

ANNEXURE “M”

MEASUREMENTS: - The measurement shall be recorded by the Corporation's Site Engineer or by an Engineer from Zonal Office /Divisional Office specifically authorized for the purpose in the Measurement Book (MB) Supplied By Corporation.(Refer Clause-21 with all its Sub-clauses of Conditions of Contract of the Tender(Part-I))

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

BASIC PRICE OF CEMENT at the Work-Site.

(Refer Clause No. 4.3 of the General Preambles to Schedule of Quantities).

Contractor's Quoted rates shall be Based on the BASIC PRICE of Cement at the work-site which includes purchase price of Cement, all Levies and duties such as Excise Duty, Sales Tax, Octroi/ Town duty, Transportation charges from the factory / stockfish's go-down to the work-site, loading and unloading charges at all points, transit insurance etc.

**A) Ordinary Portland Cement / Pozzolana
Portland Cement / Other Specified Cement**

Rs. 6600.00 / TONNE

BASIC PRICE OF STEEL at the Work-Site:

(Refer clause No. 5.3 of the General Preambles to Schedule of Quantities)

Contractor's QUOTED rates shall be based on the BASIC PRICE of Steel at the Work-Site which includes purchase price of Steel, all Levies and Duties such as Excise Duty, Sales Tax, Octroi/ Town Duty, Transportation Charges from the factory / stockiest go-down to the work-site including bending and binding charges at all points, Transit Insurance, Weighment charges, etc.

A) High Strength Deformed Bars or other specified reinforcing steel of all diameters in coil or in straight lengths	Rs. 35000.00 / TONNE
B) Mild steel bars of all diameters in coil or in straight lengths.	Rs. 35000.00 / TONNE

Note:

1. Packing of Cement (like gunny bags, polythene bags. etc.) cost of which is included in the purchase price, shall **BE THE PROPERTY OF THE CONTRACTOR.**

ANNEXURE - "Q"

STATEMENT SHOWING QUANTITIES OF THEORETICAL CONSUMPTION OF CEMENT
FOR MAJOR ITEMS OF WORKS

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
1.	PLAIN CEMENT CONCRETE WORK		
	A) Cement concrete (1:2:4)	Cu.M.	3.20
	B) Cement concrete (1:3:6)	Cu.M.	2.20
	C) Cement concrete (1:4:8)	Cu.M.	1.70
	D) Cement concrete (1:5:10)	Cu.M.	1.30
2.	DAMP PROOF COURSE		
	A) 25mm thick in C.C. (1:2:4)	100 Sq.M	8.0
	B) 38 mm thick in C.C. (1:2:4)	100 Sq.M	12.16
	C) 50 mm thick in C.C. (1:2:4)	100 Sq.M	16.0
3.	REINFORCED CEMENT CONCRETE WORK		
	A) R.C.C work in C.C. (1:2:4)	Cu.M.	3.20
	B) R.C.C. work in C.C. (1:1½ :3)	Cu.M.	4.00
	C) R.C.C. work in C.C. (1:1:2)	Cu.M.	6.10
	D) Providing and fixing precast R.C.C. (1:2:4) set in partition in CM 1:2 including finishing with cement plaster 1:3 of thickness not exceeding 6mm	Cu.M.	3.80
	i) Kerb, step and the like	Cu.M.	3.80
	ii) Copings, bed plates, Anchor blocks, window sills and the like	Cu.M.	3.80
	iii) Small lintels not exceeding 1.5m clear, coping, shelves and the like	Cu.M.	3.77
4.	A) Brickwork (all classes) In cement mortar 1:3		
	i) with modular thick	Cu.M	1.12
	ii) with F.P.S. brick	Cu.M	1.28

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	B) Brick work (all classes) in mortar 1:4		
	i) with modular thick	Cu.M	0.84
	ii) with F.P.S. brick	Cu.M	0.95
	C) Brick work (all classes) In mortar 1:5		
	i) with modular thick	Cu.M	0.68
	ii) with F.P.S. brick	Cu.M	0.78
	D) Brick work (all classes) In mortar 1:6		
	i) with F.P.S. brick	Cu.M	0.62
	E) Half Brick work (all classes) In mortar 1:3		
	i) with modular thick	100 Sq.M	12.75
	ii) with F.P.S. brick	100 Sq.M	14.28
	F) Half Brick work (all classes) In mortar 1:4		
	i) with modular thick	100 Sq.M	9.50
	ii) with F.P.S. brick	100 Sq.M	10.64
	G) Brick work 3" thick in cement mortar 1:3 with F.P.S. brick	100 Sq.M.	9.23
	H) Honey comb brick work half brick thick in C.M. (1:4)		
	i) with modular brick	100 Sq.M	5.54
	ii) with F.P.S. brick	100 Sq.M.	6.56
	I) Brick drip course at junction of roofs and walls in C.M. (1:4)		
	i) 10 cm thick with modular brick	100 M	0.84
	ii) 7.6 cm thick with F.P.S. brick	100 M	0.83
	J) Brick drip course at junction of rooms and walls in C.M. (1:6)		
	i) 10 cm thick with Modular brick	100 M	0.55
	ii) 7.6 cm thick with F.P.S. Brick	100 M	0.54

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	K) Providing brick band 5cm projected from wall face in C.M. (1:4)		
	i) 10cm thick 5 cm Projected with modular brick	100 M	0.42
	ii) 7.6 cm thick 5.7 cm projected with F.P.S. brick	100 M	0.41
5.	STONE WORK		
	A) Random Rubble masonry within foundations or superstructure in cement mortar 1:6 including leveling up with cement concrete 1:6:12 at plinth or sill or ceiling level	Cu.M.	0.85
	B) coarse rubble masonry in foundation and super structure in cement mortar 1:6	Cu.M.	0.75
	C) Stone work plain ashlar cyclopean, sunk or moulded and ashlar punched in cement mortar 1:6 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade.	Cu.M.	0.54
	D) Stone work plain ashlar cyclopean sunk or moulded arch, dome or circular moulded and curved columns in cement mortar 1:3 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade.	Cu.M.	1.07
	E) Stone work plain in coping cronies; string courses and plinth course in cement mortar 1:6 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade.	Cu.M.	0.54
	F) Stone work for wall lining etc. average thickness 40mm to 70mm in cement mortar 1:3 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade	100 Sq.M	8.75

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	G) 30mm thick sand stone shelves, fixed in walls in cement mortar 1:3 including finishing complete	100 Sq.M.	1.64
6.	FLOORING		
	A) Brick flooring in cement mortar 1:4	100 Sq.M.	11.02
	B) Brick flooring in cement mortar 1:6		7.25
	C) 25mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement		12.20
	D) 40mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement		17.00
	E) 50mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement		20.20
	F) 75mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement		28.20
	G) Cement concrete pavement (25mm to 50mm thick) with 1:2:4 including finished complete	Cu.M.	3.20
	H) 50mm thick cement concrete flooring with metallic concrete hardener topping, under layer of 40 mm thick cement concrete 1:2:4 and top layer 10mm thick metallic cement, hardener consisting of mix 1:2 by volume with metallic hardening compound of approved quality is mixed in the ratio of 4:1.	100 Sq.M	21.10
	I) 40mm thick cast - in situ m.m. flooring (28mm thick under layer and 12mm thick top layer)		
	i) Neutral shade with Grey cement	100 Sq.M	19.07
	ii) Light shade with white cement Grey Cement	100 Sq.M	8.10
	iii) Medium shades 50% Grey Cement	100 Sq.M	10.97
	White cement		15.02
	J) Pre-cast terrazzo tiles 22mm thick with marble chips of sized upto 6mm, laid in 20mm thick bed of cement mortar 1:6, cement slurry, jointing with gray cement		4.05

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	i) Light shade using White cement Grey cement	100 Sq.M	4.40 10.00
	ii) Dark shades (with Grey cement)	100 Sq.M	14.40
	K) Pre-cast terrazzo tiles 22mm thick with marble chips of sizes upto 6mm. In skirting on walls, laid on 12mm thick cement plaster (1:3) jointed with neat cement slurry.		
	i) Light shade using white cement Grey cement	100 Sq.M	2.20 13.94
	ii) Medium shade using 50% white cement & 50% grey cement. White cement Grey cement	100 Sq.M	1.10 12.84
	iii) Dark shades (with Grey cement)	100 Sq.M	16.14
	L) checkered terrazzo tiles 22mm thick with marble chip of sizes upto 6mm on 25mm thick bed of lime mortar jointed with neat cement slurry		
	i) Light shade using white cement Grey cement	100 Sq.M	4.40 12.90
	ii) Medium shade using 50% white cement & 50% grey cement. White cement Grey cement	100 Sq.M	2.20 15.10
	iii) Neutral shades (with Grey cement)	100 Sq.M	17.30
	M) White glazed tiles 5.5 mm thick in flooring, treads and risers of steps, skirting and dado on 12mm thick cement plaster 1:3 in base and jointed with white cement slurry etc. White cement Grey cement	100 Sq.M 100 Sq.M	2.50 9.42
	N) Marble stone slab flooring over 20mm thick base lime mortar and jointed with grey cement slurry etc.		
	i) 20mm thick	100 Sq.M	5.0
	ii) 30mm thick	100 Sq.M	5.12
	iii) 40mm thick	100 Sq.M	5.36

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	O) Marble stone slab flooring over 20mm thick base of cement mortar (1:4 and jointed with Grey cement slurry)		
	i) 25mm thick	100 Sq.M	13.51
	ii) 30mm thick	100 Sq.M	13.63
	iii) 40mm thick	100 Sq.M	13.87
	P) Extra if white cement slurry used instead of Grey cement slurry in joints of stone flooring. (White cement)	100 Sq.M	0.76
	Q) Marble tiles 25mm thick in riser of steps, skirting and pillars, laid on 12mm thick cement mortar (1:3) and jointed with grey cement slurry	100 Sq.M	12.34
	R) Kotah stone slab flooring over 20mm thick base of lime mortar and jointed with cement slurry etc.		
	i) 25mm thick	100 Sq.M	6.40
	ii) 30mm thick	100 Sq.M	6.80
	lii) 40mm thick	100 Sq.M	7.60
	S) Kotah stone slab flooring over 20mm thick base of cement mortar (1:4) and jointed with neat cement slurry etc.		
	i) 25mm thick	100 Sq.M	14.91
	ii) 30mm thick	100 Sq.M	15.31
	iii) 40mm thick	100 Sq.M	16.11
	T) Kotah stone slab 25mm thick in riser in steps, skirting dado and pillars laid on 12mm thick cement mortar 1:3 and jointed with neat cement slurry etc.	100 Sq.M	13.74
	U) 40mm thick sand stone flooring over 30mm thick base of cement mortar 1:5 with joints finished flush.	100 Sq.M	7.75
	V) 40mm thick sand stone flooring over 20mm thick base of cement mortar 1:5 including pointing with cement mortar 1:2 (1cement 2 stone dust)	100 Sq.M	9.31
	W) 40mm thick sand stone flooring over 20mm thick lime mortar including pointing with cement mortar 1:2	100 Sq.M	1.56

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	X) 40mm thick fine dressed and rubbed stone flooring over 20mm thick base of cement mortar 1:5 (1cement 5 sand) with joints 5mm thick finished flush.	100 sq.M	8.28
	Y) 40mm thick fine dressed and rubbed stone, flooring, over 20mm thick base of cement mortar 1:5 with joints 5mm thick including pointing with cement mortar 1:2 (1cement 2 stone dust)	100 Sq.M	9.84
7.	FINISHING		
	A) 12mm cement plaster 1:3	100 Sq.M	7.34
	B) 12mm cement plaster 1:4	100 Sq.M	5.47
	C) 12mm cement plaster 1:5	100 Sq.M	4.46
	D) 12mm cement plaster 1:6	100 Sq.M	3.60
	E) 15mm cement plaster 1:3	100 Sq.M	8.77
	F) 15mm cement plaster 1:4	100 Sq.M	6.54
	G) 15mm cement plaster 1:5	100 Sq.M	5.33
	H) 15mm cement plaster 1:6	100 Sq.M	4.30
	I) 20mm cement plaster 1:3	100 Sq.M	11.42
	J) 20mm cement plaster 1:4	100 Sq.M	8.51
	K) 6mm cement plaster 1:3 to ceiling	100 Sq.M	3.67
	L) 6mm cement plaster 1:4	100 Sq.M	2.74
	M) Neat cement punning	100 Sq.M	2.20
	N) 18mm cement plaster in two coats underlay 12mm cement plaster 1:5 finished with a top layer 6mm thick cement plaster 1:6	100 Sq.M	6.26
	O) 18mm cement plaster in two coats under layer 12mm cement plaster 1:5 finished with a top layer 6mm thick cement plaster 1:3	100 Sq.M	8.13

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	P) 12mm cement plaster 1:2 (1 cement 2 stone dust)	100 Sq.M	9.79
	Q) 18mm thick or artificial red stone plaster of 12mm thick under layer of cement plaster 1:4 with 6mm thick finishing coat of cement mortar 1:1:3 mixed with red oxide (1cement:1marble dust:3stone dust)	100 Sq.M	9.47
8.	POINTING	100 Sq.M	
	A) Flush or ruled or cut or Weather pointing on brick work with cement mortar 1:3	100 Sq.M	1.53
	B) Raised and cut pointed on brick work with cement mortar 1:3	100 Sq.M	2.04
	C) Flush or ruled pointing on stone work with cement mortar 1:3	100 Sq.M	1.17
	D) Raised and cut pointing on stone work with cement mortar 1:3	100 Sq.M	2.35
9.	MORTAR		
	A) Cement mortar 1:1	Cu.M	10.20
	B) Cement mortar 1:2	Cu.M.	6.80
	C) Cement mortar 1:3	Cu.M.	5.10
	D) Cement mortar 1:4	Cu.M.	3.80
	E) Cement mortar 1:5	Cu.M	3.10
	F) Cement mortar 1:6	Cu.M	2.50
10.	SANITARY INSTALLATIONS:		
	A) Fixing long pan or Orissa Pattern, squatting or pedestal type W.C pan	Each	0.025
	B) Fixing Flat back or wall corner type lipped front urinal basin	Each	0.01

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	C) Fixing sink or wash basin	Each	0.015
	D) Fixing Holder bat clamps for 100 / 75 / 50 mm dia sand cast iron pipes	Each	0.005
	E) Fixing sand cast iron trap	Each	0.025
	F) Providing and fixing G.I fittings and clamps including cutting and making good the walls etc. (Internal work)		
	Exposed Walls	100 RM	0.05
	15mm dia	100 RM	0.06
	20mm dia	100RM	0.07
	25mm dia	100 RM	0.075
	32mm dia	100 RM	0.08
	40mm dia	100 RM	0.08
	50mm dia		
	G) Concealed pipe including ceiling chases and making good the walls 15/20 mm normal bore	100 R.M	0.88
	H) 100 mm dia SWG pipes	100 RM	22.91
	I) 150mm dia SWG pipes	100 RM	26.01
	J) Fixing square mouth S.W Gully trap	Each	0.40
	K) Inspection chambers Inside size 0.75 x 0.75 x 1.00 m depth	Each	2.13
	L) Inspection chamber Inside size 1.20 x 0.90 x 1.00 m to 2.00 depth	Each	3.70
11.	MISCELLANEOUS		
	A) Lime concrete terracing average 10cm thick with 25mm brick ballast and 50% lime concrete 1:2 (1 Lime putty: 2 surkhi) rammed and finished with gur and belgri finished with gur and belgri treatment and covered with flat brick tiles grouted with cement mortar 1:3 over 12mm layer of cement mortar 1:3	100 Sq.M	6.63

Sl.No.	Description	Units	Quantity of cement per unit / Quantity of work in quintal
	B) Providing and laying average, 10cm thick cement based water proofing treatment with brick bat coba as per manufactures specification	100 Sq.M	(*)
	C) Providing and filling with waterproof brickbat cement concrete	100 Sq.M	(*)
	D) Rough cast or pebble dash plaster in two layers under layer 12mm cement plaster 1:4 and top layer 10mm cement plaster 1:3	100 Sq.M	11.59
	E) Plinth protection 50mm thick in cement concrete 1:3:6 over 75mm bed of dry brick ballast	100 Sq.M	11.0
	F) Brick edging 10cm wide 10cm deep to plinth protection including grouting with cement mortar 1:4	100 Sq.M	1.14
	G) Fixing of precast cement concrete jalli 1:2:4 in cement mortar 1:3	100 Sq.M	1.64
	i) 50mm thick		
	ii) 40mm thick		
	iii) 25mm thick		
	H) CC blocks for hold fasts	100 Nos.	1.10
	i) CC blocks for hold fasts for windows	100 Sqm.	1.30

(*) As specified by the specialist firm at the time of tendering

NOTE: For any other item of work, Site Engineer shall refer to the CPWD specification and norms. In case no coefficient is available for a specific item, the decision of Chief Engineer, shall be final and binding on the contractor.

ANNEXTURE I

LIFE INSURANCE CORPORATION OF INDIA
FORM OF GUARANTEE FOR WATERPROOFING

(To be given by Waterproofing Agency)

Name of the work: _____

Location & Approximate Area: _____

Name of the Main contractor: _____

Name of Water Proofing Agency

M/s. _____

We M/s. _____

_____ hereby guarantee that the surfaces treated by us for waterproofing in the above work, for

M/s. _____

the General builders Contractors for the above work, shall remain entirely watertight. 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 work i.e. from _____ to _____ the same shall be rectified by us without any cost to the Life Insurance Corporation of India. However, we shall not be responsible in any way if our work is tampered with or if the body of the structure is damaged due to sinking, cracking and/or by any other act of God. The intimation received from LIC of India during Guarantee period shall be deemed to have been received from Main Builder's Contractor and inspection as well as necessary work shall be carried out and reported upon by us forthwith.

Signature of Waterproofing Agency

Signature of the Main Builders' Contractor

ANNEXURE - "S"

LIFE INSURANCE CORPORATION OF INDIA
PROFORMA FOR REQUEST FOR PAYMENT TO CEMENT SUPPLIERS
BY LIC ON BEHALF OF CONTRACTORS

Dated: _____

(Refer clause 4.5 of General Preambles to Schedule of Quantities)

To,
CHIEF ENGINEER
LIC OF INDIA

Dear Sir,

Name of work:

1. The cement balance in stock as on day is _____ tonnes. It is expected to last upto _____. We now require _____ tonnes of additional quantity for the work upto _____. We shall be grateful if you arrange to place order and make payment of the cement to any one of the approved suppliers at approved rate on our behalf. We accept the responsibility of taking proper delivery of cement and all other responsibilities as per the relevant clause of tender referred to above.

NOT APPLICABLE

2. The order for transport of cement may also be placed on our behalf by you on any one of the approved transport agency at approved rate. The transport charges and octroi charges etc. shall be paid by us initially and the original bills/receipts produced to you later on for reimbursement.

3. We note that in case any quantity of cement is not delivered at site of work within reasonable time, the advance amount paid by you towards the quantity of cement to be supplied shall immediately be recovered from us from any amount due to us including Security Deposit lying with you.

Yours faithfully,

(SIGNATURE OF CONTRACTOR)

ANNEXURE - "T"

LIFE INSURANCE CORPORATION OF INDIA
**PROFORMA FOR REQUEST FOR PAYMENT TO
STEEL SUPPLIERS BY LIC ON BEHALF OF CONTRACTOR**

Dated : _____

(Refer Clause 5.5 of General Preambles to Schedule of Quantities)

To
THE CHIEF ENGINEER
LIC OF INDIA

Dear Sir,

Name of Work: _____

We now require the following steel for the work. The approximate balance quantity at site for the required categories of steel as on date and further additional quantities are mentioned below.

<u>Category of Steel</u>	<u>Balance quantity at site</u> MT	<u>Further quantity required</u> MT
--------------------------	---------------------------------------	--

NOT APPLICABLE

We shall be grateful if you arrange to place order and make payment for the steel to anyone of the approved steel suppliers on our behalf. We accept the responsibility of taking proper delivery of steel and all other responsibilities as per the relevant clause of tender referred to above.

1. The order for transport of steel may also be placed on any of the approved transport agency at approved rate on our behalf by you. The transport charges and octroi charges etc., shall be paid by us initially and the original bills/receipts produced to you later on for reimbursement.
2. We note that in case any quantity of steel is not delivered at site of work within reasonable time, the advance amount paid by you towards quantity of steel to be supplied shall immediately be recovered from us from any amount due to us including Security Deposit lying with you.

Yours faithfully,

(SIGNATURE OF CONTRACTOR)

SCHEDULE "A"

TO BE READ IN CONNECTION WITH ANNEXURE "P"

- a. Contractor shall note that although the materials and the basic prices for the same have been mentioned in this schedule, the responsibility of procurement of the materials shall rest with the Contractor.
- b. Contractor shall consider in his quoted rates for the relevant item/s the basic rate mentioned in this schedule. The basic rates for the items mentioned in this schedule are ex-work site and are inclusive of:-
 - i. Cost of material,
 - ii. All taxes levied by Central/State Government/Local Bodies, such as excise duty, sales tax, octroi/Town duty etc.
 - iii. Transportation including transit insurance from factory/suppliers/stockiest/ dealers go-down/ shop/depot including loading and unloading charges at all points except unloading at work site.
 - iv. All other expenses including wastage shall be to the Contractor's account and shall be included in his quoted rates.
 - v. **Contractor shall purchase those materials which basic price is mentioned in the tender items (other than cement and steel) in required quantities from the approved source after the Chief Engineer/Dy.Chief Engineer has approved the price of materials to be purchased.**
 - vi. Contractor shall produce the vouchers/bills in support of the material purchased and brought by him from the approved supplier.
- c. Storage and safety of the material shall be the Contractors responsibility.

ANNEXURE -U

(ON STAMP PAPER OF REQUISITE VALUE)

FORM OF GUARANTEE FOR ANTI-TERMITE

Name of the project:-

Location and Approx. plinth area:-

We hereby guarantee that the area treated by us for Anti-termite in the above work shall remain Termite-proof. Should, however, due to any reasons, there be any traces of termite within the area 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 Life Insurance Corporation of India.

Signatures of the Contractor

(ON STAMP PAPER OF REQUISITE VALUE)

FORM OF GUARANTEE FOR ANTI-TERMITE

Name of the project:-

Location and Approx. plinth area:-

Free Maintenance Guarantee-Anti-termite Work
by M/s _____

We, The.....hereby guarantee that the areas treated by us for Anti-termite in the above work, for M/s, the General Builders, contractors for the above work, shall remain termite-proof. Should, however, due to any reasons, there be any traces of termite 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 Life Insurance Corporation Of India.

The intimation received from the LIC of India during guaranty period shall be deemed to have been received from main contractors and inspection as well as necessary work shall be carried out and reported upon by us forthwith.

SIGNATURE OF ANTI-TERMITE AGENCY

SIGNATURES OF THE GENERAL BUILDER'S CONTRACTOR.

LIST OF PRINCIPAL / APPROVED MAKES FOR CIVIL WORKS

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
1.	GI PIPES	Jindal Zenith Apollo GST Prakash QST
2.	GI PIPES FITTINGS	R-Brand K.S. Brand Zoloto RR SSS NMC
3.	COPPER PIPES /TUBES	Rajco Metal Industries B.P. Conex Comap
4.	MULTI LAYER COMPOSITE PIPES	Ki-TEC Kisan Flowguard CPVC Astral
5.	PVC PIPES AND FITTINGS	Chemplast Prince Supreme Finolex Oriplast
6.	UPVC (UNPLASTICIZED PIPES & FITTINGS)	Prince Supreme Paras
7.	GATE VALVES, GLOBE VALVE	Leader Kirloskar Zoloto Orient
8	FOOT VALVES, CHECK VALVE	Kirloskar Leader Ashoka
9	WATER METERS	Capstan Anandaasahi Dasmesh Remco
10	FERRULES	Leader Hindco Neta Annapurna

SL. No.	ITEM	MAKES/ AGENCIES/ BRANDS
11.	BIB COCKS, STOP COCKS, PILLAR TAPS	Jaguar (Continental Series) Marc (Orient Series) Essco ARK GEM
12.	LOW LEVEL FLUSHING CISTERNS (PVC/CERAMIC)	Parryware Cera Hindware Commander
13.	VITREOUS SANITARY WARE LIKE WC, WASH BASIN, URINALS, EWC ETC	Parryware Cera Hindware Neycer
14.	PLASTIC SEAT AND COVER	Commander Parryware Bestolite Duroshine
15.	BATH ROOM FITTINGS	Jaguar (Continental Series) Essco GEM ARK Marc (Oriental Series)
16.	C.I. PIPES & FITTINGS	Hind BIS BIC Neco
17.	C.I. NAHANI TRAP	BIC SKF NECO RAJCO
18.	SW PIPES	HIND PERFECT BURNS
19.	PVC CABINET MIRROR	Commander
20.	SLUICE VALVE	Leader Kirloskar
21.	HDPE/LDPE/LLDPE WATER STORAGE TANKS	Sintex Polycon G & P

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
22.	CERAMIC / GLAZED TILES	Nitco Somany Kajaria Euro H.R. Johnson
23.	VITRIFIED TILES	Nitco Somany Kajaria RAK EURO
24.	PLY WOOD (BWR,BLOCK BOARD)	Kitply Archid Green Ply Century Ply Bhutan Ply Sharon Anchor Swastik National
25.	FLOAT GLASS	Saint Gobin Modi Guard Triveni Sheet Glass Indo Asahi Glass Co. Tata Atul
26.	PVC DOORS & DOOR FRAMES	Rajshri Sintex Supreme
27.	ALUMINIUM EXTRUDED SECTIONS	Hindal Jindal Indal Hindalco
28.	STAINLESS STEEL KITCHEN SINKS	Nirali Farnkee Jayna Diamond Neelkanth
29.	PRELAMINATED/ VENEERED PARTICLE BOARD	Novopan Green Lam Kitlam Archid Lam Swastik

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
30.	FLUSH DOOR SHUTTERS	Kutty Flush Door Century Green Ply Shiva Hari Plywood Ltd.(Corbett) Anchor Ply Swastik Ply Western India Parvathi Wood
31.	DECORATIVE LAMINATES	Green Lam Merino Sunmica/Formica Century Durian Sundek Anchor Decolam
32.	FLOOR SPRINGS	Everite Hardwyn Efficient Gadgets Garness Dormer
33.	VENEERS	Decowood Euro Veneers Durian Green Lam
34	MDF BOARDS	Duratuff Nuwood Century Novopan Kitply Green Ply
35	ADHESIVE	Fevicol SH Araldite Ciba Giegy Mowiool HV of Mafatlal
36	WOOD PRESERVATIVES	Bison Godrej Kot

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
37	HARDWARE FITTINGS	Jyoti Argent C.I.E.F. Classic Everite Metaco India JH Aluminium PV Radhakrishna Etalite Hardwin
38	DOOR CLOSER	Everite Hardwyn Efficient Gadgets Ebco Dorma Garness
39	DRAWER SLIDERS	Efficient Gadgets Ebco Etahoa Sisco
40	LOCK	Godrej Golden Efficient Gadgets Mark Sheet Vision Dorma
41	MIRRORS	Atul Sun Commander Modi Guard Saint Gobin Globe
42	WATER PROOFING COMPOUND	Impermo Cico Pidliite Roff Choksey Hindustan –Ciba Gaigey Accoproof Sika Fosroc

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
43	STEEL WINDOWS AND VENTILATORS	Agew Steel Mfg. Co. Ltd. Sen Harvic Hopes Diana Casement Madhu Industries Bangalore Multiwin Unique Metal Windows Ankur Industries Modern Fabricators
44	AC PIPES/SHEETS	Charminar Everest Visakha Orient Ramson
45	SPECIAL PROTECTIVE & DECORATIVE FINISH	Snowcem Paint Asian Paints Berger Jenson & Nicholson Kansai Nerolac ICI Godawari
46	OIL BOUND DISTEMPER	Asian Berger Jenson & Nicholson ICI Kansai Nerolac Godawari
47	CEMENT PAINT	Snowcem Plus Berger Asian Paints Jenson & Nicholson Kansai Nerolac ICI Godawari
48	SURFACE TEXTURE	Heritage (Bakelite Hylam Ltd.) Spectrum

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
49	TEXTURE PAINT	Snowcem India Ltd. Santex Matt Asian Jenson & Nicholson Berger Kansai Nerolac
50	ENAMEL PAINT PRIMERS/READY MIXED PUTTY FOR WOOD WORK , IRON & STEEL	Asian Berger Jenson & Nicholson Kansai Nerolac ICI MRF Godawari
51	WALL PUTTY	Birla wall Care Snowcem paints JK Asian paints
52	EXTERIOR EMULSION	Asian Paints - Apex Berger Paints Kansai Nerolac MRF Jenson Nicholson ICI Godawari
53	CEMENT CONCRETE PIPE	The Indian Hume Pipe Premier Pre-stressed Co.
54	EXPANSION JOINT BOARD	Shalimar Tar Products Lloyds Insulations Fosroc Shalitex
55	FALSE CEILING	India Gypsum Armstrong Daikin Insula QED Panels
56	VERTICAL BLINDS	Vista Levlor TRAC MAC Marvel

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
57	ADHESIVE FOR TILE FIXING	Roffe Balendura Cera Bond Fosroc Choskey Chemicals Dr. Fixit Sika Sunanda
58	PAVING TILES	Eurocon Ultra Duracrete
59	PVC FLOORING	Flora Armstrong
60	VINYL FLEXIBLE FLOORING	Wonder Floor Armstrong BHOR Rikvin Tusker
61	FIBRE GLASS DOORS	Master Craft
62	SS/CP FRICTION HINGES	Ebco Jyoti Everest Magnum
63	SOFT BOARD	Jolly Board
64	SCREW	Nettelefold GKW
65	FIBRE REINFORCEMENT COMP.DOOR	Loknath Unique

APPROVED MAKES OF MATERIALS FOR ELECTRICAL, FIRE ALARM & STRUCTURAL CABLING WORK

SR. NO	MATERIAL	MAKES		
		(a)	(b)	(c)
1	COPPER CONDUCTOR PVC INSULATED FR GRADE WIRES	(a) FINOLEX	(b) HAVELLS	© V GUARD
		(d) RRS		
2	PVC INSULATED ARMOURED CABLES (LT/HT)	(a)FINOLEX	(b) FORT GLOSTER	© CCI
		(d) RR KABLE	(e) DELTON	
3	MAIN SWITCH WITH HRC FUSES	(a) L & T	(b)SIEMENS	© GE
		(d) ENGLISH ELECTRIC	(e) STANDARD	(f) HAVELLS
4	MAIN SWITCHES WITH REWIRABLE FUSE	(a) L & T	(b) CROMPTON	© STANDARD
		(d) HAVELS		
5	MCCB	(a) SIEMENS	(b) L & T	© SCHNIEDER i MJ
		(d) LEGRAND		
6	MCB / ELCB / ELMCB / DB	(a) LEGRAND	(b) SIEMENS	© HAGGER
		(d) SCHNEIDER MJ		
7	CHANGE OVER SWITCH / SWITCH FUSE UNIT UPTO 100 AMP	(a) HPL	(b) L & T	© HAVELLS
		(d) STANDARD	(e) SIEMENS	
8	CHANGE OVER SWITCH / SWITCH FUSE UNIT ABOVE 100 AMP	(a) HPL	(b) L & T	© SIEMENS
9	RISING MAINS	(a) ENGLISH ELECTRIC	(b) GEC	© SCHNIEDER

SR. NO	MATERIAL	MAKES		
		(a)	(b)	(c)
10	PVC CONDUIT (ISI MARK)	(a) PRECISION	(b) AVON PLAST	© ESSARKE
		(d) SUDHAKAR	(e) KALINGA	(f) AKG
11	PVC CASING CAPING	(a) PRECISION	(b) KALINGA	© AKG
		(d) SUDHAKAR	(e) DIAMOND	
12	M.S. CONDUIT	(a) SUPREME	(b) BEC	© NIC
		(d) AKG		
13	FLOOR TRUNKING SYSTEM	(a) LEGRAND	(b) MK ELECTRIC	© PRECISION
		(d) MODI		
14	G.I. PIPE	(a) JINDAL	(b) SENITH	© PRAKASH
		(d) TATA	(e) GST	(f) APOLLO
15	MODULAR SWITCHES, ACCESSORIES & ELECTRONIC REGULATOR	(a) ANCHOR ROMA	(b) SSK	© LEADER
		(d) CRABTREE	(e) MK	
16	NON MODULAR SWITCHES, ACCESSORIES & ELECTRONIC REGULATOR	(a) ANCHOR	(b) LEADER	© SSK
		(d) CPL		
17	INDUSTRIAL PLUG & SOCKET	(a) LEGRAND	(b) HAVELLS	© CROMPTON
		(d) HAGGER	(e) STANDARD	
18	CEILING / EXHAUST / WALL FAN	(a) USHA	(b) CROMPTON	© ORIENT
		(d) BAJAJ	(e) ALMONARD	
19	INDOOR LIGHT FITTINGS	(a) PHILIPS	(b) WIPRO	© CROMPTON
		(d) GE		
20	OUTDOOR LIGHT FITTINGS	(a) PHILIPS	(b) WIPRO	© CROMPTON
		(d) GE	(e) K i LITE	

SR. NO	MATERIAL	MAKES		
21	CABLE GLANDS	(a) COMET	(b) DOWELLS	© BRACO
		(d) SIEMENS		
22	LUGS	(a) DOWELLS	(b) COMET	
23	CONNECTORS	(a) ELMEX	(b) CONNECTWELL	© PHOENEX
24	FLUORESCENT LAMP	(a) PHILIPS	(b) OSRAM	© CROMPTON
		(d) BAJAJ	(e) GEC	
25	COMPACT FLUORESCENT LAMP	(a) PHILIPS	(b) OSRAM	© HAVELLS
		(d) WIPRO		
26	MOTOR STARTER	(a) SIEMENS	(b) L & T	© CROMPTON
27	MONOBLOCK PUMP	(a) KIRLOSKAR	(b) CROMPTON	© CRI
28	LIGHTENING ARRESTOR	(a) PACTIL	(b) HECO	© ATLAS
		(d) G.K. ELECTRICALS		
29	TRANSFORMER			
(i)	UPTO 500 KVA	(a) PACTIL	(b) EMCO	© CROMPTON
		(d) KIRLOSKAR	(e) GEC	(f) TESLA
(ii)	ABOVE 500 KVA	(a) KIRLOSKAR	(b) GEC	©
30	A.B. SWITCH & D.O. FUSE	(a) PACTIL	(b) JENCO	© CROMPTON
		(d) ATLAS		
31	SELECTOR SWITCH	(a) KAYCEE	(b) SIEMENS	© C & S
32	INDICATING LAMPS	(a) VAISHNO	(b) ESSEN	© PHILIPS
	CONTACTORS	(a) SIEMENS	(b) L & T	© ABB
		(d) SCHNIEDER		

SR. NO	MATERIAL	MAKES		
33	MEASURING INSTRUMENTS	(a) AMP	(b) MECO	© AE
		(d) ENERCON	(e) PROK-DV&S	
34	PF IMPROVEMENT CAPACITOR & APFC PANEL	(a) EPCOS	(b) NEPTUNE	© L & T
		(d) CROMPTON		
35	RELAY FOR AUTOMATIC PF IMPROVEMENT	(a) EPCOS	(b) CONZERVE	© L & T
36	CURRENT TRANSFORMER	(a) AE	(b) RISHABH	© KUPPA
		(d) L & T		
37	DATA CABLES & FACTORY MADE PATCH CHORDS	(a) LEGRAND	(b) D LINK	© FINOLEX
		(d) MOLEX	(f) AMP	
38	INFORMATION OUTLET / RJ 45 CONNECTORS / RJ – 11 SOCKETS	(a) D LINK	(b) LEGRAND	© MOLEX
		(d) SYSTEMAX	(e) AMP	
39	TELEPHONE WIRES	(a) FINOLEX	(b) DELTON	© HAVELLS
		(d) RR KABLE		
40	RG 6 CABLE FOR TV	(a) FINOLEX	(b) DELTON	© NATIONAL
41	JACK PANEL	(a) D LINK	(b) LEGRAND	© MOLEX
		(d) SYSTEMAX	(e) VALRACK	(f) AMP
42	RACK	(a) VALRACK	(b) DIGITRON	© HCL
		(d) A LINK		
43	FIRE ALARM PANEL	(a) HONEY WELL	(b) CARMEL	© ZICOM
		(d) NOTIFIER	(e) MIRCOM/SE CUTRON	(f) MORLEY IAS

SR. NO	MATERIAL	MAKES		
		(a) APOLLO	(b) MORLEY IAS	© EDWARD
44	SMOKE / HEAT DETECTOR	(d) SYSTEM SENSOR	(e) HONEY WELL	(f) MIRCOM/SECUTRON
45	MANUAL CALL POINT / HOOTER/ RESPONSE INDICATOR	(a) HONEY WELL	(b) ZICOM	© NOTIFIER
		(d) SIMPLEX	(e) MIRCOM/ SECUTRON	(f) CARMEL

Note:

All Switch-gear and the Distribution Boards should be clearly marked with Red, Yellow, Blue and Black colour for phases and neutral. All busbar enclosures Angle iron frame and switch-gears should be painted with battleship grey oil paint. Danger and caution boards at appropriate places on main boards and Distribution Boards should be fixed. All controlling main switches on main boards and distribution boards should clearly indicate with white oil paint lettering the floor and section controlled by it. All equivalent alternative materials used on the job will have to be approved by Chief Engineer of LIC before it is actually used. If any item is installed without prior approval, the contractor will be asked to dismantle the installation and use materials as specified. The insulated wire used for concealed wiring shall be with Red, Yellow, Blue colour for respective phases, Black for neutral & Green for earth wires.

LIST OF PRINCIPAL / APPROVED MAKES FOR FIRE FIGHTING WORKS

Sl. No.	ITEM	MAKE
1	Pressure Boosting Terrace Pump	KIRLOSKAR / CROMPTON GREAVES / CRI
2	Hydrant (Landing) Valve. Conforming to IS-5290	NEW AGE / EVERS SAFE / MINIMAX / SAFE GUARD
3	Fire delivery hose-IS-636-type-B fitted with delivery hose coupling-conforming to IS-903	NEW AGE / EVERS SAFE/CRC / JAYSHREE
4	Short branch pipe universal-conforming to IS-2871	EVERSAFE / VIKING/GE / MINIMAX / NEWAGE / SAFE GUARD
5	Hose cabinet :	NEW AGE / EVERS SAFE / MINIMAX / SAFE GUARD
6	Isolation valve	KIRLOSKAR / LEADER / ZOOTO / ORIENT
7	Non-return valve	KIRLOSKAR / LEADER / ASHOKA
8	Fire service inlet	EVERSAFE /NEW AGE / MINI MAX / SAFE GUARD
9	First Aid Hose Reel Swinging Type:-	EVERSAFE / NEW AGE / MINI MAX / SAFE GUARD.
11	Piping	JINDAL / ZENITH / APOLLO / GST / PRAKASH / QST
12	Pressure Gauge	H GURU / DWYER / FIEBIG / INDFOS / DANFOSS
13	Butterfly Valve	AUDCO / DANFOSS / CASTLE
14	Fire Alarm Control Panel	HONEY WELL / NOTIFIER / MORLEY IAS / MICROM / SECUTRON / CARMEL / ZICOM
15	Manual call Point	HONEY WELL / ZICOM / NOTIFIER / SIMPLEX / MICROM / SECUTRON / CARMEL
16	Hooter	HONEY WELL / ZICOM / NOTIFIER / SIMPLEX / MICROM / SECUTRON / CARMEL
17	Connecting wire / Cable	FINOLEX / HAVELLS / V GUARD / RR CABLES.
18	PVC Conduit	AKG / PRECESSION / AVON PLAST / ESSARKE / SUDHAKAR / KALINGA
19	Carbon dioxide type portable fire extinguisher	EVERSAFE / FIRESHIELD / MINIMAX / CEASE FIRE
20	ABC type stored pressure portable fire extinguisher	EVERSAFE / FIRESHIELD / MINIMAX / CEASE FIRE
21	Water Co2	EVERSAFE / FIRESHIELD / MINIMAX
22	Amplifier battery backup. With microphone & AUX line.	AHUJA / PHILIPS
23	Speaker	AHUJA / PHILIPS

TECHNICAL SPECIFICATIONS FOR BUILDING WORKS

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

1. EARTH WORK

1. SITE CLEARANCE :

Contractor's rate shall cover for clearing the site of shrubs, brush wood, under growth and trees not exceeding 30cm. in girth measured at 1 meter above ground before commencement of work. The rubbish which may thus be obtained would be disposed off as directed.

2. BLOCK LEVEL PLAN:

Before starting earth work on site, the requisite block level of the entire site shall be taken by the contractor in consultation with Executive Engineer/Superintending Engineer of LIC of India. The record of levels shall be prepared and shall be jointly signed by the contractor and the Executive Engineer/Superintending Engineer countersigned by the concerned Dy.Chief Engineer of LIC of India. The copy of the said level sheet shall be sent to the Chief Engineer of LIC of India for record.

Excavation in trenches/overareas - Rates shall include for cartage of materials outside the/Contractor's own dump including all cost for transportation.

3. FILLING WITH APPROVED EXCAVATED EARTH:

The plinth and low laying areas on site shall be first filled in by approved excavated surplus earth, consolidated and quantity of filling measured. Before the item of filling with approved sand/soil brought from outside is operated, the contractor shall take prior permission of the Executive Engineer. The rate of Contractor shall include the filling of approved excavated earth, unless otherwise specified in description of item.

4. FILLING WITH APPROVED EARTH BROUGHT FROM OUTSIDE BY THE CONTRACTOR:

- a. Black cotton soil shall not be used for back filling. Soil used for filling shall be free from roots and vegetable moulds and shall be approved by the Executive Engineer.
- b. Earth for filling brought by the contractor from his own source from outside shall be of approved quality and from approved source.

5. METHOD OF EARTH FILLING:

Earth filling shall be in layers not exceeding 15 cms. (30 cms in case of site filling) thick, watered and thoroughly consolidated. All lumps clods are to be broken up so as to allow a regular subsidence of the work through out. The finished surfaces shall be formed to correct lines, levels, slopes, shapes, etc. as directed.

6. RATES OF EARTH/SAND FILLING BROUGHT FROM OUTSIDE BY THE CONTRACTOR:

Rates quoted shall include cost of earth, royalty, taxes, octroi, duties, all transport, plant and machinery required for carrying, handling, dumping and consolidation, labour, loading and unloading at all points, stacking, lead and lifts, dumping sectioning, dressing consolidation, making payments and deposits to all concerned (local and Government) authorities. Rates shall also include bailing out surface water due to rains or sub soil water if encountered and dewatering by pumps wherever required.

7. TEMPORARY DRAINAGE ARRANGEMENTS:

Adequate drainage arrangement must be made to provide katcha drainage at suitable intervals as directed by the Executive Engineer, so as to prevent flooding in the locality on account of filling, Some gaps may also be kept and suitable pipe drain or katcha culverts be provided so as to keep the area dry. No extra payment will be made for the temporary drainage arrangements so provided.

8. MODE OF MEASUREMENTS :

**i. (Mode of taking cross sectional areas :
(IN CASE OF FILLING OF LARGE AREAS)**

- a) Before commencing filling in the low lying site detailed cross sections shall be taken at every 5 mtrs or at suitable intervals, as may be required both ways as decided by Executive Engineer. For this purpose a base line shall be fixed along edge of the area and parallel cross sections lines will be fixed at every 5 mtrs. or suitable intervals along this base line. Levels shall be taken at sufficiently close intervals and at salient points along each of these cross section lines. In all cases leveling must precede filling. The cross section along which levels are taken will be permanently demarcated with their starting and terminal points to represent fixed chain age of their respective cross section. all further leveling for finding out quantities will be done on these cross sections only.

- b) In order to fix these base lines and cross section lines etc., before start of work the contractor shall provide the pillars for bench marks at his cost and maintain them till

completion of work and till final measurements are recorded. The said pillars for bench marks shall be 25 cms x 25cms brick masonry with plaster.

- c) After levels in a 5 mtrs. (or suitable intervals as may be decided) grid have thus been taken and jointly signed by the contractor and Executive Engineer the filling shall be commenced. The method of quarrying, conveying and filling is left to the contractor who shall however have to get the same approved by Executive Engineer before starting the work. The materials may be quarried by a bull dozer, shovel, etc., and conveyed by trucks to site.

- d) The final measurement of the filling will be with reference to the stipulated level as directed by the Executive Engineer only. Other measurements being treated as purely interim for part payment. Thus the final measurements will be for the quantity inclusive of consolidation that takes place till then.
 - e) The interim payments shall be based on the quantity of filling arrived at by cross sections used on average of existing Ground level and the top levels of filling under development of area. However, for final measurements the quantity of the earth filling should be worked out on sectional method.
 - f) The contractor shall carry out the filling in the area marked by boundary stones as and when directed. No payment shall be made for materials dumped in any other area without the knowledge and permission of the Executive Engineer.
- ii. Interim payments will be made by taking spot levels and thereby arriving at the average depth of filling which will be multiplied with area to arrive at cubical contents.
 - iii. The final measurement will be by section measurements using following formula:
 - A. Area of cross section = $d/3 \{(\text{first ordinate} + \text{last ordinate}) + 4 (\text{total of even ordinates}) + 2 (\text{total of odd ordinates})\}$ where d = Distance between the ordinates.

The above formula shall be used for odd number of ordinates.

Note: In case the numbers of ordinates are even, the area of last section shall be computed on the basis of average ordinate of last section.

 - B. Volume = $D/3 \{(\text{area of first section} + \text{Area of last section}) + 4 (\text{total of areas of even sections}) + 2 (\text{total of areas of odd sections})\}$

Where D = Distance between the Section.

NOTE: The above formula shall be used for odd number of sections. In case the number of section is even the volume of last section shall be computed by average method.
 - iv. **The net quantity of filling for payment shall be arrived at by applying five percent (5%) deductions from the total consolidated quantity of filling computed as above.**

2. CONCRETE WORK

GENERAL :

P.C.C shall mean Plain Cement Concrete.

R.C.C. shall mean Reinforced Cement Concrete.

R.M.C shall mean Ready Mixed Concrete

1. All concrete specified in this tender shall be ordinary mix./ Design Mix/ Ready Mix concrete.

2. MIXES OF CONCRETE:

Concrete used shall be in volumetric mix such as 1:4:8, 1:3:6, 1:2:4, 1:1.5:3, 1:1:2, etc. (Cement: Sand: Stone Chips) / Design Mix/ RMC such as M20, M25 etc.

3. WORKABILITY:

Workability of concrete should be controlled by direct measurement of water content, making allowance for any surface water in the fine and coarse aggregates. The slump test or compacting factor test shall be carried out at intervals as directed by the Corporation's Engineer. The slump test is suitable for slump of 5 cm. to 15 cm.

4. ALLOW IN RATES FOR CONCRETE ITEMS:

Apart from various factor mentioned elsewhere in the tender, rates quoted for all concrete items shall include for:-

- a) All labour, materials, use of equipments, tools and plants etc.
- b) All necessary operations for the proper volume batching, mixing, handling, transporting, placing, directed, hacking of concrete surfaces where they have to receive plaster (but the plaster on concrete surfaces shall be measured and paid separately under respective plaster items) etc.
- c) Pouring concrete around reinforcement for reinforced concrete work but reinforcement shall be measured and paid for separately, unless otherwise stated in the tender.
- d) Rates quoted for all concrete items shall include for concreting of structural members of any shape and sections as per drawings including providing slopes to slabs, beams, chajjas, canopies etc. wherever required. Form work shall be measured and paid separately.
- e) Allowing work of another agencies being carried out by them like laying conduits, boxes, pipes, clamps etc. as directed before laying concrete and coordinating with other agencies viz, electrical, sanitary ,air conditioning and ventilation Contractor and other agencies working on site.

- (f) Filling the bolt holes (of the shuttering) on concrete surface with cement mortar (1:3) and finishing the same as directed.

5. **FORM WORK:**

- a) Irrespective of what is stated in general specifications for builder's work, trade preambles for "CONCRETE", contractor's rates quoted for concrete items shall be exclusive of form work. Formwork for all concrete items shall be measured and paid for separately. Form work or shuttering shall be water tight and for all concrete of mix 1:2:4 and higher grades shall be of timber/Steel/Plywood unless otherwise specified. Area of shuttering in contact with concrete surface shall be measured for payment purposes.
- b) Unless otherwise stated, rates quoted for formwork shall include columns /slabs /beams etc. at regular floor heights upto 3.5 meter or at smaller heights as shown on the drawings.
- c) The materials used for shuttering, if not confirming to the specifications required for providing waterproof shuttering, shall be rejected.
- d) For the purpose of measurement of formwork for external side of external/end beams full heights from top of slab to bottom of beams shall be considered under formwork for the beams.

6. **ALLOW IN RATES FOR FORM WORK:**

Apart from various factors mentioned elsewhere in the tender, rates quoted for the formwork items shall include for:-

- a) All labour, materials, use of equipments, tools, nails, bolts, screws, Centering, oiling etc. required for formwork specified in the tender.
- b) All necessary operation for the proper erection and removal of the formwork when directed.
- c) For necessary provision in the formwork for forming holes and pockets for bolts, balusters, for taking out dowels bars, fan hooks and for other inserts in the concrete as shown including making provisions for other large size openings for doors/ windows/ ventilators/grills etc. in the walls.
- d) For formwork of any shape and sections as per drawings including providing necessary slopes, camber to slab, etc. wherever required.
- e) For necessary provisions in the formwork for forming chamfers, bands, splays, drip moulding, rounded or curved angles, chases, grooves, rebates, making notches, dowels etc. in the concrete wherever directed.
- f) For making construction joints and dummy joints as directed.

- g) Work involving plain or circular, straight or curved forms or in slopes etc. as directed.
- h) Sinking of formwork wherever shown on drawings.

7. CEMENT SHOULD CONFORM TO FOLLOWING STANDARDS (IS: 269-1976 / IS: 8114) / IS: 455:

a) FINENESS:

When tested for fineness in terms of specific surface by Blaines' air permeability method as directed in IS:4031-1968, the cement shall comply with the following requirements:

Type of Cement	Specific Surface Sq/Cm/g
Ordinary	Not less than 2250
Low heat	Not less than 3200

b) SOUNDNESS:

- b.1. When tested by the 'Le Chatelier' method described in IS:4031-1968, unaerated ordinary and low heat Portland cements shall not have an expansion of more than 10mm.
- b.2. In the event of the cement failing to comply with the above requirement, a further test shall be made by the 'Le Chatelier' method described in IS:4031 - 1968, from another portion of the same sample, after aeration, by being spread out to a depth of 75mm at a relative humidity of 50 to 80 % for a total period of 7 days, when the expansion of each of the two types of cements mentioned above, shall not be more than 5mm.
- b.3. Unaerated ordinary and low heat Portland cements having a magnesia content of more than 3 % shall be tested for soundness by autoclave test described in IS:4031-1968 and shall not have an expansion of more than 0.8%. However, if specified by the purchaser at the time of placing the order, cements having a magnesia content of less than or equal to 3%, shall be also tested for autoclave expansion as described in IS:4031-1968 and shall not have an expansion of more than 0.8%.

c) SETTING TIME:

The setting time of the cements, when tested by the Vicat apparatus method described in IS: 4031-1968 shall confirm to the following requirements:

	<u>Ordinary</u>	<u>Low heat</u>
i) Initial setting time in Minutes, not less than	30	60
ii) Final setting time in Minutes, not more than	600	600

- d) Compressive Strength: The average compressive strength of at least three mortar cubes (area of face 50 Sq.cm.) composed of one part of cement, three parts of standard sand (Confirming to IS: 650-1966) by mass and P/4 + 3 % (of combined mass of cement plus sand) water and prepared, stored and tested in the manner described in IS: 4031-1968 shall be as follows:

Kgf/SqCm.	Ordinary	Low Heat
a) 72 + 1h, not less than	160	100
b) 168 + 2h, not less than	220	160
c) 672 + 4h, not less than	-	350

Note 1: Standard sand shall confirm to IS:650-1966

Note 2: P is the percentage of water required to produce a paste of standard consistency.

8. WATER PROOFING COMPOUND:

Cement water proofing compound wherever mentioned in the items shall be "IMPERMO" manufactured by M/s SNOWCEM (India Ltd.) , 2% by weight of cement or "CICO" waterproofing compound manufactured by M/s STRUCTURAL WATERPROOFING Co. Pvt. Ltd., Kolkata, 3% by weight of cement or other equal and approved as per Manufacturer's Specification and rates quoted shall include for the same (As per approved materials).

9. MATERIALS: ALL MATERIALS SHALL BE OF APPROVED QUALITY.

10. AGGREGATES:

Aggregates shall conform to IS:383/1970 and IS:2386-1963 and shall be from approved sources.

11. LOADING OF FLOOR SLABS:

Materials shall not be stored or stacked on suspended floors and roofs without the Corporation's Engineer's prior approval.

12. WATER :

Water used for both mixing and curing shall be potable and free from injurious amounts of deleterious materials which are likely to affect the strength or durability of concrete. Water containing any sugar shall not be allowed for use. Also, water which fails to satisfy the following requirements shall be not be used

- a. To neutralize 100 ml. sample of water, it should not require more than 5 ml. of 0.2 normal HCL.

- b. To neutralize 100 ml. sample of water, it should not require more than 25 ml. of 0.02 normal H_2SO_4 .
- c. Water should not contain solids in excess of the following :-

Organic	200 mg/ltr.
Inorganic	3000mg/ltr.
Sulphate (as SO_4)	400mg/ltr.
Chloride (as Cl)	2000mg/ltr. (for P.C.C)
Chloride (as Cl)	500 mg/ltr. (for R.C.C)
Suspended matter	2000mg/ltr.

The PH value of water shall be between 6 to 8.

13. SAMPLES AND TEST:

Every facility shall be provided to enable the Corporation's Engineers to obtain samples and carry out test on the materials of construction, if these tests show that any of the materials of construction do not comply with the requirements of this specification, the Contractor will be responsible for the cost of the tests and the replacement of the defective materials and/or construction.

14. REJECTED MATERIALS:

All materials which have been damaged contaminated or have deteriorated or do not comply in any way with the requirements of the specifications shall be rejected and shall be removed immediately from the site at the Contractor's own expense.

3. BRICK WORK

1. Nominal Size of brick shall be 250 x 125 x 75 mm. from approved source. Bricks shall be well burnt first quality, having regular shape with sharp corners, edges and should stand all tests as required by I.S.I. specification. One brick wall shall be considered as 250 mm thick, half brick thick shall be 125 mm thick and brick on edge shall be 75 mm thick.
2. The brick should have minimum crushing strength of 75 kg per sq.cm.
3. The rates quoted shall include for all work like those in walls, jambs, pillars, mullions, steps, kerbs or thresholds, corbels, nibs and raking out joints, cutting, scaffolding and curing.
4. The rates quoted shall also include for recesses, cutouts etc., in brick work for electrical/plumbing works if required.
5. Sand for masonry mortars shall be as per I.S. 2116-1965 as applicable to unreinforced brick work.
6. For exposed brick work, selected and approved facing, bricks shall be used having uniform colour, size and sharp edges. Faces of bricks shall be protected from staining by cement mortar splashing.

4. STEEL AND IRON WORK

1. Rates for M.S. Door and window frames shall include for fabrication, cutting and bending to required size and shape, drilling, punching, counter sinking, welding, filling etc. finishing, erecting, fixing in position and all concrete work for grouting/ embedding wherever required including painting. Concrete for grouting/embedding shall not be considered in the measurement of the weight and shall not be paid separately also.

SPECIFICATION FOR PRESSED STEEL DOOR FRAMES:

I. MATERIAL:

- a. Steel door framed shall be manufactured from commercial mild steel shall be 1.25mm thickness conforming to I.S.:435±-1976.
- b. Steel door framed with or without fan light shall be made in the profiles described which may be manufactured to suit doors of either and, opening inwards or outwards as directed by Engineer-in-Charge.

II. CONSTRUCTION:

Each door framed shall consist of hinges, jamb, lock jamb, head and if Required, angle threshold. The whole shall be welded or rigidly fixed together by mechanical means. Where no angle threshold is required, temporary bar tie shall be screwed to the feet of frames in order to form rigid unit. Where no specified base ties shall be pressed mild steel 1.25mm thick adjustable to suit floor thickness of 35 or 40 mm and removable, or alternatively, threshold shall be provided for external frames

FABRICATION: The fixing lugs there shall be 3 adjustable lugs with the split and tail to each jamb without fan light, and 4 for jamb with a light. The head of the fixing lugs shall be of one of the following lengths.

- i. 95mm long for use with profile A.
- ii. 120mm long for use with profile B.
- iii. 160mm long for use with profile C.

The head shall be made from flat steel strip 25mm wide and not less than 1.6 mm thick. The tail of the locks shall be 200mm long and shall be made to steel strips not less than 40mm wide and not less than 3mm thick.

Hinges 100mm mild steel butt thickness shall be used. For frames for door shutters width less than 90 cm. 3 hinges shall be welded to one jamb for single shutter. For frames for door shutters width more than 90 cm. 4 hinges shall be welded to one jamb for single shutter. 3 hinges of each jamb of framed shall be welded for double shutters.

In all cases the hinges, shall be fixed, that the distance from inside of the head rivet to the top of the upper hinges and the bottom of the lower, to floor is about 175 mm.

Hinges shall be made of steel 2.5 mm thick with a zinc coated removable pin of 6mm dia. The space between the two leaves of the hinge when closed shall be 3 mm and the leaf that is not welded to the frame shall have for counter sunk holes to take No. 10 wood screws.

MORTAR GUARDS:

Mortar guards as instructed by Engineer-in- charge shall be provided. These shall be welded to the frame, at the head of the frame for double shutter doors to make provision for bolts.

LOCKS STRIKE PLATE:

There shall be an adjustable lock strike plate of Steel, complete with mortar guard, to make provision for locks or latches complying with the relevant Indian Standards. Lock strike plate shall be of galvanized mild steel and fixed at 95 cm from the head of the frame.

SHOCK ABSORBERS:

For side hung door shutters, there shall be not less Than buffers of rubber suitable material inserted in the holes in the rebate and one shall be located on the CENTRE line of the lock strike plate and other two at least 45 cm. above and below the centre line of the lock strike plate. For double shutter doors, there shall be two buffers of rubber or similar suitable material inserted in holes in the rebate in the lock jamb only at the head and spaces 15 cm. at either side of the centre line of the door.

FINISH :

The door frame shall be either hot drip galvanized or painted or as specified. The surface shall be thoroughly cleaned, free of dust, mill-scale dirt, oil etc. Either by mechanical means, for example, sand or shot blasting or by chemical means such as picking and then painted or galvanized as directed by Engineer-in-charge.

After pre treatment of the surface one coat of steel primer (Zinc Chromate) and two coats of enamel paints as directed by Engineer-in-charge shall be applied to the exposed surface.

MEASUREMENT:

The length shall be measured in running meter correct to a cm. out to out of the frames.

RATE:

The rate shall include the cost of labour and material involved in all the operation described above including one coat of approved steel primer (Zinc Chromate) and two coats of enamel paint etc., complete as directed.

5. WOOD WORK AND JOINERY

1. Unless otherwise specified, rates quoted shall include for cost of copper oxidized iron butt hinges heavy quality extruded section, 3 nos. 100 mm size per shutter of doors and 2 Nos. 75 mm size per shutter of windows and ventilators with mild steel pins and copper oxidized screws. Hardware other than the hinges shall be paid separately.
2. Unless otherwise specified, rates quoted shall include for clear sheet waveless glass of approved make such as Triveni, Modi, Asahi or other Equivalent.
3. Doors shall be painted with 3 coats of synthetic enamel paints (First quality) of approved colour and shade including suitable primer. Although 3 coats of paints are specified, Contractor will have to do additional coats of paint, if well finished surface is not obtained to the satisfaction of the Superintending Engineer, Executive Engineer and there shall be no extra payment on account of this.
4. Panel inserts for door shall be both side commercial veneered particle water proof quality bonded with phenol formaldehyde synthetic resin adhesive and conforming to I.S./3097:1980.
5. Timber in contact with masonry or concrete shall be coal tarred or creosoted before fixing and rates quoted shall include for the same.
6. Rates quoted for wood work and joinery shall include for rebates, joints, chamfers, molding, grooves, beads laps, rounded angles, notches, nails, screws, pins, anti-termite treatments etc.
7. Hardware for doors and windows shall be of approved make, all hardware shall be fixed with screws to match the hardware and rates quoted shall include for the same.
8. For factory made door shutters B.W.R. ply used as panel insert should confirm to I.S.: 303-1989.
9. All internal doors shall be provided 2 coats/or more if necessary at Synthetic enamel painting over a coat of primer.
10. Rate quoted by the contractor shall allow for above factors, all labour charges, all taxes and conveyance excluding cost of fixtures only.
11. Prime cost of item : Contractor shall purchased in the open market at competitive rates and fix in position hardwares, fixtures and fittings for doors etc., such as door handles, tower bolts, aldrops, night latches, door stopper, safety chain, magic eye etc., of quality size and make approved by the Chief Engineer or his authorised representative, Contractor shall quote in item the percentage

amount he would charge over the actual cost of the material and fixing them in position (Contractor will be paid the actual cost of materials, supported by vouchers plus percentage amount over it as per the quotation in this item.

A set of the approved samples shall be lodged with the Chief Engineer until the completion of the work. The rates for the purchase of materials must be competitive. In case the Chief Engineer is able to obtain the quotation in the open market for any material similar in specification to the one obtained by the Contractor as per vouchers produced by him, then the Contractor will be paid only according to the competitive rates obtained by the Chief Engineer plus percentage amount over it as per this item and not according to the Contractor's claim. Hardwares for doors and windows shall be approved make and shall be fixed with required screws to match the hardware and rates quoted shall include for the same.

12. Flush doors shall be solid core ISI marked.
13. Factory makes panel door shutters as per IS: 1003 made from approved hard wood duly kiln seasoned as per IS-1141, chemically treated as per IS-401.

6. FLOORING AND FINISHING

1. Plain or colour cement tiles and terrazzo tiles shall be manufactured as per latest version of I.S.:1887/195¹ using gray or white cement and pigments and marble chips of sizes as required. Tiles shall be of size 250 X 250 X 20mm (10" X 10" X 7/8") or any other approved size. Thickness of wearing layer of the tiles shall not be less than 8 mm. Tiles shall be of approved colour, shade and make. A few approved samples of tiles is to be used shall be deposited by the Contractor in the office of the Corporation's Engineer.

2. White Glazed earthen ware tiles shall be of first quality as per our approved material list enclosed:-

	<u>Minimum</u>	<u>Maximum</u>
a. Glazed	- 5 mm. :	7mm
b. Ceramic	- 6 mm. :	8mm

3. **KOTA STONE** : Kota Stone specified in the item shall be got approved from Chief Engineer. At its thinness part, no stone shall be thinner than minimum thickness specified in the tender item. Kota Stone used in the work shall be hard, sound, durable, resistant to wear. It shall be cut to shape and size as directed. Rough Kota stone shall have plain surface.

For machine polish Kota Stone, the exposed surface of the stone slab shall be machine polished, having smooth even and true plane. The stone slab shall be without any soft veins, cracks or flaws and shall have uniform colour. Kota stone for flooring, skirting, trade and risers shall have even natural surface free from broken flakes on top and shall be machine cut, edges shall not be marred by careless dressing of slab.

TOLERANCE:

The thickness or slab shall be as specified in the description of item. Tolerance of plus minus 2mm shall be allowed for the thickness. In respect of length and breadth of slabs, a tolerance of plus minus 5 mm. is allowed.

4. Cement Waterproofing Compound wherever mentioned shall be " IMPERMO" manufactured by M/s Snowcem (India) Ltd., 2% by weight of cement or CICO water proofing compound manufactured by M/s. Structural Water roofing Company Pvt. Ltd., Kolkata, 3% by weight or Cement or other equal and approved as per manufacturer's specification. The rates quoted shall include for the same.
5. Terrazzo / Marble mosaic/Ceramic/Kota/Kudappa/Shahabad/Tandur Stone/ Glazed tile in flooring, skirting, dado, treads and risers shall be laid as described in the schedule.
6. Rate quoted in the tender shall allow for above factors with all cost of labour, materials, taxes, conveyance, royalties, T&P etc., complete.

7. Internal Cement plaster to brick walls, columns, beams, lintels etc., shall be 12mm thick. R.C.C. slab soffits shall have cement plaster not less than 6mm thick. External cement plaster shall be 20mm thick in two coats (Under coat 12mm thick and finishing coat 8mm thick. except for R.C.C. members not flush with brick work which shall be 12mm thick in 2 coats (Under coat 8mm thick and finishing coat 4mm thick) such as R.C. facials, chajjas, canopies, drop walls, beam ribs, projected slabs etc. the rates quoted for plastering and finishing items shall include for Jambs, sills, drip moulds, bands, forming grooves, chambers, curved Angles, arises etc., and such other projections, which shall not be measured separately and paid for.
8. Rates quoted for painting and colour washing etc., shall include for providing shade or approved colour.

In case of painting, white washing and colour washing items, although number of coats are specified, Contractors will have to do additional coats if well finished surface is not obtained to the satisfaction of the Executive Engineer and there shall be no extra payment on account of this.

Sand for mortar bedding for floors shall be from approved source and shall conform to I.S. 2216-1965 as applicable to unreinforced masonry works.

Sand for plaster shall be from approved source, and shall conform to I.S. 1542-1977 as applicable to internal walls and ceiling plastering and external wall plastering.

SPECIFICATION FOR SAND FOR PLASTER (IS:1542-1977):-

Table - I Grading of sand for internal wall or external wall or ceiling plaster:

SIEVE OF NOMINAL APPERTURE SIZE [See IS:460 (Part-I)-1978*]	<u>PERCENTAGE PASSING</u>
9.50mm	100
4.75mm	95-100
2.36mm	95-100
1.18mm	90-100
600 micron	80-100
300 micron	20- 65
150 micron	00- 15

NOTE : For crushed stone sands, the permissible limit on 150 micron nominal aperture size sieve is increased to 20% allowance permitted in

4.1 applying to other sieve size.

* specification for test sieves: part - I wire cloth test sieve (second revision).

7. WATER PROOFING

GENERAL :

Specifications, as applicable for the trades and as given elsewhere in the tender are applicable in Toto except where otherwise mentioned in following pares or in the working of items. The rates quoted shall cover for complying with the same. Respective Trade Preambles wherever applicable shall apply to this section also.

The water proofing work shall be got executed from one of the specialist agency, names of which are given below or any other agency as approved by the competent authority, as per their specification under the overall supervision of the main builder's contractor. Rates quoted by the main Builder's contractor shall include for the waterproofing treatment through the water proofing agency and will cover for all over heads and profits.

Name of Specialized agencies:

a) M/s Kolkata Water proofing Co (b) M/s Asian Water Proofing Co, Ranchi (c) M/s New Asia Co. (Bangalore), Chennai & (d) M/s A.K Associates, Cuttack.

7.1 CRAZY MARBLE MOSAIC FLOORING/TOPPING ON TERRACES :

Work of Crazy Marble Mosaic tile topping on terraces shall be as given in the specification for Builders' work. Rates quoted shall include for the following factors also:

- a) Tile pieces shall be laid on screed of lime mortar 1:3 (1 lime: 3 sand) or Cement mortar 1:6, 20 mm thick (average) and floated in neat Cement slurry in required levels and slopes in crazy fashion.
- b) The joints between the pieces shall not exceed 3 mm. In width and shall be solidly filled with Cement mortar 1:3 mixed with waterproofing compound and finally flush pointed on top with neat Cement mixed with waterproofing compound.
- c) Cement waterproofing compound shall be as manufactured by one of the manufacturer/s as per the attached list and as per manufacturer's specification and shall be added to mortar bedding and Cement floating coat.
- d) The junctions of the topping/paving and the parapet wall shall be rounded/coved to be 75 mm radius and the topping/paving shall be extended up to the parapet wall for 15 cm. The top edge shall be finished in a neat horizontal line and tucked in a groove in a groove in the wall. Bell mouths around rain water pipe inlets etc. wherever required for effecting drainage, shall be formed in crazy marble mosaic tile-piece finish. Necessary channels/ dishing as required shall be also formed.
- e) After the toping/paving has been lad as required or the day's fixing work is completed, the surplus Cement grout that may have out of the joints on compacting shall be cleaned off.
- f) Proper slopes shall be imparted to the finished surface to drain off the rain water easily without any stagnation anywhere on the finished surface.
- g) Bitumen painting of slab shall extend upto parapet/curb/up stand for 150 mm.

- h) Necessary rounding/coves near parapet/curb/up-stand shall be done and junction made leak proof
- i) Dishing near rain water outlets.
- j) Preparation of channels as required.

7.2. **MEASUREMENTS :**

Measurements for Lime Concrete as well as for crazy marble mosaic flooring/topping on terrace shall be only the respective flat area in plan of the terrace between the exposed internal faces of parapet walls/curbs/up stand portions. Cover/rounding etc. shall not be measured. While measuring the average thickness mentioned in the item, thickness of rounding/coves near the parapet walls/curb and the portion carried over the in the parapet wall shall not be considered.

- 7.3. Wherever the R.C.C. and brick corbelling courses are required to be provided on the same terrace floor, they shall be in line and level with each other.
- 7.4. The Contractors shall ensure water tight/leak proof construction. The Contractors, if they so desire may carry any further (in addition to the waterproofing treatment specified above) for waterproofing of surfaces as considered necessary by them, however the rates quoted by them for the items shall be amount shall be paid for the same.

7.5. **WATERPROOFING- "CETROOF" TREATMENT:**

(CEMENT BASED WATERPROOFING TREATMENT THROUGH SPECIALIST AGENCIES)

I. TERRACE WATERPROOFING :

Terrace waterproofing shall be "CETROOF SURFACE TREATMENT" (Permanent waterproofing treatment) by one of the Specialized Agencies mentioned in the list attached and shall be as per their Specification and shall be under Guarantee of 10 years against leakage.

This treatment shall start directly over R.C.C. slab and shall include for providing and laying of brick bat coba with necessary gradient for the easy flow of water. This coba shall be done in special waterproof mortar and shall be finally covered with "CETROOF" waterproof joint less plaster, finished smooth with trowel in grey cement colour, marked into 30 X 30 cms. False squares. The treatment shall be carried along the inside of parapet or other adjoining walls upto a height of about 300 mm. In the shape of round vata (rounding off). The surface provided shall be hard; and tough, suitable for all normal domestic purpose. Rate quoted shall include for making round vata and also for tucking the treatment on the vertical face of the parapet at required height including making necessary groove in the parapet for tucking. Rate quoted by the Contractor shall include for the above waterproofing treatment of Specialized Agencies, with all overhead and profits.

MODE OF MEASUREMENT FOR CETROOF TREATMENT OVER TERRACE:

Unless otherwise specified in the item in Schedule of Quantities, flat area covered between inside of the parapet wall (unfinished) shall be measured.. To this the area of the vertical surface treatment calculated by taking the inside perimeter of the parapet wall and the height of treatment over parapet wall measured from finished horizontal "CETROOF" treatment shall be added. In case the treatment is continued over the horizontal portion of the parapet on top, the same shall also be added to the areas calculated as above.

II. TOILET WATERPROOFING:

Toilet waterproofing by approved specialist firm under guarantee of 10 years.

- a) The main contractor shall while the concrete is still green, carry out smooth cement punning in thin layer to the bottom of side of sunk portions at the time of concreting of the slab.
- b) The brick bats from well-burnt bricks of about 40 mm. Size completely saturated with water shall be used for filling in sunk portion of toilets including space around W.C. pan.
- c) The surface of sunk portion where waterproofing is to be done shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and dusted off. The cleaned surface shall be treated with neat cement slurry admixed with acrylic waterproofing compound to penetrate into services and fill up all porosities in the surface. The cracks observed, if any, in the slab shall be appropriately treated.
- d) After treatment at II (c) above, brick bats fully saturated with water shall be laid in position within layers of cement mortar 1:1 duly admixed with acrylic water proofing compound. The topmost layer of brick bat shall not be covered with cement mortar.
- e) Treatments at and II (g) shall follow except that top layer will be 12 mm. Thick and finished.
- f) This item shall be carried out after nahani traps, W.C. pan, all pipes are laid in position and are duly jointed. The treatment shall be worked well around the nahani taps. "P" or "S" traps, pipes and their joints, holes made in the walls shall also be treated suitable.
- g) 12 mm. Thick waterproof plaster in cement mortar 1:4 with acrylic waterproofing compound shall be carried out upto proposed height of dado in the toilets. Before carrying out waterproofing treatment on the wall, the wall surface shall be thoroughly cleaned and the joints of brick work shall be raked out if required treatment of Cement slurry admix with acrylic waterproofing compound be carried out to the wall. Junction of wall and top of slab/beam shall be treated with cement slurry with acrylic, W.P. compound by injection method.

h) MODE OF MEASUREMENT :

- a) The filling of waterproof brick bat coba in sunk floors of toilet blocks shall be measured in Cu.M. as actually laid at site to the required level.
- b) Waterproofing plasters treatment to floor and walls of toilet block above the sunken slab/beam shall be measured separately in Sq.M. as actually provided at site over the required areas.

III. RATES TO INCLUDE:

- a) Contractor shall obtain a guarantee for a period of 10 years from the Specialist Agency carrying out the work and shall be jointly responsible for any defects noticed in the work during the above period. Rate quoted shall include for the same.
- b) Rates quoted by the Main Builder Contractor shall include for the above water proofing treatment by one of the Specialized Agencies with all overheads and profits to execute the work and no extra will be paid.
- c) Rates quoted by the Contractor shall also allow for the leakage test to be carried out as stated below. Any leakage/dampness noticed shall be rectified by the Contractor at his won cost.

IV. Waterproofing work shall be guaranteed for then years in approved proforma (see Annexure "R" attached herewith) acceptable to the Employer, on a stamp paper of required denomination. This guarantee will be given by the Specialist agency carrying out the work directly to LIC of India and counter signed by the Main Builder's Contractor and furnished to LIC of India as soon as the work is virtually completed and before the final bill is settled.

Although the waterproofing work is guaranteed by the Specialist Agency for 10 years, the Main Builders' Contractor shall be responsible, if at any time during the defects liability period, the surfaces treated for waterproofing by the Specialist Agency given way to the inadequacy of the work carried out or used or for any other reason what so ever relating to materials, workmanship etc. and shall be liable without any extra cost and inconvenience to the Employer or the occupants to carry out the necessary remedial measures as and when required during Defect Liability Period.

V. LEAKAGE TESTS:

(Applicable to all types of waterproofing treatments to terrace and toilet blocks).

After completion of waterproofing work of terraces as well as toilet blocks, the leakage test shall be carried out by impounding the water 75mm. to 150 mm. deep, over the surfaces treated for a period of 10 days, without any extra cost.

"Joint inspections shall be carried out by the Contractor daily with LIC of India's representative to find out leakage/dampness of the surface if any. In case, any leakage/dampness is noticed, the same shall be rectified by the Contractor without any extra cost to LIC. Rates quoted by the Contractor shall allow for the above test also.

8. ALUMINIUM DOORS, WINDOWS AND VENTILATORS

1. Aluminium alloy section shall be as per LIST OF PRINCIPAL/APPROVED MAKES
2. All aluminium work shall be free from defects impairing strength, appearance and shall be of the best available quality for the purpose specified. All aluminium alloy sections used in the fabrication shall be of heavy quality, sturdy, extruded sections to withstand wind pressure of high intensity, other forces and day to day handling and shall be free from rattling, leakage, etc-all conforming to latest versions of IS-733-1956 and IS-1285-1958 for "Specifications for wrought Aluminium, Anodised Aluminium alloys, bars, rods and sections and extruded round, tube and hollow sections (for General Engineering Purposes only)."
3. Anodic coating shall be of minimum thickness of 15 microns. Anodising shall be of mat finish natural/coloured as specified, conforming to latest version of IS-1868-1968. Anodising shall be carried out on all exposed faces. Surfaces in contact with masonry, concrete, plaster or any other dissimilar materials shall be coated with Zinc chromate primer conforming to IS-104-1950. Further the contractors shall cover all anodised, finished work with a thick layer of clear, transparent laquer, based on methacrylates or cellulose butyrate to protect the surfaces from wet cement during installations. This lacquer coating shall be removed on completion. if necessary, the contractors shall provide for visits to his workshops where the manufacture of members, anodising, etc are being carried out by him.
4. Contractors shall commence manufacturing Doors, windows, ventilators, etc. only after the shop drawings showing full size sections, thickness of metal, detail of construction, hardware, etc. are approved by the Chief Engineer.
5. In case any modification in size, thickness and weight are required to any members of Doors, windows, ventilators, etc. same shall be carried out by the contractors and suitable adjustment shall be made on the basis of relevant tender items.
6. The Chief Engineer reserves the right to delete any or all items of this trade and allot the work under this head to any specialized agency/agencies. No claim whatsoever shall be entertained on this account.

7. HARDWARE :

Hardware shall be of best quality extruded section and shall be of anodised Aluminium with natural/Bronze finish. Hinges shall be of heavy pattern with stainless Steel pins and nylon/stainless steel washers. Contractor's rate shall include for necessary Screws, Bolts and other devices for neat and secure hardware arrangement. The bolts and wood screws etc. shall be cadmium plated brass, sheet metal screws wherever used shall be GKW or equivalent approved, of required size to securely and permanently fix the hardware in place. No steel or iron screws shall be used.

8. **GENERAL :**

All the manufactured Doors, windows, ventilators, etc. shall be stacked on site under cover. Damaged surfaces with defects like scratches, etc on finished work shall not be accepted. Fabricated materials shall be created in an approved manner to protect the material against any damage during transportation. Loading and unloading shall be carried out with utmost care. The Doors, windows, ventilators, etc. on arrival at site shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged pieces/parts. Materials found to be acceptable on inspection only shall be used.

9. The frames shall be square and flat and corners of the frames being fabricated to true right angles. Both the fixed and opening frame shall be of sections which have been cut to length, mitered and mechanically jointed and/or electrically welded at corners as required for satisfactory performance. Subdividing bars shall be toned and riveted into the frames. All frames shall be accurately machine milled and fitted to form hair fine joints. The jointing accessories such as cleats, brackets, etc., shall be of such material as not to cause any bimetallic action and as per approved samples.

Dimensions shown in the drawings and tender are overall heights and widths to the outside of the frames of Doors, windows, ventilators, etc. and shall be considered as approximate, structural dimensions, only. Contractors are advised to verify the dimensions before fabricating and fixing the Doors, windows, ventilators, etc. in position after allowing the margins for sub frames (40 to 50 mm) as well. Payment shall be based on actual size provided.

10 **METHOD OF FIXING :**

- a) Aluminium members coming in contact with masonry shall be fixed by means of slotted steel lugs, not less than 100 mm x 16 mm, 3mm with counter sunk galvanized machine screws and nuts 19x 6.3 mm and to concrete works by means of 45 mm No.10 galvanized wood screws.
- b) Fixing screws and lugs

Outer frame/sub frame shall be provided with fixing holes centrally in the web of the section at approved intervals. Any steel lugs coming in contact with Aluminium should be either galvanized or given one coat of bituminous paint. After fixing the members in position as stated above, the space between the concrete surface and the frame of Doors, windows, ventilators, etc. shall be pressure grouted with CM 1:4 so as to achieve absolute water tightness between the frame and inside surface. Care shall be taken that exposed surface of opening is not damaged while fixing Doors, windows, ventilators, etc.

Further, all vertical, horizontal members of Doors, windows, ventilators, etc. shall be provided with Neoprene/ EPDM weather stripping.

The contractors shall design, fabricate and fix in position, sub frames, Doors, windows, ventilators, etc. in such a way that water penetration is totally and effectively sealed and any dampness on inner surfaces is totally eliminated. The shop drawing submitted by the contractor shall show the method of sealing the water penetration also.

Doors, windows, ventilators, etc. shall be fixed to sub frames by means of screws of adequate size and numbers, which shall be cadmium plated brass.

The method of fixing as above shall generally be followed and members used in the manufacturing of units shall be designed accordingly. However, contractors are free to adopt any other equivalent, approved method of fixing. In no case, fixing shall be allowed over wooden runners.

Doors, windows, ventilators, etc. shall be designed not only for their strength, stability, stiffness against all odds but also for easy operation, water tightness, easy replacement of glass and cleaning from inside.

11. GLASS & GLAZING :

Glass shall be of specified thickness and shall be ASAHI or MODI float waveless glass or equivalent, approved, clear sheet glass or tinted as specified in schedule of quantities.

Before installation of glass, contractor shall ensure the following:-

- a) All glazing rebates shall be square, plumb, true in plane, clear, dry and free of dust.
- b) Glass edges shall be clear and cut to exact size, glass with chipped or damaged edges shall be rejected.
- c) Glass shall be set in glazing clips and so installed as to achieve proper water tightness.
- d) Suitable Neoprene, EPDM gaskets shall be used for fixing glass so as to prevent rattling.
- e) Beading shall be of anodised Aluminium section as per schedule of quantities.
- f) Putty shall be applied to beading face in contact with glass and if necessary also filled at back-conforming to the latest version of IS-420-1953. On completion of job, all glass shall be thoroughly cleaned and freed from dirt, putty or other adhering material.
- g) Wastage in cutting shall be to contractors' account. Frosted/Ground glass shall be set with smooth surface outside.

12. Contractors shall submit detailed drawings showing various members of Aluminum Doors, windows, ventilators, etc. which they propose to use, along with their filled in tender.

13. MODE OF MEASUREMENTS:

Aluminium Doors, windows, ventilators shall be measured in Kg. Any fixture or projection embedded in concrete/masonry work shall not be measured. Samples of all sections, accessories, beadings, etc. shall be got approved, weighed and preserved at site.

Rate shall include for fittings and fixtures shown on the shop drawings approved by the Chief Engineer.

14. RATE TO INCLUDE:

Part from other factors mentioned elsewhere in this tender document, rates for the items for supplying and fixing aluminium doors, windows and ventilators shall also include for the following:

- a) All accessories, for fixing doors, windows and ventilators to concrete/masonry surface as described in the trade.
- b) Filling sealants as per details to ensure water tightness. All the sealants must be permanently resilient and of non-bleeding nature.
- c) EPDM weathering strips as directed.
- d) Drip strip to drain out water falling on the members of the frame.
- e) Pressure grouting in CM 1:4 the space between the concrete surface and the frame of windows and ventilators, or sub frames, as per site conditions.
- f) EPDM gaskets for fixing glass.
- g) Cadmium plated brass wood screws wherever specified.
- h) Galvanized/ Aluminum channels pieces, coach screws, raw plugs, etc. of required size and nos. for fixing doors, windows and ventilators frames in position.
- i) Necessary scaffolding/cradle for erection of aluminum doors, windows and ventilators in position.
- j) Rates for sliding/ doors/ windows and ventilators to include for adequate arrangements for draining out water collected in the channels of the outer frame.
- k) For all Doors, windows, ventilators, etc. openings, contractor shall prepare MS retrieval template frames with necessary tolerance for obtaining correct dimensions of openings in masonry/concrete works.
- l) Suitable, approved cleats, etc. at every joint of outer frame.

15. VARIATION OF WEIGHTS:

The contractors shall base their quoted rates on total weight of Aluminium content for Doors, windows, ventilators units excluding hardware and glass, proposed by LIC in the items

TECHNICAL SPECIFICATION FOR ELECTRICAL WORKS

SPECIFICATION FOR ELECTRICAL INSTALLATION WORKS IN L.I.C.I. BLDGS.

SUBJECT TO THE GENERAL CONDITION OF CONTRACT IN FORCE

(A) GENERAL

1. The installations shall generally be carried out in conformity with the Code of Practice for electrical wiring installation (system voltage not exceeding 650 V. viz I.S. 730. 1963 or the latest revision thereof.
2. **Definition:**
As given in I.S. Code of Practice shall apply.
3. **Pressure and frequency of supply** :
All current consuming devices shall be suitable for 433 V., 3phase, 50cycle A.C. supply.
4. **System of wiring** :
 - i) The wiring shall be carried out as per schedule. Power wiring must be in separate PVC conduit and shall be kept separate and distinct from lighting wiring. All wiring must be done on the distribution system with main and branch distribution board at convenient centers and without isolated fuses. All conductors shall run as far as possible along the walls and ceilings so as to be easily accessible and capable of being thoroughly inspected. The contractor shall arrange beforehand the balancing of circuits in consultation with Electrical Engineer of L.I.C.I.
 - ii) Within one month of taking over of the installation, the contractor shall submit to L.I.C.I. 3sets of completion drawings of the Electrical Installation in corpora ting all modifications made from time to time including cable & conduit lay-outs to the satisfaction of the Electrical Engineer of L.I.C.I. & the wiring plans shall be deemed to be "Drawings" within the meaning of the term as used in the general conditions of contract.
5. **Conductor** :
The conductors shall be of copper or otherwise stated in tender and shall be either PVC insulated or PVC insulated PVC sheathed. The minimum sections of conductors used for wiring of light and plug points shall be 1.5 sq mm. Single core wires shall only be used.
6. **Cables:**
 - i) All cables including flexible cables used shall be ISI approved and confirming the ISI specifications.
 - ii) Twin flexible cable shall be of minimum section area of 14/0.0076 and PVC insulated.
 - iii) Wires as per specification of materials.

7. Fall of Potential:

The cross sectional area of all conductors inside buildings shall be so proportioned to their lengths that the drop in pressure between the main fuses and their furthest point shall not exceed two percent, with all the consuming devices in use.

8. Rating of Lamps and Fans:

In estimating the current to be carried by any conductors glow lamps are to be rated, as of 4 and 1.25 watts per candle power for carbon and metallic filament lamps respectively where the conditions are known, otherwise at 40 watts except in the case of gas filled lamps. Ceiling fans are to be rated 60 watts; table fans at 60 watts unless actual values, are known or specified.

9. Test :

The installation with fittings complete shall before current is switched on satisfactorily pass the following tests:

The whole of the lamps and appliance having been connected to the conductors and all switches and fuses being on a pressure not less than twice the intended working pressure subject to a limit of 500 volts shall be applied and the insulation resistance of the whole or any part of the installation to earth must not be less in Mega ohms than 25 divided by the number of points as defined above. With all lamps and appliance removed from the circuits a similar test between poles may be demanded, provided that during the rainy season half the above test value will be accepted. Where any appliance referred to is a motor larger than one-half B.H.P. the insulation resistance of that particular circuit must be greater than one Meg ohm.

10. Joints and Looping Back:

No joints shall be allowed in conductors. Neutral shall be looped from point to point whereas the live wires shall be looped in the switch board only from switch to switch.

11. Switches:

- i) All main switches (other than those of iron clad pattern) carrying over ten amperes shall be fitted for back connections.
- ii) All switches and circuit breakers shall be constructed in accordance with the I.E.E. wiring rules 8th, edition no 67, or its latest version, provided also that springs shall be either of phosphor bronze, or if of steel, shall be copper or nickel plated; & that handles shall be so fastened that do not tend to unscrew or become loose (see clause 16).

12. Control at point of Entry of Supply:

There shall be one main switch and one main fuse on each pole of each main circuit (other than the neutral conductor of a 3-wire circuit) at the point of entry of the supply. The switches must be linked.

13. Distribution Boards:

- i) Main distribution board shall be metal clad and shall be provided with an iron clad switch and fuse on each pole of the circuit (MCCB / Switches).
- ii) Branch distribution board shall be provided with one fuse/ MCB for each circuit and one common neutral bar. Maximum number of points to be wired on each circuit shall be 6.
- iii) Switches and fuses of opposite polarity shall be mounted on separate bases with a shield of non-ignitable insulating material between the bases when placed one above the other.
- iv) In wiring a branch distribution board the total number of points shall be divided as far as possible evenly between the numbers of ways of the board. A spare circuit shall be left for future extensions.
- v) MCB / Fuses shall be of approved materials and each circuit shall be clearly numbered from left to right in conspicuous figures to correspond with the wiring plans.
- vi) Two spare fuse carriers / MCB per main branch board shall be supplied for replacements.

14. Passing through the walls

- i) Except as laid down in clause 87 where conductors pass the walls, one of the following alternative methods shall be used.
A hole of suitable area shall be made in the wall through which the casing or conductor shall be carried so as to allow of an air-space of not less than one inch on three sides of the casing or conductors as the case may be or the conductors shall be carried in approved heavy gauge solid drawn or lap welded conduit tube on porcelain ducts. Where the supply is alternating current, the conductors of the circuit must be bunched.
- ii) Where a wall tube passes outside a building so as to be exposed to the weather, the outer end shall be bell mounted and turned downwards.

15. Branch Switches (see clause ' 11) ' In installation supplied from a three wire system, all branch switches shall be placed on the outer wires, switches (Other than those for multiple control) controlling not more than 10 amperes shall be of the Modular type switches shall be ON when knob is down. Where the specified position of branch switches is altered, any such alterations of position after fixing will be paid for.

16. Ceiling Rose and Wall Sockets ' Three pins Ceiling roses, and wall sockets shall not contain fuse terminals. Wall sockets shall comply with the requirements of the Bureau of Indian Standards.

17. Fittings. Where conductors are required to be threaded through tubes or channels formed in the metal work of fittings, these must be free from sharp angles or projecting edges and of such a size as will enable them to be wired with the conductors used for the final sub-circuits without removing the braiding taping or outer covering. As far as possible all tubes or channels should be of sufficient size to permit of looking back. Where with approval of the Electrical Engineer of L.I.C. Electrolytic

copper wire is used for wiring fittings. The sub-circuit leads must terminate in a ceiling rose or connector from which this wire will be carried into the fittings. Flexible wire must not be used for wiring fittings, except portable fittings. All fittings must have not less than a half inch male nipple. Fittings and lamp holders for gas fitted lamps shall be adequately ventilated.

18. Lamp holders-Lamp holders for use on brackets, etc. shall have not less than a half inch female nipple and all those for use with flexible pendants shall be provided with cord grips. All cases must be solid and substantial thin case export type not being admissible. Edison screw holders will not be accepted for lamps below 100 watts.

19. External and Road lamps ; External and Road Lamps shall have weather proof fittings of approved design so as to effectually prevent the admission of moisture. An insulating distance piece of moisture proof materials must be inserted between the lamp holder nipple and that of the fitting. Flexible cord conductors and cord grip lamp holders must not be used where exposed to the weather. In verandahs and similar exposed situations rod pendants or ceiling plates shall be used.

20. Lamps: All glow lamps unless otherwise specified in the special conditions of contract shall hung at a height of nine feet above the floor level. Metal filament lamps shall be made of drawn wire only.

21. Fans and Regulators

- (i) (a) All ceiling fans shall be suspended from a hook or shackle and insulated from the same. All joints in the suspension rod shall be screwed and all joints or bolts in connection therewith shall be additionally secured by means of split pins.
- (b) The canopy and wood block at the top of the suspension rod shall effectually hide the suspension.
- (c) The leading in wire shall be not smaller than 3/22 S.W. G. and shall be protected from being cut.
- (d) All fans shall be free from sparking, noise oil throwing and excessive heating.
- (ii) (a) All fans shall be hung nine and half feet above the floor or as directed by the supervising officer.
- (b) All fans shall be capable of running at full speed for one month without additional oiling and shall not overheat after eight hours continuous run at full speed.
- (c) Each fan shall have a speed regulator of Electronic type.

22. Attachment of Fittings and Accessories :

- i) In other than conduit wiring all ceiling roses, wall sockets, switches, regulators, brackets, pendants and accessories attached to walls or ceiling shall be mounted on suitable PVC Base plate.

23. Interchangeability :

Similar parts of all the switches, lamp holders, distributing boards, ceiling roses, brackets, pendants fan and all other fittings of the same type shall be interchangeable.

B. CONDUIT SYSTEM

- 1) **Conduit to be continuous** ĩ Conduit shall be of approved pattern and manufacture and in accordance with the specification of the Bureau of Indian Standards & relevant IE rules.
- 2) **Bunching of Wires** ĩ The wires of a circuit may be bunched together in a conduit, and if the supply is alternating current, they must be bunched
- 3) **Junction in Conduit** ĩ The lengths of conduit shall be joined by means of push fit joints or other approved joints. The greatest care shall be taken in preparing the conduit that no sharp edges or burrs are left which could damage the Insulation. The Elec. Engineer with a view to ensuring that the above proviso has been carried out, may require (if he should consider if necessary) that the separate lengths of conduit etc. after they have been prepared shall be submitted for inspection before being fixed.
- 4) **Fixing of Conduit** – The PVC conduit shall be fixed to the surface of walls, secured to plugs, arranged as in clause 15 by saddles and round-headed screws. No conduit shall be buried beneath the surface of the masonry unless so specified or approved by the Electrical Engineer, L.I.C.
- 5) **Bends of Conduit** – The conduits shall be brought round the angles of walls by means of bends or elbows as may be directed.
- 6) **Outlets**- All outlets for fittings, switches, etc. shall be equipped with an approved outlet box.
- 7) **Conductors** – All conductors used in conduit wiring shall be stranded
- 8) **Erection and Earthing of conduit** ĩ The whole system of conduit shall be erected and completed before the conductors are drawn in. In conduit system, the pipe must be continuous when passing through walls or floors, and no other form of insulating or protecting tube is required.

Specifications for the Concealed Conduits in slab /wall columns etc. for electrical main / sub main / point wiring; will be as under :

- i. Rigid PVC conduit of Medium class ISI marked and corresponding PVC conduit accessories.
- ii. Special deep junction boxes 75 mm deep to be laid in the slab / ceiling.
- iii. The rectangular junction boxes wherever provide shall be made out of 16 gauge M.S. Sheets and painted with two coats of ready mixed oil paint of approved shade over a coat of red oxide primer.
- iv. Make of conduits to be used should be of ISI marked and as per list of Electrical Materials.
- v. **The electrical installation work shall be carried out through a Licensed Electrical Contractor. The name of licensed electrical contractor shall be get approved from the competent authority well in advance before commencement of the work.**
- vi. **INSTALLATION OF CONDUIT:**

All conduits including bends, unions, junction boxes, etc. shall be cleaned before they are fixed in position. Conduits which are to be taken in the ceiling slab shall be laid on the prepared shuttering work of the ceiling slab before concrete is poured. The conduits shall be properly fixed into the sockets, bends, junction boxes, outlet boxes and shall be made watertight by using proper sealant recommended by the manufacturer. The conduits in ceiling slab shall be straight as far as possible, to facilitate easy drawing of wires through them. Before the conduits are laid in the ceiling, the positions of outlet points, point control junction boxes shall be set out clearly so as to minimize offsets and bends.

Conduits recessed in walls shall be secured rigidly by means of steel hooks/staples at not more than 0.6 meter intervals before conduit is concealed in the walls. All chases, grooves shall be neatly made to proper dimensions to accommodate the required number and size of conduits. The outlet boxes, point control boxes, inspection and draw boxes shall be fixed as and when conduit is being laid. The recessing of conduits in walls shall be so arranged as to allow at least 12 mm plaster to cover the same. All grooves, chases, etc. shall be refilled with cement mortar and finished up to the wall surface before plastering of walls is taken up by the Contractor. Where conduits pass through expansion joints in the buildings, adequate expansion fittings or other approved devices shall be used to take care of any relative movement. Wherever conduits terminate into points control boxes, distribution boards, etc, conduits shall be rigidly connected to boxes, boards, etc. Running joints in conduits wherever necessary shall be rigidly held in aligned position. After conduits, junction boxes outlet boxes, etc. are fixed in position their outlets shall be properly plugged with PVC.

Stoppers or with any other suitable materials so that water, mortar, vermin or any other foreign material do not enter into the conduits system.

Draw box junction box, point control boxes, etc, shall be provided with bushes of PVC or rubber, after the conduit ends are properly filed to remove the burrs and sharp edges. Concealed conduit laying above false ceiling shall be executed in a similar manner described above. Wherever called for, surface conduit system shall be adopted with PVC conduits being fixed on to the wall surfaces, ceilings, etc., with saddles, clamps and screws.

Conduit shall be run in square and symmetrical lines with proper drawing and ventilation. Before surface conduits are installed, the exact route shall be marked at site and the approval of the Employer's Engineer shall be obtained.

Conduit shall be concealed wherever specified in ceiling, walls, etc. as required. The conduits shall be laid in ceiling slab before pouring of Concrete. Care shall be taken to ensure that conduits are not displaced during the process of pouring and consolidating the Concrete.

The following precautions shall be observed while installing the conduits:-

- a. As far as possible bending shall be done at site in a proper manner.
- b. Where a number of conduits converge, a large M.S. box shall be used to avoid crossing of conduits. Where conduits are installed in straight runs, draw boxes will be provided at centers not greater than 15 meters on straight runs and at every change in direction. No boxes will be provided in voids where access cannot be readily obtained.

The rate for rigid P.V.C. conduit sleeves shall include for recesses and holes, etc. in brick work for electrical conduits as shown on drawings and as directed on site and making good the same.

Section-I

Specifications for LT (1.1 KV Grade) Cables

1 Scope:

This specification covers supply, testing at works, supply at site, installation, termination, jointing, connection, testing at site, commissioning and handing over of 1.1 KV grade Cables.

2 System :

The 1.1 KV grade cables are to be used in under ground distribution system with normal system voltage of 415 V, 50 Hz, 3 phases, 4 wire systems.

3 Applicable standards:

Cables to be supplied under this specifications shall be with Copper or Aluminum conductor as specified, in drawings or Bill of Quantities, PVC insulated and PVC sheathed, armored and with an outer PVC protective sheath, heavy duty type and shall conform to,

IS 1554 (Part I) 1976: PVC insulated electric cables.

IS 1753: Aluminum conductors for insulated cables.

IS 3961: Recommended current ratings for cables.

4 General requirements:

4.1 All cables shall be new without any kinks or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on surface of the cable at distance not exceeding 1 M.

4.2 Procurement of cables shall be on the basis of the actual site measurements and the quantities given shall be regarded as a guide. Before procurement of the cables, the contractor shall submit the detailed measurement sheet, based on site measurement showing the various cable lengths and after approval of the same place orders for the cables.

4.3 Cables shall be tested at factory as per IS requirement. The tests shall incorporate routine tests, type tests and acceptance test. The Contractor shall produce the certificate for type test.

4.4 The cables shall be of one of the makes mentioned in the list of approved materials and with ISI mark.

4.5 The cables shall be supplied and delivered at site in original cable drums with manufacturer's name, cable size, type and length all clearly indicated on each drum.

- 4.6 The unit rate shall include loading, unloading, transport, storage, handling, unwinding the cable from cable drums and laying in the cable trench or erected on cable trays etc.
- 4.7 The cables shall be laid by skilled and experienced labour.
- 4.8 Where the cable route intersects roads, streets or pathways, RCC spun pipes shall be laid in the trenches to serve as cable ducts. The pipes shall be joined by RCC spun collars. The RCC pipes shall project at least 150 mm on either side of road crossing.
- 4.9 The cable loops shall be kept at both ends of the cable length. Minimum 3 meters long loop shall be provided.
- 4.10 The contractor shall take care to see that the cables received at site are apportioned to various locations to ensure maximum utilization and cable joints are avoided. This apportioning shall be got approved before the cables are cut to lengths. Straight joints are permitted only under exceptional circumstances.

5 Storage and loading, unloading of cables. :

- 5.1 Cable drums shall not be stored one above the other. Sufficient space between cable drums shall be left for air circulation and the drums shall stand on battens placed directly under the flanges.
- 5.2 Cable drums shall be stored preferably on a plain ground without having any hard stones or any other sharp materials projecting above the ground surface. The drums shall be stored preferably in the shed or otherwise they shall be covered by tarpaulin.
- 5.3 Drums shall be stored and kept in such a way that bottom cable end does not get damaged.
- 5.4 Drums shall be rotated only in the direction marked on the drum.
- 5.5 Loading and unloading shall be done with material handling equipments only.

6 Erection and laying of cables:

6.1 General:

- 6.1.1 All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of service.
- 6.1.2 When cables pass through holes in metal work, precautions shall be taken to prevent abrasion of the cables on any sharp edge. Cables passing through walls, ceiling or floor shall run through sleeves of Hume pipes of adequate dia. & after pulling of the cables both ends of the sleeve shall be sealed with fire resistance material to prevent spread of fire.
- 6.1.3 In every vertical channel, duct, trucking or cable trench, containing cables and exceeding three meters in length, internal barriers shall be provided so as to avoid heating of the air at the top of the unit.
- 6.1.4 In every vertical cable shaft, cable trench or any passage of cable through wall, ceiling, floor etc. Barriers against spread of fire and smoke shall be provided.
- 6.1.5 In fire hazard areas extra care shall be taken to prevent spreading of fire in case of cable failure. Cables in these areas shall be covered by glass wool or embedded in sand in appropriate trenches. The cabling in such areas shall be done as per FIA approval and IEE regulations.
- 6.1.6 Communication cables should be laid away from the power cables to avoid electromagnetic interference. Minimum clearance of 300 mm shall be maintained.
- 6.1.7 Control and power cables shall be laid on separate trays.
- 6.1.8 The maximum number of power cables on a tray should be limited to six.
- 6.1.9 Every cable shall be installed where it will not be exposed to direct sunlight, rain, dripping water, oil or any corrosive substance.
- 6.1.10 The cables shall be erected and laid by either of the following methods and as specified in Bill of Quantities or specifications or drawings.

6.2 Cables laid in excavated trenches:

- 6.2.1 The cables for external electrification work shall be laid in specially prepared cable trenches as specified under the section for cable trenches.
- 6.2.2 While laying cable in the trench the cable end shall be pulled with pulling eye only after mounting the drum on the jacks.
- 6.2.3 Care shall be taken in laying cables to avoid forming kinks. The drums shall be unrolled and cables run over wooden rollers, placed at intervals not exceeding 2 Mts.
- 6.2.4 High voltage cables are to be laid separately from other cables. HV, MV cables shall not be laid in the same trench and /or alongside of water main.
- 6.2.5 The cables shall not be laid directly in such soil, which is corrosive, and having components, which react with the insulating layer or amour of the cable. In such case it should be laid in pipes or concrete trenches.

6.3 Cables laid in built-up trenches:

- 6.3.1 For the cable route passing through the area which is proposed to be covered with concrete/tiles etc. the cables shall be laid in the R.C.C./brick masonry cable trenches as specified in the items. This arrangement shall be generally inside the building.
- 6.3.2 For the area outside the building but covered with concrete /tiles etc. the cables shall be laid through R.C.C. pipes laid in ground with brick chambers at both ends. The chambers shall be covered with C.I. heavy-duty covers if the area is prone for vehicular traffic otherwise medium duty C.I. covers should be provided.
- 6.3.3 Cables laid in the built-up cable trenches within the building shall be raised so as not to lay at the trench bottom. Cables shall be either secured to the wall by saddles or laid on hot dip galvanized angle iron brackets or cable trays, ladder, rack, trough etc.
- 6.3.4 Where cables are clamped to the wall a minimum clearance of 100 mm shall be maintained between wall and cable and minimum 150 mm vertical clearance shall be maintained between two cables. Where cables are laid on cable brackets, the brackets shall not be fixed more than 500 mm apart to avoid sag in the cables. Where cables are laid on cable tray /ladder /troughs /racks, minimum 300 mm distance shall be observed between adjacent tier of tray/ladder /troughs /racks, and cable shall be fixed minimum 25 mm away from wall and minimum 150 mm distance shall be observed between two adjacent cables. Cable shall be properly fixed with the tray /ladder /troughs /racks with cable tie or saddles.

- 6.3.5 The dimensions of the trenches shall be determined depending upon the maximum number of cables that is expected to be accommodated. Wherever specified, trenches shall be filled with fine sand and covered with RCC or steel chequered trench covers.
- 6.3.6 Where cables are to be installed under floors or above suspended ceilings or below ceiling, they shall be laid on a cable tray and shall be run in such positions that they are not liable to be damaged by contact with the floor or the ceiling or their fixture. The cable tray shall be properly fixed with tie rod to the ceiling. The concrete inserts for fixing the tie rod shall be put in place while casting the slab. The cable tray route shall be co-coordinated with other services. While laying the cables on the tray minimum 150 mm distance shall be observed between two adjacent cables. At least 25 % space shall be kept spare for any future installation.
- 6.3.7 The cable reaching for the motors in the mechanical room or plant room or machine room or service area shall be laid on cable tray. The cable reaching to motors shall be protected by rigid galvanized conduits up to a height of 300 mm above the floor. Above that height, the cable shall be protected by means of oil tight flexible metallic conduits fixed to the terminal box of the motor. The connection between the rigid conduit and the flexible conduit shall be done by a screwed coupling of an approved type. The flexible conduit shall be properly fixed with the terminal box of the motor by means of double hexagonal check nut.

6.4 Duct System:

Wherever specified cables shall be laid in underground ducts. The duct system shall consist of a required number of reinforced Hume pipes with simplex joints. Wherever asbestos cement pipes are used, the pipes shall be encased in concrete of 75 mm thick. The ducts shall be properly anchored to prevent any movement. The top surface of the cable ducts shall not be less than 60 cm below the ground level. The duct shall be at a gradient of at least 1:300.

The ducts shall be provided with inspection manholes at all direction changes and at required regular intervals for drawing the cables. The manholes shall be of reinforced concrete either cast-in-situ or precast. The manhole covers shall be cast iron and machine finished to ensure a perfect joint. The manhole covers shall be installed flush with the ground or paved surface. The ducts shall be properly plugged at the ends to prevent entry of water, rodents etc. Suitable duct markers shall be placed along the run of the cable ducts. The duct markers shall at least be 15 cm square embedded in concrete, indicating the voltage, number of ducts and the direction of run of the cable duct. Suitable cable supports made of angle iron shall be provided in the manholes for supporting the cables. Proper identification tags shall be provided for each cable in the manholes.

6.5 Cables on Trays / Racks:

6.5.1 Cable shall be laid on cable trays/racks wherever specified. Cable racks/trays shall be of ladder, trough or channel design suitable for the purpose. The nominal depth of the trays/racks shall be 150 mm. The width of the trays shall be as per the design shown on drawing.

The cable trays shall be made of steel or Aluminum as specified. The trays/racks shall be completed with end plates, tees, elbows, risers, and all necessary hardware. Steel trays shall be hot dip galvanized. Cable trays shall be erected properly to present a neat and clean appearance. Suitable cleats or saddles made of Aluminum strips with PVC covering shall be used for securing the cables to the cable trays. The cable trays shall comply with the following requirements.

- a. The tray shall have suitable strength and rigidity to provide adequate support for all contained cables.
- b. It shall not present sharp edges, burrs or projections injurious to the insulation of the wiring/cables.
- c. If made of metal, it shall be adequately protected against corrosion or shall be made of corrosion resistant material.
- d. It shall have side rails or equivalent structural members.
- e. It shall include fittings or other suitable means for changes in direction and elevation of runs.

6.5.2 Installation of cable trays/racks:

- a. Cable trays shall be installed as a complete system. Trays shall be supported properly from the building structure. The entire cable tray system shall be rigid.
- b. Each run of the cable tray shall be completed before the installation of cables.
- c. In portions where additional protection is required, non-combustible enclosures to be used.
- d. Cable trays shall be exposed and accessible.
- e. Where cables of different system are installed on the same cable tray, non-combustible, solid barriers shall be used for segregating the cables.
- f. Cable trays shall be grounded by two nos. earth continuity wires. Cable trays shall not be used as equipment grounding conductors.

7 Cable trenches (excavated):

7.1 The cable trenches shall be excavated 60 cms below the finished ground level and shall have a minimum width of 300 mm for laying of single cable. When more than one cable are laid in the same trench, the width of the trench shall be increased such that the spacing between the cables is 200 mm and the end cables are at minimum 100 mm from the side of the trench. At the turning of the cable route the trench shall be dug with radius equal to 15 times the cable diameter.

- 7.2 The trenches shall be cut square with vertical sidewalls and with uniform depth. Suitable shoring and propping may be done to avoid caving in of trench walls. The floor of the trench shall be rammed and leveled. The bottom of the cable trench shall be prepared with 100 mm sand bed for laying the cables.
- 7.3 The cables shall be laid in trenches over the rollers. After the cable is laid and straightened it shall be covered with sand, and bricks shall be placed on top and at the side of the cable.
- 7.4 Wherever specified, half round RCC pipes shall be placed above the cables.
- 7.5 The cable trench then shall be refilled with excavated materials after removing the stones and other sharp materials and the refilled materials shall be compacted with light ramming.
- 7.6 Approved Cable markers made of Aluminum or CI with 15 cms crown shall be provided along the route of cables at a spacing of 25 - 30 meters and also at both ends of crossings or at the cable turning point. The class, type, No. of cables shall be indicated on markers.
- 7.7 Cable shall be laid in Hume pipes at all road crossings and in GI pipes at the wall entries or at the crossing of the drains/gutters.

8. Cable jointing:

- 8.1 The straight joint in cable shall be avoided as far as possible by correctly apportioning the cable lengths. If unavoidable following precautions shall be taken while jointing.
- 8.2 Cable jointing shall be done as per the recommendations of the cable manufacturer. Jointing shall be done by qualified cable jointer. The location of the cable joint shall not be where the cable takes a bend also where the soil is loose and shows signs of subsidence.
- 8.3 Cable jointing boxes shall be of appropriate size suitable for PVC insulated cables of particular voltage ratings and shall be of approved make.
- 8.4 Jointing of cables in the joint boxes and the filling of the compound shall be done in accordance with the manufacturer instructions and in an approved manner. All straight or T joints shall be done in epoxy mould boxes. All terminal leads of conductors shall be heavily soldered up to at least 50 mm length.
- 8.5 All cables shall be joined colour-to-colour and tested for insulation resistance and continuity before commencing the jointing. The seals of cables shall not be removed until preparations for jointing are completed. Joints shall be finished on the same day, as commenced and sufficient protection from the weather shall be arranged.

8.6 Joints shall be made by means of suitable solder for conductor, the conductors being firmly bolted into the connections or ferrule and the whole end soldered with proper solder and flux or resin. Conductors shall be properly insulated with high voltage insulating tape and by using separators of approved size and pattern. The joints shall be completely filled with epoxy compound (with necessary tapping) to ensure proper filling of the box.

8.7 Epoxy compound shall be prepared as per manufacturer instructions. Oil, water or any other liquid shall not be added to the mixture and which shall be used within 30 minutes of mixing. The surface on which epoxy is to be used shall be free from dust, rust, oil, grease and shall be dry. Joint shall not be moved or disturbed until the epoxy has completely hardened.

9 Cable Termination. :

9.1 All cable terminations for conductors upto 4 sq.mm may be insertion type and all higher sizes shall have tinned copper compression lugs.

9.2 Cable termination shall be done in cable end box or in terminal box or in pillars etc. The end terminations shall be insulated with a minimum of six half lapped layers of PVC tape.

9.3 Cable terminations are to be made with flange type brass cable glands so as to grip inner and outer PVC sheaths and also the cable armour. Cable gland shall be bonded to earth.

9.4 The cable conductor ends are to be connected by crimping tinned heavy-duty copper lugs. Hydraulic crimping tool shall be used.

9.5 Every connection at a cable termination shall be mechanically and electrically sound and protected against mechanical damage and any vibration liable to occur shall not impose any harmful mechanical damage to the cable conductor.

10 Testing of cable before laying and commissioning:

All tests shall be carried out in accordance with relevant IS codes of practice, IE rules and specifications.

10.1 100% cable drums shall be checked for continuity and cross continuity tests to ensure that there is no internal damage to the cable during transportation.

10.2 Prior to burying of cables, insulation resistance shall be measured with 500 V megger between the cores and all the cores to earth (armour) and results shall be recorded.

10.3 On completion of cable laying work, all the tests such as insulation resistance test, continuity test, sheathing continuity test, earth test etc. shall be conducted in the presence of the Architects.

- 10.4 After the cables are installed, before commissioning it shall be tested for high DC voltage test. The recommended volts and duration of the test between each core and metallic armour (earth) at 3 KV DC is for 5 minutes. During high voltage test all electrical equipments related to the cable installation must be earthed and adequate clearance shall be maintained from the other equipments and from work to prevent flash over.

SECTION – II

Specifications for Earthing and Lightning Protection

1 Scope:

This specification covers supply of necessary materials, and erection at site, of complete earthing system including earth pits at the locations indicated, earth conductors from earth pit to the respective equipments, switchgears, pillars etc. and making connections, testing at site, commissioning and handing over.

2 Applicable standards:

The entire work of earthing system, shall confirm to IS 3043, Indian Electricity Act and Rules and relevant regulations. The work of Lightning protection shall conform to IS 2309.

3 General requirements:

- 3.1 The earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules 1956 as amended from time to time and relevant regulations. Following IE rules are particularly applicable. IE Rule Nos. 32, 51, 61, 62, 67, 69, 88(2) & 90.
- 3.2 All earth connections shall be carefully made, visible for inspection, and the testing of individual earth electrode shall be possible.
- 3.3 All materials, fittings etc. used in earthing shall conform to IS specifications and in the absence of which the approval of competent authority shall be obtained.
- 3.4 The earthing electrode shall be at a minimum distance of 2 metres away from the outer face of the building wall. A minimum clearance of twice the depth of the electrode shall be maintained between two earthing stations.
- 3.5 A brick masonry chamber to facilitate easy identification and for carrying out periodical tests and inspection shall be constructed on top of the earth pit.
- 3.6 All metal conduits, trunkings, cable sheaths, HT and MV switchgears, Transformers, distribution boards, meters, light fixtures, fans, and all other metal parts forming part of the work shall be bonded together and connected to earthing network as specified.
- 3.7 Earthing system shall be mechanically robust and the joints shall be capable of retaining low resistance even after passage of fault currents.

3.8 Joints shall be soldered, tinned and double riveted. All the joints shall be mechanically, electrically continuous and effective. Joints shall be provided against corrosion.

4 Earth Electrodes:

4.1 The materials of earth electrode and earth conductors shall be galvanised iron unless specified otherwise in Bill of Quantities, specifications or drawings.

4.2 The earth electrodes shall be free from paint, enamel, grease etc.

4.3 The earth electrode shall be embedded as far as practicable in a moist soil and below permanent moist level.

4.4 The earth electrode shall not be installed in the proximity of a metal fence.

5 Types of earth electrodes:

The earth electrodes shall be either a pipe electrode or plate electrode, the details of which are as given in the following sections of specifications, drawings and BOQ.

6 Pipe electrode:

6.1 Pipe electrode shall consist of 2.5 meter long single piece G.I. pipe of min. 40 mm dia. as specified and shall be cut tapered at the bottom. 12 mm dia. holes shall be drilled with 75 mm spacing between the holes and in a staggered manner as indicated in IS 3043.

6.2 The electrode shall be buried vertically in a specially prepared earth pit of size 35 cm x 35 cm and the earth pit shall be filled with alternate layers of charcoal, salt and fine washed sand for a minimum thickness of 150 mm. A funnel with wire mesh inside shall be fixed to the top of the GI pipe for watering purpose.

6.3 The earth conductor of 25 x 3 mm GI strip shall be connected to the electrode just below the funnel with proper terminal lugs and check nuts and the other end of earth conductor shall be connected to the equipotential bus of the equipments.

6.4 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of the masonry shall be constructed on top of the GI pipe to house the funnel and the earth connection. The approximate size of the chamber shall be 300 mm x 300 mm and 300 mm deep.

6.5 The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.

6.6 The top of the masonry chamber shall be 50 mm above the finished ground level.

7 Plate Electrode:

- 7.1 The plate electrode shall consist of either copper plate of size 60cm x 60 cm x 3.15 mm or GI plate of size 60 cm x 60 cm x 6.3 mm, and as specified in the BOQ or drawings.
- 7.2 The electrode shall be buried vertically in a specially prepared earth pit, which shall be dug up to required depth, from the ground level. The earth plate shall be placed in the earth pit with its face vertical and embedded in the alternate layers of coal and salt for a minimum thickness of 15 cms.
- 7.3 The earth conductor shall of same material as of the earth electrode. For copper earth electrode copper strips shall be provided as conductor and for GI earth electrode GI strips shall be used as earth conductor. The size and material of the earth conductor shall be as specified separately in the Bill of Quantities or drawings. The earth conductors shall be connected to the earth electrode (plate) with G.I. nut bolts, check nuts and washers and welded at the edges and shall be brought up in the masonry chamber at the ground level.
- 7.4 The earth conductor shall be extended via the earth link provided in the masonry chamber. This link shall be connected to earth conductors from the earth plate and earth conductor going to equipments with two Nos. of nut bolts, check nuts and washers (all of GI) to make secured connections. This link can be removed for testing the earthing.
- 7.5 A 20 mm dia. G.I. pipe shall be provided from the masonry chamber to the top of the earth plate for watering purpose. The G.I. pipe shall be provided with a funnel at the top with wire mesh inside.
- 7.6 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of masonry shall be constructed on top of GI pipe to house the funnel & the earth connection. The approx. size of the chamber shall be 300mmx300mmx300mm deep.
- 7.7 The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.
- 7.8 The top of the masonry chamber shall be 50 mm above the finished ground level.

8 Earth conductor:

All earthing conductors shall be of high conductivity copper and or GI as specified and shall be protected against mechanical injury or corrosion. The connection of earth continuity conductors of earth bus and earth electrodes shall be strong and sound and shall be rigidly fixed to the walls, cable trenches, cable trays or conduits and cables by using suitable clamps made of non ferrous metals.

- 8.1 The cross-sectional area of earthing conductor shall not be smaller than half that of the largest current carrying conductor, subject to the minimum size being not less than 1.5 sq.mm for copper and 2.5 sq.mm for Aluminium conductors and the upper limit being 70 sq.mm for copper and 120

sq.mm for Aluminium. The size of the galvanised iron earth continuity conductors may be equal to the size of the current carrying conductors with which they are to be used.

8.2 As a guideline the following sizes of earth continuity conductors shall be used for earthing installation

8.2.1 Size of earth conductors for lighting and power circuits.

Cross sectional area of current carrying Cu conductor	cross sectional area of earth continuity Cu conductor
Size in sq.mm	Size in Sq.mm
1.5	1.5
2.5	1.5
4.0	2.5
6.0	4.0

8.2.2 Size of earth conductors from main switchboard to sub main switches or distribution boards.

Cross sectional area of current carrying conductor Copper/Alum.	Cross sectional area of earth continuity conductor Copper/Alum.
Size in sq.mm	Size in sq.mm
4	2.5
6	4
10	6
16	10
25	16
35	16
50	25
70	35
95	50
120	70

8.2.2 The size of an earth continuity conductor contained in a flexible cable or flexible cord shall be equal to that of the current carrying conductor.

9 Earth connection:

- 9.1 All metal clad switches and other equipment carrying single-phase current shall be connected to earth by a single connection. All metal clad switches carrying three-phase medium voltage and high voltage shall be connected with earth by two separate and distinct connections.
- 9.2 The earthing conductors inside the building, wherever exposed shall be properly protected from mechanical injury by running the same in G.I. pipe of adequate size. Earthing conductors outside the building shall be laid 600 mm below the finished ground level.
- 9.3 The over lapping of strips at joints where required shall be minimum 75 mm. The joints shall be revetted in an approved manner. Lugs of adequate capacity and size shall be used for all termination of wires above 6 sq.mm size and bare copper wire above 2.5 mm dia. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substance and properly tinned.

10 Connection of earthing conductor:

The earthing conductors are broadly divided in the following categories:

- 10.1 Main earthing conductor shall be taken from the earth electrode to the earth bus/connection at the main switchboard.
- 10.2 Sub-main earthing conductor shall run from the main switchboard to the sub-distribution boards.
- 10.3 Final earthing conductor shall run from the sub distribution boards to the final distribution boards.
- 10.4 Circuit earthing conductor shall run from the final distribution board to the exposed metal of the equipment to be earthed. This may run directly from final distribution boards or through earth leakage circuit breaker.
- 10.5 Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to switch boards at which they originate or at the commencement of the run by an earthing conductor.
- 10.6 Earthing conductor enclosed with the current carrying conductors within the flexible cord shall be used only in case of equipments connected by flexible cord.
- 10.7 Lighting fittings, switches and accessories shall also be provided with an earthing conductor even though they may be rigidly secured / fixed with metallic conduit.
- 10.8 The electrical resistance of earthing conductors shall be low enough to permit passage of fault current necessary to operate a fuse, protective device or a circuit breaker.

11 Prohibited Connection:

Use of following as earth conductor is not recommended, and strictly prohibited for earthing an installation or even as a link in an earthing system. Neutral conductor, sprinkler pipes or pipes conveying gas, water or inflammable liquid, structural steel work, metallic enclosures or armour of cables and conductors, metallic conduits and lightning protection system conductors are all prohibited to be used as earth conductor.

12 Earth Resistance:

The earth resistivity of the soil where the earthing stations are located shall be submitted to the Architect before the earthing work starts and the approval shall be taken. If the earth resistance is too high and multiple electrode earthing does not give adequate low resistance to earth, then the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions.

13 Testing:

On completion of the entire installation, the earthing network shall be tested for their resistance to earth in accordance with IS 3043. The contractor shall provide all meters, instruments & labour required for the test. The test results shall be submitted in triplicate to the Architects for approval. The following tests shall be conducted.

- a. Earth resistance of electrodes
- b. Impedance of earth continuity conductors.
- c. Effectiveness of earthing.

14 Lightning Protection:

Lightning protection network shall be provided for the specified buildings and locations for protection against lightning strikes. The network shall essentially consist of Air-termination units, down conductors, roof conductors, test terminals and earth electrodes etc. The entire system shall conform to IS requirements.

14.1 Air-terminations:

- a) An air-termination shall consist of a 1200 mm long, 25 mm dia 14 SWG Cu tube with 100 mm dia Cu sphere fixed at the top of the tube. The Cu sphere shall be fixed with 5 nos. 125 mm long and 12.5 mm dia threaded Cu spikes.
- b) The complete assembly shall be fixed at a highest possible location and shall project at least 1500 mm above the network on which it is fixed.
- c) All air termination shall be effectively secured against overturning by means of rod brackets and additional supports as required, which shall be permanently and rightly attached to the building.

The method and nature of fixing should be simple, solid and permanent.

14.2 Down Conductors and Roof Conductors:

- a) GI strip of specified size shall be used as down / roof conductors and the conductors shall be without sharp bends, upturns and kinks.
- b) As far as possible, the joints shall be avoided in down/roof conductors. In down conductor below ground level there shall be no joint. However in a total system where joints are unavoidable, the jointing shall be with approved method only. The joints shall be mechanically and electrically effective. The joints may be clamped, screwed, bolted, but preferably welded. The length of overlap at the joints shall not be less than 200 mm. Contact surface at joint shall be cleaned and then inhibited from oxidation with suitable non corrosive compound.
- c) The conductors shall be adequately protected against mechanical damage but for which metal pipes shall not be used.

14.3 Test Links and Testing:

Each down conductor will be provided with a testing point in a position convenient for testing but inaccessible for interference. No connection other than one direct to an earth electrode shall be made below a testing point. Testing points shall be with Copper. The ohmic resistance of the lightning protective system with air termination but without earth connection shall be measured and should be a fraction of an ohm. Earth resistance shall be measured in accordance with IS: 3043.

14.4 Earth Terminations and Electrodes:

Each down conductor shall have an independent earth termination. It should be capable of isolation for testing purposes. Earth electrodes shall be constructed and installed in accordance with IS: 3043.

SECTION – III

Specifications for MCB DB, MCB and RCCB

1 Miniature Circuit Breaker Distribution boards:

- 1.1 Miniature circuit breaker distribution boards shall conform to IS 2675, IS 8623 and shall be suitable for operation on three phase, 4 wire, 415 V, 50 Hz, AC supply or single phase, 2 wire, 230 V, 50 Hz, AC supply.
- 1.2 The MCB distribution board shall be in sheet steel enclosures with removable type cover with additional door for protecting accidental operation.
- 1.3 Enclosure and door shall be made out of 16 SWG CRCA sheet steel and powder coated and of approved shade. The interior shall be off white finish. The DB shall be totally enclosed with dust and vermin proof construction and shall be of double door type. The DB boxes shall be as supplied by the original manufacturer.
- 1.4 Where distribution boards are specified to be complete with an isolator as incomer, the isolator shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.
- 1.5 Where distribution boards are specified to be complete with MCB + ELCB as incomer, the MCB + ELCB shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.
- 1.6 Bus bars shall be tinned copper. The internal connections in the DB shall be by using stranded copper conductor, PVC insulated wire with copper lugs crimped at both ends. Neutral busbar and earth busbars shall also be provided in the enclosure. Neutral busbar shall have equal rating of phase busbars.
- 1.7 Distribution boards shall be provided with circuit identification by means of directory on the front cover. Upon completion of the works, the contractor shall provide and fix accurate framed circuit lists for all distribution boards. These shall consist of perspex envelopes, fixed securely by an approved method on the inside face of each distribution board front cover into which shall be inserted a neatly typed list of circuits, indicating the number of circuits, phase, cable, size, number of points connected, circuit rating and the loading. The contractor, shall also provide and fix by means of brass screws tapped into the D.B. cover, labels, with black letter on a white background for all distribution boards, MCB + ELCB, Isolators etc. The engraving on the labels and the inscription on the circuit lists shall be approved by the Architects before the work is carried out.

- 1.8 All incoming terminals shall be fully shrouded.
- 1.9 The conduit entry plates shall be removable type and shall be provided at top and bottom. All the conduits shall be properly terminated using glands, grips, checknuts, female adapters with bush etc.
- 1.10 Wiring shall be terminated properly using crimping type copper lugs/sockets. Identification ferrules shall be provided on all wires. Each circuit shall have an independent neutral.
- 1.11 Two No. Earth terminals shall be provided on each Distribution Board.
- 1.12 Distribution boards shall be installed surface mounted or recessed mounted as specified and erected at the locations shown.

Surface mounted DB shall be mounted on a suitable size frame made out of GI ZED section. The hole fasts of the frame shall be grouted in the wall with cement mortar and the frame shall be painted with two coats of red oxide and two coats of enamel paint of approved shade. The DB shall be mounted on this frame with proper size nut bolts.

Recessed mounted DB shall be erected in the chase/cut portion of the wall. The cutting of the walls shall be done while constructing the wall and shall be of adequate size to comfortably accommodate the DB. The cut portion shall be smoothened and made plain and shall be fine finished. The DB shall be fixed in this chased portion with suitable clamps and bolts. The top cover of the DB cabinet shall be projecting out of the wall surface and free from any obstruction so as to open the same smoothly.

2 Miniature Circuit Breakers:

- 2.1 MCB's shall be manufactured in accordance with IS 8828 having a short circuit breaking capacity category 10 kA at both 240 volts 50 Hz. and 240/415 V, 50 Hz and complying with the test requirements for both reference calibration temperatures of 20 degree C and 40 degree C.
- 2.2 All miniature circuit breakers shall be rated to withstand the fault currents of the circuits they protect without causing any interference in any other protective device associated with the distribution system. At the same time the design of the circuit breakers shall be such that, it will protect the circuit for which it is intended and not cause or allow other protective devices to operate when fault conditions apply.
- 2.3 Miniature circuit breakers shall be capable of carrying its full rated current continuously without tripping out.
- 2.4 All the miniature circuit breakers shall be fitted with a magnetic undelayed tripping mechanism. These shall have overload and short circuit elements.
- 2.5 Time current characteristic of the MCB shall match with that of HRC fuses..

3 Residual current operated circuit breakers (RCCB)

- 3.1 RCCB shall be manufactured in accordance with IS 12640 and IS 8828 having a short circuit breaking and earth fault protection up to 9 KA at both 240 Volts 50 Hz and 240/415 V, 50 Hz and complying with the test requirements as per IS 2640.
- 3.2 RCCB shall be designed to interrupt the circuit during an earth fault, overload or short circuit. All RCCB shall be high sensitive and calibrated to trip the power supply when the residual current is more than 50 % of its calibrated rating. This means that a 30 mA sensitivity RCCB should trip when the residual current is in the range of 15 to 30 mA and a 300 mA RCCB should trip when the residual current is in the range of 150 to 300 mA.
- 3.3 The RCCB shall be truly current operated, which means that it shall be totally independent of the main voltage for tripping. RCCB must operate for nominal voltage well below the maximum safe value of 10 volts. RCCB shall interrupt the circuit within 30 milisec at a leakage current of 30 mA.
- 3.4 RCCB shall be provided with a neutral advance mechanism. RCCB shall be functioning even in the event of failure of neutral and/or any one or two of phase supply conductor. RCCB shall be provided with trip free mechanism ensuring that the device cannot be reclosed / reset if the fault persists. RCCB shall be functioning even in the case of interchange of load and supply side connections.
- 3.5 Test button shall be provided to check the correct operation of the unit.
- 3.6 RCCB shall be designed for a very long life of a minimum of 20,000 operations and shall be capable of withstanding inrush current of 4 to 8 times the rated current. For the proper functioning the RCCB should not require any connection of earthing on the device.
- 3.7 The device should have high tripping accuracy of less than 5% of rated tripping current. The RCCB shall be provided with clear indication to show whether the tripping is due to current leakage or overload/short circuit.
- 3.8 The MCB section of RCCB shall be provided with arc chambers and vents are also to be provided to release the arcing products in the atmosphere, so as to increase contact life and to prevent damage to the insulation. The self-extinguishing thermoset plastic material shall be used for body and shall have a modular construction. The device should be vibration proof.

4 Moulded Case Circuit Breakers (MCCB)

MCCBs used shall be suitable for 440 V, AC, 50 Hz supply and shall be capable of withstanding electrical and mechanical stress due to short circuit capacity as specified for individual requirement. The MCCB shall be compact in size, dust and vermin proof with quick make and break operating mechanism. The construction shall be such as to ensure maintenance and current setting adjustment without removing the MCCB from the panel. The MCCB shall be suitable for interlock with panel door on which it is mounted.

SECTION - IV**Specifications for Medium Voltage Distribution Panel Boards****1 Scope:**

This section shall cover supply, assembly, installation, connection, testing and commissioning of medium voltage distribution panel boards as described in this specifications, drawings and schedule of quantities.

2 System:

All the medium voltage distribution panel boards shall be suitable for operation on three phase, 4 wire or single phase, 2 wire with normal system voltage of 415/240 volts, 50 Hz, A.C. supply with solidly grounded neutral system.

3 Weather condition at site:

The panel boards shall be suitable for continuous operation and designed to withstand heaviest conditions at site.

- a) Temperature range: 40 to 45 ° C
- b) Relative humidity: 50 to 80 %
- c) Weather: Dusty

4 Applicable IS Standards:

The panel boards to be supplied under this specification shall confirm to latest editions of relevant Indian Standards and Indian Electricity rules and regulations. The following Indian Standards shall be complied with.

IS 4237: General requirements for switch gear and control gear for voltage not exceeding 1000 V.

IS 2208: HRC cartridge fuse links upto 610 V.

IS 2705: Current transformers

IS 1248: Electrical Indicating Instruments.

IS 375: Switch gear bus-bars, main connection and auxiliary wiring, marking and arrangement for.

IS 2147: Degree of protection provided by enclosures for low voltage switchgear and control gear.

IS 2675: Enclosed distribution fuse boards and cutouts.

IS 2557: Danger notice plates.

IS 1567/4047: Specifications for switch fuse units.

IS 3072 (I): Installation and maintenance of switchgears.

TECHNICAL CONDITIONS ELECTRICAL**5 General:****5.1 Shop drawing:**

Prior to fabrication of the panel boards, the contractor shall submit for the approval of the Architect, the shop / vendor drawing and design calculations indicating type, size, short circuit rating of all the electrical components used, busbar size, internal wiring size, panel board dimension, colour, mounting detail etc. The contractor shall submit manufacturer's catalogues of the electrical components installed in the panel boards.

5.2 Inspection:

At all reasonable times during production and prior to transport of the panel boards to site, the contractor shall arrange and provide all the facilities at manufacturer's plant for inspection and testing and any stage inspection agreed upon.

5.3 Test certificates:

Testing of panel boards shall be carried out at factory or at site as specified in Indian Standards in the presence of Architect. The test results shall be recorded on prescribed forms. The test certificates for the test carried out at factory or at site shall be submitted in duplicate to the Architect for approval.

6 Cubical type Panel boards:**6.1 Construction:****6.1.1 Structure**

The panel board shall be metal enclosed sheet cubical, compartmentalised suitable for indoor or outdoor installation having dead front, floor mounting type. All M.S. sheets used in the construction of panel boards shall be 16 SWG (1.6 mm) thick unless specified otherwise in the item and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet steel shall be seam welded, all welding slag ground off and welding pits wiped smooth with plumber metal.

The panel boards shall be totally enclosed, completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be lockable and fully gasketed with foam rubber or neoprene rubber strips.

All panels and covers shall be properly fitted and secured with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with bolt and nuts. Self-threading screws shall not be used in the construction of panel boards. Suitable base channels (min size 75 mm x 75 mm x 5 mm thick) shall be provided at the bottom. A Clearance of 300 mm between the floor of the panel board and the bottom of the lower

most units shall be provision Panel boards, if necessary shall be preferably arranged in multitier formation. The panel boards shall be of adequate size with a provision of spare space (as jointly decided with the Architect) to accommodate possible future additional switchgear. The size of the panel boards shall be designed in such a way that the internal space is sufficient for hot air movement, and the electrical component does not attain temperature more than 40 degree Celsius. Opening for natural ventilation shall be provided and shall have screens or grills made of brass or stainless steel wire mesh.

The panel boards shall be provided with removable sheet steel plates at top and bottom with knockout holes of appropriate size and number in conformity with the number, and size of incoming and outgoing conduits /cables.

The panel boards shall be designed to ensure maximum safety during operation, inspection, connection of cables, maintenance and repairs etc. with busbar system energised. Means shall be provided to prevent shorting of power and /or control terminals due to accidental drop of maintenance tools etc. inside the panel board. Partitions between feeder compartments, busbar chamber, cable alleys, vertical panels etc. shall be provided to take care of this aspect. The panel boards shall be sufficiently rigid to support the equipment without distortion under normal and short circuit condition; they shall be suitably braced for short circuit duty.

For buses and cables, access shall be limited from front and top only. All other equipment shall be mounted on the front side, (unless specified otherwise for any specific panel) and shall be accessible from the front. All joints and connections shall be made by cadmium plated high tensile steel bolts, nuts and washers secured against loosening.

It shall be possible to insert any new cable and to connect all load side wiring with the busbar energized, without any special precautions. Opening of the busbar chamber shall be possible with special tools only.

6.1.2 **Protection clause:**

All the outdoor panel boards shall have protection clause of IP 55. The complete board shall be double jacketed with insulation material to withstand outdoor temperature. All the indoor panel boards shall have protection clause IP 52.

6.1.3 **Powder coating:**

All sheet steel work shall undergo a seven tank process of degreasing pickling in acid, cold rinsing, phosphatising, passivating and then treated with powder coating treatment. The finishing shall be of shade as approved by the Architect. The interior surface shall have similar finish.

6.1.4 **Circuit compartments:**

Each switch fuse units and meters shall be housed in a separate compartment and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly inter locked with the breaker/switch fuse units in "ON" and "OFF" position. However it shall be possible to bypass this interlock for inspection purpose.

6.1.5 **Instrument compartment:**

Separate and adequate compartment shall be provided for accommodating instruments, indicating lamps, control contactors /relays, and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker/switch fuse units busbar and connections.

6.1.6 **Busbars and wiring:**

The busbars shall be of three-phase four wire system with separate neutral and earth bar. The busbar and interconnection between busbars and various components shall be with high conductivity, hard drawn, electrolytic copper strips.

The busbar shall be of rectangular cross section designed to withstand full load current for phase busbars and full rated current for neutral busbars and shall be extensible on either side. The busbar shall have uniform cross-section through out the length. The rating of the busbars shall be as specified in BOQ and/or drawings.

The busbars and interconnections shall be insulated with color coded insulation tapes/covers. The busbars shall be supported on unbreakable, non-hygroscopic insulated supports at sufficiently close intervals to prevent sagging and shall effectively withstand electromagnetic stresses in the event of short circuit. The busbars shall be housed in a separate compartment. The busbar shall be isolated with 3 mm thick hylum sheet to avoid any accidental contact. All busbars connection shall be done by drilling holes in busbars & connecting by chromium plated brass bolt and nuts. Additional cross section of bus bars shall be provided in all distribution boards to cover up the holes drilled in the busbars. Spring and flat washers shall be used for tightening the bolts. All interconnections between busbars and circuit breakers/switches and between circuit breakers/switches and cable terminals shall be through solid copper strips of proper size to carry full rated current. These strips shall be insulated with insulating tapes/covers.

All interconnections in the panel shall be with Cu busbars for switchgears of ratings 63 A and above. For switch gears below 63 A, flameproof Cu wires to be used with lugs crimped at both ends.

All busbars shall be tinned copper strips of the given cross section. Unless otherwise specified all bus bars are to be designed taking maximum current density of 800 Amp per sq inch.

All busbars are to be covered with heat shrinkable PVC sleeves of red, yellow, blue and black colours to indicate various phases and neutral bar clearly.

6.1.7 **Terminals:**

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformers for instruments metering shall be mounted on the terminal blocks. No direct connection of incoming or outgoing cables to internal components of the panel board is permitted. Only one conductor may be connected in one terminal. Adequate no of spare terminals of required size shall be left in each compartment.

6.1.8 **Wire ways:**

A horizontal wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

6.1.9 **Cable compartments:**

Cable compartments of adequate size shall be provided for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate proper supports shall be provided in the cable compartments to support cables. All outgoing and incoming feeder terminals shall be brought out to terminal blocks in the cable compartment.

6.1.10 **Earthing:**

Tinned copper earth bars of suitable size shall be provided for the entire length of the panel. Provision shall be made for connection from this horizontal earth bar to the earth pit on both side of panel board. The earth continuity conductor of each incoming and outgoing feeder shall be connected to the vertical earth bar.

All non-current carrying parts and the framework of panel board shall be connected to this earth bar. All doors and movable parts shall be connected to earth bus with flexible copper connections. Armour of the cable shall be properly connected with earthing clamp, and the clamp shall be bonded with the earth bar.

6.1.11 **Name plate, labels and directory:**

A nameplate with switchgear designation shall be fixed at the top of the panel board. A separate nameplate giving feeder details shall be provided for each panel.

Engraved nameplates shall be of 3-ply (red-white-red or black-white-black) lamicaid sheets. Size of the letters shall be 5 mm. Nameplates shall be fastened by screws and not by adhesive. Size of letter for Main nameplate shall not be less than 20 mm.

Engraved PVC labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangements of circuit inside the panel board shall be pasted on inside of the

panel door and covered with transparent laminated plastic sheet. PVC labels shall be provided for spare circuits also.

Panel boards shall be provided with a directory indicating the area or loads served by each circuit breaker, the rating of breakers, size of conductors, etc. The directory shall be mounted in metal holder with a clear plastic sheet on inside surface of the front door.

6.1.12 **Danger notice plates:**

Danger notice plates with symbol as per IS shall be provided on panel boards.

6.1.13 **Fuse puller etc:**

One set of fuse puller (for various amps of fuses), panel keys and special tools etc. shall be supplied with each panel board.

6.1.14 **Internal components:**

The panel boards shall be equipped complete with all type of required number of circuit breakers, switch fuse units, contactors, relays, fuses, meters, instruments, indicating lamps, push buttons, equipment, fittings, busbars, cable boxes, cable glands etc., and all the necessary internal connections/wiring as required and as indicated on relevant drawings.

Components necessary for proper complete functioning of the panel boards, but not indicated on the drawings and specifications shall be supplied and installed.

All part of the panel board carrying current including the components, connections, joints and instruments shall be capable of carrying their specified rated current continuously, without temperature rise exceeding the acceptable values of the relevant specifications at any part of the panel boards.

The derating of the different items resulting from the prevailing conditions like room temperature shall be allowed for while selecting the components.

All units of the same rating and specifications shall be fully interchangeable.

1. **Switches:**

Switches shall be air break type as per IS 4047. The switch operating handle shall be front mounted and interlocked with the door when the switch is in ON position. The live parts shall be shrouded with suitable insulating barrier so as to prevent accidental contact with the live parts after opening the cubicle front door.

2. Fuses:

All power and control fuses shall be link type. Screw type fuses are not acceptable. All fuse links shall be HRC type and shall generally conform to IS 2208. Rewirable fuses are not acceptable. All fuses shall be readily accessible for replacement. It shall not be necessary to remove any piece of equipment or to disconnect wiring before replacing fuses using fuse puller.

3. Control switches:

Ammeter selector switches shall have make before break feature on its contacts. The selector switches shall generally have four positions for reading three phase currents and neutral. The voltmeter selector switch shall also have four positions and the fourth shall be OFF position. Remote trip /off selector switch shall be lockable in OFF position.

4. Indicating lamps:

The indicating lamps shall be LED type.

5. Measuring and Indicating instruments:

All measuring and indicating instruments shall be Digital type, in square pattern moving from 90 deg. scale, 96mm x 96mm, flush mounting type. Instrument shall be of accuracy class 1 as per IS 1248. Ammeters for motor and other feeders shall be graduated for full load current of motor with a compressed scale at the end for at least 6 times full load current. The KW meter and PF meter shall be suitable to measure unbalanced loads on 3-phase 4 wire system. PF meter shall be in 0.5 - 1 - 0.5 range. CTs shall be resin cast, with class 1 accuracy and 15 VA burden. The energy meters shall be CT operated electrolytic type.

6. Push buttons:

Push buttons shall be suitable for panel mounting type and comprise of a contact element and an actuator. The contacts shall be of silver alloy and of 10 A continuous current rating. Each push button shall be provided with 1 NO + 1 NC contacts, but if required 2 NO + 2 NC contacts be provided. Colour of the knob shall be as per IS.

7. Packing and transport:

The bigger size panel boards shall be shipped to site in wooden crates. They shall be wrapped with polythene sheets before being placed in crates to prevent damage to the finish. Crates shall have skid bottoms for handling. All panels shall have one set of two silica gel bags, which shall be checked periodically both while in storage and while in service. The smaller size panel boards shall be transported to site with polythene sheets wrapped all along and wooden frame to cover the same.

8. Storage at site:

The panels shall be stored in a well ventilated, dry place and suitable polythene covers shall be provided for necessary protection against moisture.

9 Installation:

The panel boards shall be installed at the location as indicated in the drawings. The contractor shall submit for approval a shop drawing indicating room size, panel size and method of installation prior to installation.

The cubicle type panel board shall be installed on suitable foundation. Foundation shall be as per the dimensions supplied by the panel manufacturer. The foundation shall be flat and level. Suitable grouting holes shall be provided in the foundation. Suitable MS base channel shall be embedded in foundation on which the panel can be directly installed. If the panel is provided with an angle iron pedestal or base plate the same shall be grouted firmly in the floor. The panel boards shall be properly aligned and erected in plumb and bolted to the foundation by bolt parallel to the walls.

After installation of the panel boards, various components of the boards shall be checked and be put in working order. The cables laid through cable trench or on cable trays/racks etc. shall be terminated on the bottom plate or top plate as the case may be, by using siemens type brass compression glands. The individual cables shall then be led through the panels to the required feeder compartments for necessary terminations. The cables shall be clamped to the supporting arrangement. The switchboard earth bus shall be connected to the local earth grid. Connection of cables shall be by crimping type Cu lugs using hand operated or hydraulic crimping tool as per cable sizes.

10 Testing:**1) Testing at factory:**

Panel boards shall be inspected at factory at pre-assembly stage and any modifications or changes as suggested shall be incorporated. The panel boards shall be again inspected and tested at the factory after assembly of all components and completion of all inter-connections and wiring. The tests shall include all routine and type tests as per relevant ISS.

2) Testing and pre-commissioning checks at site:

Panels shall be commissioned only after the successful completion of the following tests. The tests shall be carried out in the presence of the Architect.

2.1 Precommissioning checks:

- 1) Check all panels are aligned in line and properly erected in plumb.
- 2) All withdrawals portions shall be capable of smooth extraction and isolation.
- 3) All main and auxiliary bus bar connections shall be checked and tightened.
- 4) All wiring terminations and bus bar joints shall be checked and tightened.
- 5) Wiring shall be checked to ensure that it is according to the drawing.

- 6) Before fitting the covers, all chambers, compartments, cable alleys etc. shall be checked for complete cleanliness and removal of foreign matter if any, particularly the tools used for erection, cut pieces of cable armour etc. Covers shall be properly fixed with all fixing screws in places.
- 7) All mechanical interlocks shall be checked and all fuses and links shall be inserted.
- 8) Earthing connections shall be checked.
- 9) Operational checks on all circuit breakers or switchgear shall be carried out, both mechanically and electrically to check that correct indications are provided for closed and open positions.
- 10) The panels shall be checked to ensure that moisture ingress has not taken place during transit and storage.

2.2 Testing at site:

- 1) Insulation of the main circuit, that is, the insulation resistance of each pole to the earth and that between the poles shall be measured.
- 2) All wiring shall be tested for insulation resistance by a 1000 volts megger.
- 3) All relays and protective devices shall be tested for correctness of settings and operation by introducing a current generator and an ammeter in the circuit.
- 4) Insulation test shall be carried out both before and after high voltage test.
- 5) A high voltage test with 2.5 KV for one minute shall be applied between the poles and earth. Test shall be carried out on each pole in turn with the remaining poles earthed, all units racked in position and the breakers closed. Original test certificate shall be submitted along with panel.

TECHNICAL SPECIFICATIONS FOR SITC OF FIRE FIGHTING SYSTEMS

SECTION-1:: BASIS OF DESIGN

1. BASIS OF DESIGN :

The fire fighting system for the project is designed keeping in view the following:

- 1.1 Provision of fire fighting systems such as fire hydrants, hose reel, portable fire extinguishers and manual fire alarm system.
- 1.2 Layout: The execution of works and materials used shall be as per the latest relevant I.S. specifications. Wherever reference has been made to Indian Standard or any other specifications, the same shall mean to refer to the latest specification irrespective of any particular edition of such specification being mentioned in the specifications below or schedule of quantities.

2. CONCEPT OF THE SYSTEM :

The following services have been envisaged for the complex:

- 2.1 Fire fighting system for the complex comprises of hydrant system connected with down comer, Hose Reels, Portable Fire Extinguishers and Fire Alarm system.
- 2.2 Following components shall be included in the water supply system for efficient functioning.
 - i) Automatic air vent at convenient locations.
 - ii) Drain valve.
 - iii) Flow meter.
 - iv) Pressure gauge.

3. WORKMANSHIP:

The workmanship shall be best of its kind and shall conform to the relevant IS specifications mentioned below and elsewhere in this document in every respect or latest trade practices and shall be subject to approval of the owner's site representative. All materials and/or workmanship which in the opinion of the site representative of LIC of India is defective or unsuitable shall be removed immediately from the site and shall be substituted with proper materials and /or workmanship forth with.

4. MATERIALS:

All materials shall be best of their kind and shall conform to the latest Indian Standards. The materials to be used at site shall be of approved quality as per samples and approved by the LIC of India.

As and when required by the site representative of LIC of India, the contractor shall arrange to test the materials and / or portions of works at his own cost to prove their soundness and efficiency. If after tests any materials or portion of work are found to be defective or unsound by the site representative of LIC of India, the contractor shall replace the defective materials from site, pull down and re-execute the works at his own cost to the satisfaction of site representative of LIC of India. In order to substantiate that, the materials used are as specified the contractor shall furnish the site representative of LIC of India with original invoice on demand.

SECTION-2 : FIRE PROTECTION SYSTEM

1. SCOPE:

The scope of this section consists of but is not limited to supply, installation, testing and commissioning of the fire protection system. The philosophy of the system is as mentioned below.

- a) The fire suppression system shall comprise of fire hydrant system, hose reel, connected to down comer being pressurized through independent terrace pumps on individual blocks.
- b) Water from terrace tank shall feed water to the hydrant landing valves & hose reels on each floor through down comer.
- c) The fire hydrant system shall remain pressurized under gravity all times and during emergency situation the terrace pump shall start automatically at a pre set pressure to boost the pressure for fire fighting.
- d) Each of the down comers shall be provided with an electric driven terrace pump. The starting of the pump shall be both manual and automatic and stopping shall be manual.
- e) Contractor shall ensure Hydro Testing for the complete system.
- f) The contractor shall obtain necessary approval of the drawings and the schemes from Local Fire Prevention Officer without any cost to the LIC of India.
- g) The contractor shall design and after approval of site representative of LIC of India display near each staircase landing at all floors a glass covered framed floor plan clearly showing the locations of all landing valves, hose reels, manual alarm points & hand appliances (fire extinguishers), as well as the Do's and Don'ts for the personnel. The routes to reach the EXITS shall be clearly marked and directional sign posted to guide the population of the concerned floor for escape to safe locations. EXIT signs shall be of auto glow type which shall glow during dark. The dimensions, lettering size and color code etc shall be directed by the site representative of LIC of India.

2. PIPING WORK::

2.1 GENERAL REQUIREMENT:

- a) All materials shall be of the best quality conforming to the specifications and sample subject to approval of the site representative of LIC of India.
- b) Pipes shall be routed in such a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
- c) Pipes shall be securely fixed to walls and ceilings by suitable clamps and supports (galvanized) at intervals specified elsewhere in this document.
- d) Valves and other fittings shall be so positioned that they are easily accessible for operation and maintenance.
- e) Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmen like manner.

- f) Pipe accessories such as gauges, meters, control devices etc shall have the same working pressure rating as the associated pipe work.
- g) All pipe work shall be free from burrs, rust and scale and shall be cleaned before installation.
- h) All personnel engaged on welding operations must possess a certificate of competence issued by appropriate authority.

2.2- PIPING:

- a) Pipes of following types viz, 150 mm nb, 100 mm nb, 80 mm nb, 65 mm nb, 50 mm nb, 25 mm nb are to be used for the fire suppression net work.
- b) Mild steel black pipes as per IS:1239, part-II, heavy grade (for pipes of sizes 100 mm nb and below) shall be used and suitably lagged on the outside to prevent soil corrosion. Wherever pipes are crossing floors and wall or the like suitable tape coat of 3 mm thick shall be provided.
- c) Pipes required to be hung shall be by means of expandable anchor fastener of approved make and design. The hangers and clamps shall be fastened by means of galvanized nuts and bolts. The size / diameter of the anchor fastener and the clamps shall be suitable to carry the weight of water filled pipe and dead load normally encountered.
- d) The selection and design of the hanger & support shall be capable of carrying the sum of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipe line movements as necessary. All guides, anchor braces and structural steel to be attached to the building/structure trenches etc shall be provided. Hangers and components for all piping shall be approved by the owner's site representative/ consultant.
- e) The entire piping system shall be hydro tested for leakages at 2 times the operating pressure or 1.5 times shut-off pressure, whichever is highest including testing for water hammer effects.

2.3 –PIPING INSTALLATION AND SUPPORT:

- a) Piping shall be properly supported on, or suspended from, on stands, clamps, hangers as specified and as required. The contractor shall adequately design all the brackets, saddles, anchor, clamps and hangers and be responsible for their structural stability.
- b) Pipe work and fittings shall be supported by hangers or brackets so as to permit free expansion and contraction.
- c) Down comers shall be supported by hangers or brackets so as to permit free expansion and contraction.
- d) Down comers shall be supported at each floor with galvanized steel clamps.
- e) To permit free movement of common piping support shall be from a common hanger bar fabricated from galvanized steel sections.
- f) Pipe hangers shall be provided at the following maximum spacing.

PIPE DIA (MM)	HANGER ROD DIA (MM)	SPACING BETWEEN SUPPORTS (M)
Up to 25	6	2
32 to 50	10	2.7
80 to 100	12	2.7
125 to 150	16	3.6

- g) The end of the steel rod shall be threaded and not welded to the threaded bolt.
- h) All pipe work shall be carried out in a proper workman like manner, causing minimum disturbance to the existing services, buildings, roads and structure.
- i) Pipes passing through walls & floor shall be provided with 3 mm thick wrapping and coating of tape coat. The contractor shall make sure that the clamps, brackets, saddles and hangers provided for pipe supports are adequate or as specified / approved by LIC of India.
- j) All pipes shall be accurately cut to the required sizes in accordance with relevant BIS codes and burrs removed before laying. Open ends of the piping shall be closed to avoid entry of foreign materials. Where reducers are to be made in horizontal runs, eccentric reducers shall be used for the piping to drain freely. In other locations concentric reducers may be used.
- k) Automatic air valves shall be provided at all high points in the piping system for venting.

3. FIRE BRIGADE CONNECTION:

- a) Two way fire brigade connections shall be fitted to each down comer with two 63 mm instantaneous inlets in a glass fronted wall box at a suitable position at street level, so located as to make the inlets accessible from the outside of the building.
- b) The size of the wall box shall be adequate to allow hose to be connected to the inlets, even if the door cannot be opened and the glass has to be broken.
- c) Each box shall have fall of 25 mm towards the front at its base and shall be glassed with wired glass with FIRE BRIGADE INLET painted on the inner face of the glass in 50 mm size block letter.
- d) Each such box shall be provided with steel hammer with chain for breaking the glass.

4. SYSTEM DRAINAGE:

The system shall be provided with suitable drainage arrangement with drain valves complete with all accessories.

5. VALVES:

Sluice Valve:

- a) Shall conform in design and materials of construction to PN 1.6 of IS : 780-1984
- b) Shall be ISI marked.
- c) Shall be installed in a masonry pit with C.I. cover.

Non-return Valve :

- a) Shall be conforming in design, dimensions and materials to PN 1.6 of IS : 5312(Part I)-1984.
- b) Shall be ISI marked.

Landing Valve :

- a) Shall be single headed conforming to IS : 5290 type A.
- b) Shall be ISI marked.

6. Hoss Reel Assembly :

- a) Shall be conforming to type A of IS : 884-1985
- b) Shall be consisting of following components :
 - i) HUB
 - ii) Swinging type.
 - iii) Pipe with fitting.
 - iv) Wall bracket.
 - v) Hose reel.
 - vi) Nozzle
 - vii) Stop valve.

7. Hose Pipe :

Shall be 63mm dia. Reinforced rubber lined hose conforming and tested to IS : 636 i 1988 and a pair of GM coupling wired on to each length of hose. For indoor control percolation type.

8. Branch Pipe & Nozzle :

- a) Shall be conforming to IS : 2871 i 1983
- b) Shall be ISI marked.

9. Hose Boxes :

Shall be made of 16G MS sheet with glass front hinged door with lock and key of adequate size and shall be capable of accommodating two lengths of hose and one branch pipe with nozzle.

10. MANUAL FIRE ALARM SYSTEM:

- a) Manual Fire alarm system shall be provided in each floor of the buildings conveniently to alarm the occupants in case of fire.
- b) The system includes manual call points break glass type or pull type which when actuated will trigger dual tone electronic hooter to alert the occupants of the building.
- c) Manual call points shall be installed in such a way that one shall not travel more than 22.5 mtr to actuate the same during fire emergency. These shall be looped together and then connected to the fire alarm panel located in the security room.
- d) The address of each detector shall be indicated on the fire alarm panel.
- e) Supply and installation of the earthing conductors, control and power cabling for the complete fire alarm system shall be in the contractor's scope.
- f) Performance tests shall be conducted at site for manual call points and hooters to prove that the individual components shall satisfy all specific requirements

11. Hand Held Fire Extinguishers:-

- a) Work under this section shall consist of furnishing all labour, materials, appliances and equipment necessary and required to install fire extinguishing hand appliances conforming to IS-15683-2006 and distribution of fire extinguishers shall conform to IS-2190.
- b) Contractor shall install fully charged and tested fire extinguishers of following type :
 - (i) Co2 type-4.5 kg capacity,(body conforming to IS-7285, control valve conforming to IS-3224.
 - (ii) ABC type Dry Powder extinguishers -5 kg capacity.
 - (iii) Water Co2 type -9 ltr capacity.
- c) Hand appliances shall be installed in easily accessible locations with the brackets fixed to the wall by suitable anchor fasteners.
- d) Each appliance shall be provided with an inspection card indicating the date of inspection, testing, date of refilling, due date of refilling and date of hydro test and other relevant data. All appliances shall be fixed in a true workman like manner truly vertical and at correct locations.

12. ELECTRIC FIRE PUMP:

The electric booster pump shall be motor driven, mono block type capable of discharging 900 LPM water giving pressure of 2.0 kg / cm sq. The pump shall be coupled to TEFC motor of required capacity and complete set shall mounted on common base frame. It shall be provided with pump controller for auto & manual start with provision of manual stop. Supply installation testing and commissioning of control & power cabling as required for establishing automation of the pumping system shall be in the scope of the contractor.

13. SPEAKERS :

In each floor there should be a speaker which shall be connected to the amplifier in the stilt floor control room of respective building. Connections of each floor cable shall be connected with the split switch box of the amplifier system to make all zones/floors independent. In case of any emergency the security person will announce either to particular floor or to the total building selecting respective/all switching device.

SECTION-3: COMMISSIONING AND GUARANTEE:

1. Scope:

Work under this section shall be executed without any additional cost. The rates quoted in this tender shall be inclusive of the works given in this section. Contractor shall provide all tools & plant required for execution of the works in this contract.

2. Pre commissioning:

On completion of the installation of all pump, piping, valves, pipe connections, fire alarm systems, the contractor shall proceed as follows :

- a) Prior to start-up and hydro testing entire installation shall be cleaned, flush the pipe lines to clear of dirt and debris.
- b) Check all clamps, supports and hangers provided for holding pipes.
- c) Check all hydrant valves dry and wet for their proper functioning and then close those.
- d) Fill up the pipes with water to conduct hydro test and hold the pressure for 24 hours to detect any leakage.

- e) Operate the pump continuously for 30 minutes (with temporary piping back to the tank)
- f) Test auto operation of the pump.
- g) Operate the fire alarm system and reset those to normal.

3. Final Acceptance tests:

Following commissioning and inspection of the entire installation, and prior to issue of completion certificate, the contractor shall carry out final acceptance tests in accordance with a programme to be agreed with the representative of LIC of India.

If the results of the acceptance tests show that systems and equipment fail to perform to the efficiencies or other performance figures as given in the specification, the contractor shall adjust, modify and if necessary replace the equipment to obtain required performance without further payment.

4. Warranty & Handover:

The contractor shall warrant that all plants, materials and equipment supplied and all workmanship performed by him to be free from defects whatsoever nature before handing over to LIC of India and submit the guarantee certificate.

The contractor shall also hand over all maintenance and operation manuals, all certificates and all other documentation as per the terms of the contract to the site representative of LIC of India.

Besides the works mentioned above, the contractor will obtain “No objection Certificate” from the Fire Service Authority, Govt. of Bihar, on behalf of L.I.C. of India for the above fire fighting installation of the building and quoted amount to include to carry out this work.

TECHNICAL SPECIFICATION FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 06 PASSENGERS LIFT.

SL. NO.	HEAD	DETAILS
1	NO & TYPE OF LIFT	01 No Passenger Lift.
2	CAPACITY	408 Kg, 06 Passengers.
3	SPEED	1.0 Meter per Second.
4	TRAVEL	Ground & Seven upper floors.
5	STOP & LANDING	8 Stops & 8 Landings. All eight openings are on same side.
6	SIZE OF THE LIFT WELL AND CAR INSIDE	1900 mm (W) X 1700 mm (D).(MINIMUM SIZE OF LIFT WELL AFTER FINISHING) 1100mm X 1000mm(MINIMUM SIZE OF CAR INSIDE)
7	POWER SUPPLY	415 $\pm$ 10% Volts. 3 phase, 4wire, 50Hz. terminated in machine room.
8	OPERATION /CONTROL	As per latest I.S. and latest technology.
9	MACHINE	As per latest I.S. and latest technology.
10	DRIVE	As per latest I.S. and latest technology.
11	INDICATORS IN LIFT LANDING	Digital (7Segments) Position & Direction Indicator.
12	DETAILS OF CAR ENCLOSURE	The gauge of stainless steel sheet for car enclosure and door will be of 18 SWG. Car frame shall be of M.S. Car panel will be of stainless steel hairline finish.
13	CAR DOOR / GATE	Automatic Power Operated, Centre Opening Door of 800mm. Stainless Steel with Hair line finishes both Car & Landing Door Entrance/Car Opening.
14	Travel Height	Approximately 24 Meter.
15	INTER COMMUNICATION SYSTEM	Two station Press & Speak Hands Free Intercom. The intercom facility will be in between car & machine room or ground floor.
16	LANDING DOOR	Centre opening door of clear size 800mm x 2000 mm, power operated for every lift, there shall be access to a landing, be fitted with a landing door. Such door shall be fitted with efficient inter-locking or other devices so as to secure that the door cannot be opened except when the lift car is at landing & the lift car cannot be moved away from the landing until the door is closed and locked.
17	DOOR OPERATION	Fully Automatic Power Operated VF / D.C. Closed loop Double Door, Centre Opening with Vision Panel & Infra red Screen.

18	SIGNAL	Digital Luminous Button & Indicators at Floors. Digital Car Position in the Car. Car Operating Panels with Luminous Buttons. O/L Warning Alarm with Luminous Indicator in Car. If Over Loaded. Alarm Bell operated on Dry (SMF) Battery. Fire man switch.
19	BUFFER FOR CARS & COUNTER WEIGHT	Heavy Duty Spring Loaded Buffers as per latest I.S.
20	SAFETY / PROTECTION	SMF Battery Operated ARD. The Rescue operation should function in the event of a power failure.
21	OTHER PROVISION	Supply & fixing MS Tee Section & MS Channel for fixing Brackets etc.
22	EMERGENCY ALARM & LIGHT	Dry cell battery (SMF) operated emergency alarm and 1 battery operated emergency light in car with rechargeable compact unit.
23	OVER LOAD ALARM	Facility to be provided so that door cannot be closed due to overloading.
24	FIREMAN'S SWITCH	To be provided at main landing terminal.
25	Attendant Key	To be provided in car.
26	Infra Red Screen	To be provided.
27	Voice Announcement System	This system is to be provided in the car to announce the position of the elevator in the hoist way as the car passes or stops at a floor served by the elevator.

**TECHNICAL SPECIFICATION FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF
SOLAR STREET LIGHTING SYSTEMS.**

DUTY CYCLE:

The LED solar street lighting system should be designed to operate for dusk to dawn, under average daily insolation of 5.5 kWh / sq.m. on a horizontal surface.

LIGHT SOURCE:

1. The light source will be 12W LED type Lamp, minimum 15 LUX when measured at a periphery of 4 meter diameter from a height of 4 meter. Higher light output will be preferred.
2. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye.
3. Single lamp or multiple lamps can be used. The luminous performance of individual LED used should not be less than 90 lumen/watt when measured luminaire as whole.
4. The color temperature of LEDs used in the system should be in the range of 55000 K ÷ 65000 K.
5. Use of LEDs which emits ultraviolet light will not be permitted.
6. The light output from the LED light source should be constant throughout the duty cycle.
7. The lamps should be housed in an assembly suitable for outdoor use. The temperature of LED should increase not more than 15 degree above ambient temperature. This condition should be complied even after two hours of operation at its maximum operation voltage (i.e. Just before over voltage cut off).
8. The LED should be of high quality and should stand for minimum 50000 hours. If the luminaire fails/ need repair in LED/ electronics the whole should be replaced with the new one within the defect liability period.
9. The make, model number, country of origin and technical characteristics of LED used in the lighting system must be furnished.

PV MODULE:

1. The PV module (s) shall contain 100wp mono/ multi crystalline silicon solar cells with IEC 61215(revised) certification or equivalent National or International Standards. The manufacturer should have the required certification for at least one of their regular modules. Further, the manufacturer should certify that the submitted module is also manufactured using same design and process.
2. The power output of the PV module must be reported under standard test conditions (STC) at 16.4 Volt loading voltage. I_V curve of the each module should be submitted at the time of installation.
3. The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
4. The terminal box on the module should have a provision for opening for replacing the cable, if required.
5. A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side:
 - A) Name of the Manufacturer or distinctive logo.
 - B) Model or Type No.
 - C) Serial No.
 - D) Year of make.

BATTERY :

1. The battery should be 12V i 40AH Tubular gel type Lead acid VRLA battery and should conform to latest BIS standards. A copy of the test certificate for the battery (including its make, country of origin and model number) used in the system should be provided.
2. At least 75 % of the rated capacity of the battery should be between fully charged & load cut off conditions.

ELECTRONICS :

- (i) The total electronic efficiency of DC-Dc converter should be at least 85 %.
- (ii) Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.
- (iii) The light output should remain constant with variations in the battery voltages.

ELECTRONIC PROTECTIONS :

1. The system should have protection against battery overcharge and deep discharge conditions. The numerical values of the cut off limits must be specified, while submitting the samples for the testing purposes.
2. Fuses should be provided to protect against short circuit conditions.
3. A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s), in case such a diode is not provided with the PV module.
4. Full protection against open circuit, accidental short circuit and reverse polarity should be provided.
5. Adequate protection is to be incorporated under no load conditions, e.g. when the lamps are removed and the system is switched ON.
6. Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.
7. The LED driver circuit should be based on constant voltage, constant current, high frequency technology. The component used in LED driver circuitry should be highly reliable of reputed make and efficient.

Efficiency : The total electronic efficiency should be at least 80%.

LED Life : Lumen output of LED should remain same throughout the warranty period.

Charge Controller : The unit should have the following feature:-

1. This unit should be designed for charge regulation of storage battery and safe guard the battery against over charge & deep discharging.
2. The voltage cut-off should be set in such a way to utilize the 75% of the fully charged battery capacity.
3. The lower limit of cut off voltage should not be less than 11.4 volts.
4. The charge controller should reconnect the load when battery gets fully charged. The difference in these two voltage set point should be neither too small nor too large to avoid the relay chattering.

5. A reverse blocking diode should be provided to prevent discharge of battery in rainy season and in night.
6. The various functions should be displayed through LED indicator indicating the operations being carried out by the controller such as low battery warning sign (yellow), load current off (red) battery charging (green). The light indicator of lower voltage should be lower at 11.6 volts. However the unit with red and Green shall also be accepted.
7. The indicator should be fixed on front side of the battery box / Luminary.
8. A switch & fuse should be provided with the controller.
9. The unit should have protection against short circuit, lightening, reverse polarity surge etc.
10. The PCBs of controller should be glass epoxy.
11. All the connector indication should be covered with transparent hard plastic sheet screened properly.

MECHANICAL COMPONENTS :

- (a) The SPV module should be fixed on a rigid pole. The pole should be of minimum 50 mm dia GI pipe (B Class) of at least 03 mm thickness.
- (b) The pole should be made of GI steel pipe with approx height of 4.5 meters. The pole should have the provision to hold the weather proof lamp housing. The pole along with base plate should have suitable cement concrete foundation to assisted local worst climate conditions. The base plate shall be connected with the foundation with holding down bolted.
- (c) SPV panel shall be mounted on pole. The mounting structure (with corrosion resistance paint) shall be fixed in the center of pole made flat at fixing end, square angle adjusting plate of 115 mm size 3 mm thick shall be provided. So that SPV panel can be fixed at inclination of 15 or 30 degree from horizontal.
- (d) It should be possible to mount the light source on a metallic arm attached to the pole. The metallic arm for holding the light assembly should be extended at least 1.5 meters from the pole and set at a suitable angle to maximize uniform illumination of desired level over the specified area.

BATTERY BOX :

- (i) The battery box should be made of suitable polymer or 20 SWG, MS sheet. The battery box shall be painted with acid proof corrosion resistant paint (in case of metal) with LIC of India written on at least two faces. The box shall be properly painted after chemical cleaning & primer coating.
- (ii) The size of box should be as per battery size providing sufficient clearance on all sides. Lovers for proper ventilation should be provided on each side and back of the battery box. No vent shall be providing on top of battery box.
- (iii) Box should be provided with proper locking arrangement. The edges of box should be turned properly to give smooth edge and good strength.
- (iv) Two wooden battens should be fixed inside the battery box to avoid the electrical contact between battery and box.

- (v) The quality should be of high standards to withstand the life period. If defect arises in the DLP period, same is to be (mandatory) replaced.

OTHER FEATURES :

- (i) The system should be provided with 2 LED indicators: a green light to indicate charging in progress and a red LED to indicate deep discharge condition of the battery. The green LED should glow only when the battery is actually being charged.
- (ii) There will be a Name Plate on the system body, which will give:
 - (a) Name of the Manufacturer or Distinctive Logo.
 - (b) Model Number
 - (c) Serial Number
 - (d) Year of manufacture
- (iii) Necessary lengths of wires / cables, switches suitable for DC use and fuses should be provided.

Components and parts used in the solar street lighting system should conform to the latest BIS specifications, wherever such specifications are available and applicable. Other hardware such as clamp, nut bolt etc should be as per requirement of system. The material should be of good quality.

DOCUMENTATION :

An Operation, Instruction and Maintenance Manual, in English should be provided with the solar street lighting system. The following minimum details must be provided in the Manual:

- (a) About Photovoltaic.
- (b) About LED solar street lighting system - its components and expected performance.
- (c) About PV module.
- (d) About LED Lights. The make, model number, country of origin and technical characteristics of LEDs should be stated in the product data sheet and furnished to LIC of India.
- (e) About battery and electronics used.
- (f) Clear instructions about mounting of PV module.
- (g) About charging and significance of indicators.
- (h) DO's and DONT's.
- (i) Clear instructions on regular maintenance and trouble shooting of solar street lighting system.

INSTALLATION OF SYSTEM:

The system should be properly installed at site. The SPV module mounting structure along with pole should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it should withstand the maximum wind speed / storm. The pole should be grouted with CC mixture of 1:2:4 of radius of 300 mm having depth of 900mm. adequate space should be provided behind the PV module / array for allowing unobstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare minimum. Care should be taken to ensure that the battery is placed with appropriate leveling on a structurally sound surface. The control electronics should not be installed directly above the battery. All wiring should be in a proper conduit or capping case. Wire should not be hanging loose. Any minor item, which is not specifically included in the scope of supply but required for proper installation and efficient operation of the SPV systems, is to be provided by the manufacturer.

GENERAL CONDITIONS FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF LIFT

The work shall be carried out in accordance with the Prevalent Lift Act, Code of Practice for Supply, Installation, and Testing & Commissioning of Lift for Passenger use as per latest IS/IE Rules.

PROVISION OF LIFT MACHINE:

Directly on the top of the lift shaft.

SOUND REDUCTION ARRANGEMENT:

Suitable sound reducing rubber pads / cork pads shall be provided under the machine bedplate to reduce the transmission of the vibrations.

CARS & COUNTER WEIGHT BUFFERS:

Heavy-duty spring loaded buffers for both car & counter weight shall be provided.

GUIDES FOR CAR & COUNTER WEIGHTS:

New guide rails shall be provided.

GATES/DOORS FOR CAR & LANDING:

Doors for Car & Landing to be Stainless Steel with Hair Grain finish are to be provided and the doors of both Car & Landing should be Power Operated Centre Opening.

GEARS:

Gears shall be provided as per standard requirements.

ELECTRIC MOTORS:

New motor of ample capacity with high torque and low starting current designed for lift service and suitable for 400 / 433 / 440V, 50 Hz, AC Supply and of Squirrel Cage Induction type and suitable for Variable Voltage & Variable Frequency drive to suits the frequent starts and stoppages and silent in operation shall be provided.

BRAKES:

Brakes shall be provided as per standard requirements.

REVERSE PHASE RELAY:

This shall be provided on the controller to protect the lift equipment against phase reversal, low voltage and phase failure.

CONTROLLER:

The controller shall be Microprocessor Based of the latest design incorporating all modern safety devices and should function on a variable voltage and phase failure.

DRIVE & DRIVING SHEEVE:

It shall be provided according to the specifications to suit the main hoist way ropes and should be Micro processor based single automatic push button / duplex, Collective Selective on either direction and with or without attendant.

HOISTWAY ROPES:

The ropes shall be made of best quality high tensile steel wire and shall confirm to latest IS Specifications.

COUNTER WEIGHT GUARD:

New Counter Weight and Guard are to be provided.

GUIDE SHOES:

These shall be Spring Loaded and shall be of Phosphor Bronze.

SAFETY DEVICES:

- a) Latest type Safety Devices shall be provided to prevent Car from falling in the event of slackening or rupture of suspension on ropes.
- b) Speed Governor, Limit Switches, Final Limit Switches and automatic Electromagnetic Locks shall be provided as per latest design and requirements.
- c) ARD SYSTEM :

Automatic Rescue Device operated on SMF batteries should be provided to enable the lift to reach the nearest floor and open the door in case of any failure of Electricity.

OVERLOADING:

Audio Visual Signal "OVER LOADED" should be provided in the car & the lift should not start when the car lift is overloaded.

INFRA RED SENSOR SCREEN:

Infra Red Sensor Screen should be provided to the doors to avoid closing of doors when the passenger move in or move out from the lift car.

LIFT CAR:

Lift Car should be of the followings:-

- Stainless Steel with Hair Grain Finish on all four sides
- PVC Flooring,
- False Ceiling with plain acrylic diffuser. The frame of suspended false ceiling shall be powder coated aluminum.
- Recessed type CFL Fittings, pressure fan with anodized aluminum grill.
- Control Panel with or without Attendant Mode operation,
- Overload Warning Signal with display and sound etc as per standard.
- Fireman's Switch

WIRING:

All wiring shall be carried out in ISI Marked PVC/ M.S. Conduits. The wires to be used for the wiring shall be PVC insulated Copper Conductor FRLS wire of ISI approved makes. The wiring shall confirm to the latest relevant I.E Act & Regulations.

DESIGN STANDARD:

All materials, plant, equipment in the lift system shall confirm to the highest standard & latest design.

SCAFFOLDING:

The contractor shall make his own arrangement for necessary scaffolding required for execution of this lift work.

TRAILING CABLE:

The controlling cable of reputed make & ISI marked shall be flexible and shall be suitably suspended to relieve strain in the individual conductor.

TEST AFTER INSTALLATION:

After the completion of the lift work and before the same put into operation, the test as follows shall be carried out by the Contractor :-

- i. To determine Insulation Resistance between various wiring and the Earth.
- ii. To determine Earth Continuity of Electrical Installation.
- iii. To determine that the Motor Brake, Door Locking Devices etc.
- iv. To determine that the Motor attains the rated speed at the rated load.
- v. To determine that the speed gear stops the lift car while carrying the rated load.
- vi. Two tests shall be carried out i one with contract load and the other with empty car with ropes attached and all electrical apparatus attached.
- vii. Dead Load test shall be carried out by subjecting the equipment to the maximum dead load for half an hours. The equipment to the capable of retaining this load for the specific period without signs of permanent distortion.

The entire tests shall be carried out to the satisfaction of the LIC of India as well as the Electrical Inspector and other authorities associated with lift and all arrangements including test instruments and electricity shall be arranged by the Contractor and necessary clearance / test certificate for operation of lift shall be obtained from the concerned Authority / Authorities and submitted to LIC of India prior to commissioning of the lifts and the quoted amount to include for the same.

Requisite inspection charges as required by the inspection authorities are to be deposited with the state treasury. This amount shall only be reimbursed on submission of the copy of the treasury challans.

**GENERAL CONDITIONS FOR MAINTENANCE OF FIRE FIGHTING SYSTEMS
DURING DEFECT LIABILITY PERIOD.**

- i. Quarterly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Fire Fighting & Fire Alarm system in perfect running condition including fitting of parts accessories, repair etc,
- iii. In case of any defect cropped up, it shall be attended within 04 hours of getting information over telephone as and when is required.
- iv. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required.
- v. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractorsôrisk & cost and the amount spend shall be recovered from Security Deposit.
- vi. Safety controls should be tested and replaces in case of malfunctioning.
- vii. Arranging demonstration at least once in every six month.
- viii. Any defect in electrical items and control wiring of fire fighting systems should be attended.
- ix. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to replace, should take prior approval from the Competent Authority.
- x. Ensuring proper working entire Fire Fighting & Fire Alarm systems.

Agreed and confirmed

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Signature of company with seal and date

**GENERAL CONDITIONS FOR MAINTENANCE OF LIFTS
DURING DEFECT LIABILITY PERIOD.**

- i. Monthly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Lifts in perfect running condition including fitting of parts accessories, repair etc,
- iii. Apart from attending monthly services, the contractor shall promptly attend within three hours all breakdown calls as & when needed.
- iv. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractors risk & cost and the amount spend shall be recovered from Security Deposit.
- v. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required.
- vi. Safety controls should be tested and replaces in case of malfunctioning.
- vii. Any defect in electrical items and control wiring of Lift should be attended.
- viii. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to be replaced, should take prior approval from the Competent Authority.

Agreed and confirmed

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Signature of company with seal and date

**GENERAL CONDITIONS FOR MAINTENANCE OF SOLAR LIGHTS
DURING DEFECT LIABILITY PERIOD.**

- i. Quarterly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Solar Light in perfect running condition including fitting of parts accessories, repair etc,
- iii. The scope of work includes repairing / replacement of parts to make the system functional within DLP period whenever a complaint is lodged by the user. The contractor shall attend the same within a reasonable period of time and in any case of breakdown shall be corrected within a period not exceeding 3 days.
- iv. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to replace, should take prior approval from the Competent Authority.
- v. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required
- vi. During every servicing dust should be blown from solar street lights and cleaned. Battery charger parameters should check and adjust to required level.
- vii. Connections of batteries terminals to be checked \ cleaned and necessary applying of petroleum jelly to be carried out. Ensuring proper working of all components of units.
- viii. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractors's risk & cost and the amount spend shall be recovered from Security Deposit.

Agreed and confirmed

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Signature of company with seal and date

TIME AND PROGRESS CHART

COMPLETION TIME: 24 MONTHS.

S I. N O	ITEM OF WORK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Demolition work / Revalidation of drawings																								
2	PRELIMINARIES :																								
	Layout and excavation of foundation, including Anti termite treatment.																								
3	CARACAS :																								
	All structural monolith structural concrete work and brick work, staircase room etc.																								
4	FINISHING:																								
5	INSTALLATION :																								
A	Including stair railing, Waterproofing, grill, Painting work, Electrical Conduits wiring & plumbing																								
B	Lift																								
C	Fire Fighting																								
6	ANCILLARIES:																								
	Includes ancillary works, pavements, drainages, filling in site, septic tanks, & clearance of site etc.																								

NOTE :

CONTRACTOR

CHIEF ENGINEER

1. **Default in compliance with this programme in the chart in any of its section shall entail operation of liquidated clause No.19 under "Condition of Contract" in whole or part of the sole discretion of the Chief Engineer.**
2. **With reference to Clause No.4 under "General instruction to Contract" unless the Contractor submits his version of time and programme Chart within 15 days of communication of acceptance of tender, this chart shall be deemed to be as agreed and submitted by him.**
3. **In consultation with Superintending/Executive Engineer, this time and progress chart can be amended to bring in conformity and extension of time granted by competent Authority during this currency of the contract.**
4. **Ancillary work should be started that all such work shall be completed before the date of completion mentioned in the Appendix to the condition of contract.**

CHIEF ENGINEER

SCHEDULE OF QUANTITIES

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

1. Rates for each item of works are against the quantity only. Conditions of extra items will be applicable based on total quantity.
2. Rates for each item of works are on the basis of the make/brand of material mentioned in this schedule. However other equivalent make/brand as included under the heading Principal/Approved make can be chosen during execution subject to prior approval and price adjustment. In case of non availability of all the brands / makes mentioned under the heading "Principal/Approved make" Chief Engineer shall allow material of other make/ brand for use subject to price variation. For price variation purpose comparison shall be made with the brand/ make mentioned in the Schedule. However, after price adjustment if the derived rate becomes more than the rate quoted by the contractor, the contractor shall be paid quoted rate.

PART – A (CIVIL WORK)

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
1A	DEMOLITION WORK OF EXISTING FOUNDATION:				
1.01	Earth work in excavation by mechanical means (Hydraulic excavator) up to a depth of 1.5 m, below the existing ground level, over areas for demolishing/removing the existing foundations of buildings the superstructure of which is already demolished in all types of soil having ground water table at 1.00m(approx) below the existing ground level and carrying out dewatering with suitable method without affecting the neighboring buildings surrounding the plot. Approved excavated earth to be spread in low lying areas at work site and the surplus/rejected excavated materials to be dispose off in the Contractor's own dump outside the plot including carrying away the same from the excavated pit.	1450.00	213.00	Cum	308850.00
1.02	--DITTO-- as item no. 1.01 above but depth beyond 1.50m. but not exceeding 3.00m below the existing ground level.	1450.00	308.00	Cum	446600.00
1.03	--DITTO-- as item no. 1.01 above but depth beyond 3.0 m but not exceeding 4.50 m below the existing ground level.	965.00	385.00	Cum	371525.00
1.04	Close timbering over areas including strutting, shoring and packing cavities (wherever required) etc. complete. (Measurements to be taken of the face area timbered) :				
a)	Depth not exceeding 1.5 m	210.00	96.00	Sqm.	20160.00
b)	Depth exceeding 1.5 m but not exceeding 3 m	210.00	103.00	Sqm.	21630.00
c)	Depth exceeding 3 m but not exceeding 4.5 m	140.00	110.00	Sqm.	15400.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 144					1184165.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
1.05	Demolition of RCC work including cutting the reinforcement of existing foundation, the bottom of which lays approximately 4.0 m below existing ground level by mechanical means, and disposal of the demolished materials at the contractor's own dump outside the plot including carrying away the same from the excavated pit.	240.00	1234.00	Cum	296160.00
1.06	Demolition of plain cement concrete by mechanical means including disposal of materials from site at the contractor's own dump outside the plot including carrying away the same from the excavated pit..	165.00	737.00	Cum	121605.00
1.07	Demolition of underground brick work by mechanical means and disposal of materials at the contractor's own dump outside the plot including carrying away the same from the excavated pit..	185.00	715.00	Cum	132275.00
1.08	Filling the excavated pit with approved filling sand in layers of 300mm including watering, ramming, dressing and compacting to the required level as directed after demolition of the existing RCC work, PCC work, Brick work and taking away the same etc. complete.	4375.00	508.00	Cum	2222500.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.144					2772540.00

1.00 TRADE SUMMARY OF DEMOLITION WORK OF EXISTING FOUNDATION:

C/O TO TRADE SUMMARY VIDE PAGE NO. 143	:Rs. 11,84,165.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 144	:Rs. 27,72,540.00
=====	
C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 39,56,705.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
2	CONCRETE WORK AND PLOT FILLING: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
	<u>FORM WORK</u>				
	Providing and removing formwork/ centering and shuttering (for concrete members other than those having self finished exposed concrete surfaces needing no plaster) including strutting, propping, etc in floors at all levels and lift and removal of forms for: (Only steel plate, ply and steel props are to be used)				
2.01	In Foundations, footings, pedestals, columns, plinth beams, Grade beams, tie beams, stair case foundation & walls, cantilevers, projecting slabs, all work up to Plinth Level etc.	921.00	192.00	Sq.m	176832.00
2.02	In all types/shapes of beams, lintels above plinth level in superstructure	3640.00	314.00	Sq.m	1142960.00
2.03	In Columns, pillars etc. above plinth level (Super structure) at all levels of structure as directed by Engineer-in-Charge.	2400.00	421.00	Sq.m	1010400.00
2.04	In Floor / roof slabs, cantilever slabs / canopy slabs /Projecting slabs, floor landing, loft slab, kitchen platform slab etc including edges of slabs and breaks in floors.	3840.00	379.00	Sq.m	1455360.00
2.05	In Horizontal & vertical Fins & fascias, drop pardis, shelves, corbels, including edges etc.	378.00	668.00	Sq.m	252504.00
2.06	Chajjas, corbels, for decorative facia, fins, lift walls etc. including edges, (edges shall not be measured separately).	152.00	565.00	Sq.m	85880.00
2.07	In Centering & Shuttering for Lift Walls, Staircase walls, underground/over head tank water tank walls, parapet etc. of any thickness including pilasters, buttress etc.	802.00	348.00	Sq.m	279096.00
2.08	Window sills, kerbs & coping, bands etc.	65.00	182.00	Sq.m	11830.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 151					4414862.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	NOTE: PLAIN CEMENT CONCRETE AND REINFORCED CEMENT CONCRETE EXCLUDING CENTERING, SHUTTERING AND REINFORCEMENT				
2.09	Providing and laying PCC 1:3:6 (1 cement, 3 fine aggregates, 6 coarse graded aggregates of 20 mm and down size), in foundation pits for columns, rafts, walls, steps, trenches under plinth beams, bottom of drains or wherever required as directed	50.00	4563.00	Cum.	228150.00
2.10	Providing and laying PCC 1:2:4 (1cement, 2 fine aggregates, 4 coarse graded aggregates of 20 mm and down size) in floor bedding, 100 mm thick.	52.00	5591.00	Cum	290732.00
2.11	Providing and laying PCC 1:2:4 100mm thick broom finished with proper slope in plinth protection including dressing of earth and joints 12mm thick filled with bitumen and sand mix at intervals of 6 RM (coarse graded aggregate of 20mm size).	10.00	6061.00	Cum	60610.00
2.12	Providing and laying P.C.C. 1:2:4, in window sills average 75 mm thick (Coarse graded aggregates 12mm and down gauge).	61.00	487.00	Sq.m	29707.00
2.13	Providing and laying PCC 1:2:4 (1cement, 2 fine aggregate, 4 coarse graded aggregates of 20mm size) in coping over parapet wall, compound wall, piers, pillars, drains, etc. 75mm thick sloping to 50mm thick including projection if required (using coarse graded aggregate of 12mm size).	47.00	390.00	Sq.m	18330.00
2.14	Providing & laying 50mm thick PCC 1:2:4 in damp proof course using 12mm coarse graded aggregate with water proofing compound as per manufacturer's specification including applying one coat of bitumen S-90 over the PCC @ 1.75 kg per sqm.	14.00	399.00	Sq.m	5586.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.151					633115.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
2.15	Boring, providing and installing bored cast-in-situ reinforced cement concrete pile of specified diameter and length not less than 23.5m below the pile cap with M25 Grade cement concrete satisfying the requirement of IS:456(Latest Edition) ,the mix of which including chemical admixture, if any shall be decided by carrying out Design Mix at a Govt Recognised lab/Govt Engineering College, to carry a safe working load not less than as specified, excluding the cost of steel reinforcement but including the cost of boring with bentonite solution and temporary casing of appropriate length as required as per site condition. The concreting work shall be carried out by using a Mini Mobile Batching Plant .The minimum cement content shall not be less than as stipulated in IS:456(Latest Edition).The quoted rate is to include carrying out design mix for M25 grade concrete from a Govt Recognised lab/Govt Engineering College. The cost of materials for design mix and incidentals if any is to be included in quoted rate. The quoted rate is also to include Empty boring if any. Payment to be made on the basis of length between termination level and cut-off level.				
a)	500mm Dia Pile, Capacity 49T with length of 23.5 m from cut off level. The cut off level is 1.5 m below existing ground level.	940.00	2524.00	R.M	2372560.00
b)	600mm Dia Pile, Capacity 60T with length of 23.5 m from cut off level. The cut off level is 1.5 m below existing ground level.	1692.00	3376.00	R.M	5712192.00
c)	450mm Dia Pile, Capacity 43T with length of 23.5 m from cut off level. The cut off level is 1.5 m below existing ground level.	1974.00	2139.00	R.M	4222386.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.151					12307138.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
2.16	Vertical load test (Routine) by hydraulic jack on pile with 1.5 times the design load as per IS 2911(Part 4) latest edition. This item includes preparation of pile head, arrangement of dial gauges, loading platform, loading by sand bags etc. as necessary and removal of all these when test is complete. This item includes all necessary equipment, arrangement and materials at no extra cost.				
a)	500mm Dia. Pile - (Design load taking capacity 49 T)	1.00	36239.00	Each	36239.00
b)	600mm Dia. Pile - (Design load taking capacity 60 T)	1.00	39863.00	Each	39863.00
c)	450mm Dia. Pile - (Design load taking capacity 43 T)	2.00	36239.00	Each	72478.00
2.17	Vertical load test (Initial) by hydraulic jack on pile with 2.0 times the design load as per IS 2911(Part-4) latest edition. This item includes preparation of pile head, arrangement of dial gauges, loading platform, loading by sand bags etc. as necessary and removal of all these when test is complete. This item includes all necessary equipment, arrangement and materials at no extra cost.				
a)	500mm Dia. Pile - (Design load taking capacity 49 T)	1.00	28991.00	Each	28991.00
b)	600mm Dia. Pile - (Design load taking capacity 60 T)	2.00	31407.00	Each	62814.00
c)	450mm Dia. Pile - (Design load taking capacity 43 T)	1.00	28991.00	Each	28991.00
2.18	Demolition of RCC Pile heads upto desired depth including cleaning of steel bars and disposal of unserviceable materials to the contractors own dump.				
a)	500 mm Dia. Piles	40.00	121.00	Each	4840.00
b)	600 mm Dia. Piles	72.00	174.00	Each	12528.00
c)	450 mm Dia. Piles	84.00	98.00	Each	8232.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.151					294976.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
2.19	Providing & laying in position RMC of M25 Grade for RCC work using fly ash and cement content as per approved design mix satisfying IS:456(Latest Edition) and manufactured in fully automatic batching plant and transported to site of work in transit mixers for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for RCC work, including pumping of RMC from transit mixer to site of laying, vibrating, compacting and finishing excluding the cost of centering, shuttering, and reinforcement, including cost of admixtures in recommended proportions as per IS:9103 to accelerate/retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. Fly ash conforming to grade I of IS 3812(part-I) only be used as part replacement of OPC as per IS: 456. Uniform blending with cement to be ensured. No price variation shall be paid for cement consumed in this item. All work upto Plinth.	506.00	6500.00	Cum	3289000.00
2.20	Providing & laying in position RMC of M25 Grade for RCC work using fly ash and cement content as per approved design mix satisfying IS:456(Latest Edition) and manufactured in fully automatic batching plant and transported to site of work in transit mixers for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for RCC	1240.00	7181.00	Cum	8904440.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.151					12193440.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	work, including pumping of RMC from transit mixer to site of laying, vibrating, compacting and finishing, excluding the cost of centering, shuttering and reinforcement, including cost of admixtures in recommended proportions as per IS:9103 to accelerate/retard setting of concrete, improve workability without impairing strength and durability as per direction of engineer-in-charge. Fly ash conforming to grade I of IS 3812(part-I) only be used as part replacement of OPC as per IS: 456. Uniform blending with cement to be ensured. All work at any levels and any height. No price variation shall be paid on cement consumed for this item.				
2.21	RCC 1:2.4 with well graded stone chips of maximum size 20mm in Chajja, weather sheds etc. of average 75mm thick (if required thickness will vary within average thickness)	155.00	513.00	Sq.m	79515.00
2.22	R.C.C. 1:2:4 with well graded stone chips of maximum size 20mm in Kitchen Platform/Counters, 50mm thick.	70.00	342.00	Sq.m	23940.00
2.23	RCC 1:2:4 with well graded stone chips of maximum size 20mm in lintels and transoms.	28.00	6845.00	Cum	191660.00
2.24	Filling Plot in 300 mm layers with approved filling sand brought by the contractor from his own source from outside the work site including watering, ramming, dressing and compacting to the required level as directed.	1060.00	508.00	Cum	538480.00
2.25	Filling Plinth in 150 mm layers with approved filling sand brought by the contractor from his own source from outside the work site including watering, ramming, dressing and compacting to the required level as directed.	75.00	508.00	Cum	38100.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.151					871695.00

2.00 TRADE SUMMARY OF CONCRETE WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 145	:Rs. 44,14,862.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 146	:Rs. 6,33,115.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 147	:Rs. 1,23,07,138.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 148	:Rs. 2,94,976.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 149	:Rs. 1,21,93,440.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 150	:Rs. 8,71,695.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 3,07,15,226.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
3	BRICK WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
3.01	Brick work using best quality conventional brick with minimum crushing strength 75kg/sq.cm with standard dimension in one or more brick thick in foundations and plinth in Cement mortar 1:5	50.00	5025.00	Cum	251250.00
3.02	Brick work using best quality conventional brick with minimum crushing strength 75kg/sq.cm with standard dimension in one or more brick thick in superstructure at any height in Cement mortar 1:6.	610.00	5749.00	Cum	3506890.00
3.03	Brick work in half brick thick walls using best quality conventional brick with minimum crushing strength 75kg/sq.cm with standard dimension in superstructure in Cement Mortar 1:4 with 75 mm thick 1:2:4 R.C.C. horizontal bands at 1 meter centre to centre all along the brick-wall, reinforced with two numbers 8mm dia TMT steel bar (the rate shall be including R.C.C. and necessary shuttering. The reinforcement shall be measured and paid separately under item No. 4.01.) When the half brick wall does not touch the soffit of beams/slab, it also have R.C.C. band at the top.	1580.00	734.00	Sq.m	1159720.00
3.04	Brick on edge soling using CONVENTIONAL OVER BURNT (JHAMA) BRICKS with minimum crushing strength 75kg/sq.cm OF STANDARD DIMENSION with 25mm. thick layer of sand below and filling in joints properly including watering and consolidating etc. complete.	418.00	553.00	Sq.m	231154.00
3.05	Brick work using best quality conventional brick with minimum crushing strength 75kg/sq.cm with standard dimension in one or more brick thick in foundations and plinth in Cement mortar 1:5 (For strengthening the existing compound wall)	115.00	5025.00	Cum	577875.00
CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.210					57,26,889.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
4	STEEL AND IRON WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
4.01	Ribbed (Tor Steel)/TMT bar reinforcement in R.C.C works including bending, binding and straightening of bars and placing in position. (Steel supplied by contractor, refer Clause No. 5 of General Preambles).	360.00	58061.00	M.T.	20901960.00
4.02	Providing and fixing M.S. security grills of required pattern and design for windows, ventilators, balconies, railing, Gates, made with M.S. angles, flats, Square, round bars etc. and to be fitted to the concrete/Brick work with necessary holdfasts, welding, grouting with P.C.C., 1:2:4 etc. including two coats of synthetic enamel paint over a coat of primer all as per drawing and the instruction of the Engineering-in-charge	225.00	12920.00	Quintal	2907000.00
4.03	Providing & fixing MS Fan box of approved make & size including 12mm dia MS rod holdfasts, welding, grouting with R.C.C. slab etc. two coats of synthetic enamel paint over a coat of metal primer all as per instruction of the Engineering-in-charge.	140.00	125.00	Each	17500.00
4.04	M S Gates for compound wall consisting of MS pipes, MS tubes, MS flats, MS uprights, M.S. bars, M.S. thick plates etc. including all fittings & fixtures such as steel rollers, guide plates fixed in plain cement concrete 1:2:4, M.S. brackets/ cleats, stoppers, bearings, latch and locking arrangements, angle iron door stoppers embedded in plain cement concrete 1:2:4, tower bolts, G.I. pipe pieces, M.S. aldrops, etc. including welding and	6.00	10490.00	Quintal	62940.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.154					23889400.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	two or more coats of synthetic enamel paint over a coat of Zink Chromate metal primer complete as per drawing & as directed.				
4.05	Providing & fixing 40mm dia A class G.I. pipe for railing to be fitted to the concrete/Brick work with necessary holdfasts, welding, grouting with P.C.C., 1:2:4 etc. including two coats of synthetic enamel paint over a coat of metal primer all as per drawings and the instruction of the Engineering-in-charge.	210.00	382.00	R.M	80220.00
4.06	P&F Collapsible steel shutters with vertical channels 20 mm X 10 mm. X 2 mm.@100c/c and braced with flat iron diagonals 20 mm. X 5 mm. size, including top and bottom rails of M.S. tee 40 mm.X 40 mm X 6 mm. with 40 mm. dia. steel pulleys complete with bolts, nuts, locking arrangements, stoppers, handles, rollers, washers, etc. including two coats of synthetic enamel paint over a coat of primer complete as directed.	120.00	5686.00	Sq.m	682320.00
CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.154					762540.00

4.00 TRADE SUMMARY OF STEEL AND IRON WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 153	:Rs. 2,38,89,400.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 154	:Rs. 7,62,540.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 2,46,51,940.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
5	WOOD WORK AND JOINERY: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
5.01	Supplying and fixing seasoned Sal wood doors & Windows frames, transoms and mullions of sizes such as 150 mm x 60 mm, 95 mm x 60 mm. etc. and cut to shape, rebated including M.S. hold fasts, anti-termite treatment and two coats of synthetic enamel paint over a coat of primer painting over all exposed surfaces and surface contact with masonry or concrete should have painting with two coats of coal-tar as per drawings and as directed at site.	11.00	96703.00	Cum	1063733.00
5.02	Teak Wood moulded architrave 35mm x12 mm. fixed all around the frames of doors which are flush with plaster to walls including screws and painting as directed.	1315.00	94.00	R.M	123610.00
5.03	Providing and fixing factory made 38 mm thick ISI marked IS: 2202 (Part-I, Latest Edition) decorative type FLUSH DOOR SHUTTERS , core of block board construction with 4 mm thick teak veneer on both faces of shutters of approved make with 4 nos. of heavy weight stainless steel butt hinges including screws (100x60x2.5mm) satisfying IS: 12817 (Latest Edition) including lipping of teak wood of size 38x12 mm all-round the edge and surfaces of shutter with melamine polish etc. complete.	65.00	5148.00	Sqm	334620.00
5.04	Providing and fixing factory made 32 mm thick ISI marked IS: 2202 (Part-I, Latest Edition) non-decorative type FLUSH DOOR SHUTTERS, core of block board of approved make with 4 nos. of heavy weight stainless steel butt hinges including screws (100x60x2.5mm) satisfying IS:12817 (Latest Edition) including lipping of	370.00	3055.00	Sq.m	1130350.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.161					2652313.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	teak wood of size 30x12 mm all-round the edge and two coats of synthetic enamel paint over a coat of wood primer etc. complete.				
5.05	35 mm thick teak wood shutter with fly mosquito-proof net using stainless steel grade 304 wire gauge with wire dia 0.5mm and average width of aperture 1.4mm in both direction for doors, windows etc shutters made of styles and top rail 95 mm width, lock and bottom rails 197 mm width, with 4 nos. of heavy weight stainless steel butt hinges (100x60x2.5mm) satisfying IS: 12817 (Latest Edition), screws and two coats of synthetic enamel paint over a coat of wooden primer etc. complete.	58.00	4062.00	Sq.m	235596.00
5.06	P&F ISI marked Resin coated Flush door shutters 30mm thick having a louver of size 450x300mm and conforming to IS: 2202(Part-I) non decorative type, core or block board construction with frame of 1 st class of hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters, including ISI marked brass butt hinges 100mm long with necessary screws and resin coat on surfaces.	82.00	3104.00	Sq.m	254528.00
5.07	Providing & fixing stainless steel (Grade 304) railing made of hollow tubes, channels, plates etc. including welding, grinding, buffing, polishing and making curvature (where ever required and fitting the same with necessary stainless steel nuts and bolts complete including fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size, on top of the floor or side of waist slab with suitable arrangement as per	785.00	594.00	Kg	466290.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.161					956414.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	approval of Engineer-in-charge. (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners				
5.08	Providing and fixing 125mm long coach screws to door frames abutting R.C.C. columns and fixing the same with necessary rawl plugs/electric drill driven into column.	345.00	42.00	Each	14490.00
5.09	Providing and fixing Built-in double shutter wardrobes of 450 mm depth comprising of top, bottom, sides and shutters made of 19mm tk. BWR grade Block board and back of 6mm tk. BWR grade ply, having a 19mm tk. BWR grade block board vertical partition in the centre and a horizontal partition all as per drawing. The exposed surface shall be laminated with 1mm tk. laminates with 5mm tk. Teak wood lipping on exposed edges and all internal surface shall be painted with two coats of synthetic enamel paint over a coat of primer. The surfaces coming in touch with walls shall be painted with two coats of bitumen paint. The shutter shall be fixed with full length MS piano hinge including magnetic shutter catch. Both the top compartments shall be provided with Nickle coated 20mm dia MS pipes fixed with nickle coated brackets and flats for hanging cloths. The size and design shall be all as per drawings and instruction of the Engineer in charge. (All other Hardware shall be paid extra)	300.00	8600.00	Sq.m	2580000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.161					2594490.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
5.10	Providing and fixing of Overhead storage Unit of overall depth 450mm comprising of top, bottom and sides of 19mm tk. BWR grade Block board and back of 6mm tk. BWR grade ply, having a 19mm tk. BWR grade block board vertical partition in the centre and a horizontal partition at a height specified in the drawing. The exposed surface shall be laminated with 1mm tk. laminates with 5mm tk. Teak wood lipping on exposed edges and all internal surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer. The back surface coming in touch with wall shall be painted with two coats of Bitumen paint. The front shall be provided 19mm thick BWR block board shutters hung with 2 nos., 75mm wide MS hinges, including magnetic catches. The size and design shall be all as per drawings and instruction of the engineer in charge. (Hardware shall be paid extra).	40.00	4655.00	Sq.m	186200.00
5.11	Providing and fixing Show case of overall depth 350mm comprising of top, bottom and sides of 19mm tk. BWR grade Block board and back of 6mm tk. BWR grade ply, having a 19mm tk. BWR grade block board vertical partition in the centre and a horizontal partition at a height specified in the drawing. The exposed surface shall be laminated with 1mm tk. laminates with 5mm tk. Teak wood lipping on exposed edges and all internal surfaces shall be laminated with 1mm thick white balancing laminate. The back surface coming in touch with wall shall be painted with two coats of synthetic enamel paint over a coat of primer. The top compartment shall be comprising of fully glazed shutters of	85.00	7504.00	Sq.m	637840.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.161					824040.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	5mm tk. glass framed in 40mm wide block board and hung with 2 nos, 75mm wide MS hinge, including magnetic shutter catches. The glazed compartments shall be provided with 3 nos, 8mm thick glass shelves with edges polished, fixed on SS pins. The bottom compartments shall be provided with 19mm thick BWR block board shutters hung with 2 nos., 75mm wide MS hinges, including magnetic catches. The size and design shall be all as per drawings and instruction of the Engineer in charge.				
5.12	Providing & fixing letter box overall size 200x300x200mm of 12mm thick BWR plywood including locking arrangement and 1mm tk. laminates on the exposed sides. The inside surface and back to be painted with two coats of enamel paint over a coat of primer, all as per the directive of the Engineer in charge.	27.00	600.00	Each	16200.00
5.13	Providing and fixing 19 mm thick, 150 mm wide pelmet of 19mm commercial interior grade ply wood conforming to IS : 303 BWR interior grade , nickel plated M.S. pipe 20mm dia (heavy type) curtain road with nickel plated brackets, including fixing with hollock wood cleats of size 100mmx40mmx40mm on both side of pelmet and rawl plugs 75 mm long etc. two coats of synthetic enamel paint over a coat of wood primer etc. complete.	858.00	559.00	R.M	479622.00
5.14	Providing & fixing Plastic covered 10 gauge GI wires for drying cloths spaced out in between CP brass hook mounted on hardwood battens 150x75x25mm including supplying and fixing GI hooks.	540.00	28.00	R.M	15120.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.161					510942.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
5.15	Prime cost for purchase of Hardware, fixtures and fittings for doors, Window and Joinery etc.			Lump sum	300000.00
5.16	Contractor's percentage on above item no 5.15 for overhead including transport, screws, nails and profits for purchasing prime cost items and fixing them in position with screws, nails etc. complete.		25	%	75000.00
5.17	Providing and fixing Crockery unit of overall depth 600mm upto a height of 800mm and 450mm depth for balance height, comprising of top, bottom and sides of 19mm tk. BWR grade Block board and back of 6mm tk. BWR grade ply, having a 19mm tk. BWR grade block board vertical partition in the centre and a horizontal partition at a height specified in the drawing. The exposed surface shall be laminated with 1mm thick laminates with 5mm thick Teak wood lipping on exposed edges and all internal surface shall be laminated with 1mm thick white balancing laminate. The back surface coming in touch with wall shall be painted with two coats of synthetic enamel paint over a coat of primer. The top compartment shall be comprising of fully glazed shutters of 5mm thick glass framed in 40mm wide block board and hung with 2 nos, 75mm wide MS hinge, including magnetic shutter catches. The glazed compartments shall be provided with 3 nos, 8mm thick glass shelves with edges polished, fixed on SS pins. The bottom compartments shall be provided with 19mm thick BWR block board shutters hung with 2 nos., 75mm wide MS hinges, including magnetic catches. The size and design shall be all as per drawings and instruction of the Engineer in charge.	85.00	8874.00	Sq.m	754290.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.161					1129290.00

5.0 TRADE SUMMARY OF WOOD WORK & JOINERY:

C/O TO TRADE SUMMARY VIDE PAGE NO. 155	:Rs. 26,52,313.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 156	:Rs. 9,56,414.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 157	:Rs. 25,94,490.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 158	:Rs. 8,24,040.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 159	:Rs. 5,10,942.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 160	:Rs. 11,29,290.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 86,67,489.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
6	FLOORING AND FINISHING: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
6.01	Providing and fixing approved 18 mm thick pre-polished granite stone of sizes 900 X300 mm., 900X 150 mm, 900X900 mm laid in tread, riser, landing of entrance steps over bed mortar 20mm thick 1:4 (cement : sand) and floated in cement slurry including machine cut, machine polished, filling joints with white cement and colour pigment to match the colour of the stone, etc. making suitable arrangement to hold the stone properly etc. complete as per direction of the Engineer-in-charge.	535.00	3898.00	Sq.m	2085430.00
6.02	Providing and fixing approved 18 mm thick pre-polished granite stone sizes 1200mmx600mm or part thereof in wall cladding, over 12 mm. thick Cement Mortar backing 1:3 with necessary brass clips and floated in neat cement slurry filling joints with white cement and colour pigment to match with colour of stone etc. complete.	200.00	4199.00	Sq.m	839800.00
6.03	Providing and fixing approved 18 mm thick and 150mm high pre-polished granite stone in skirting, over 12 mm. thick Cement Mortar backing 1:3, and floated in neat cement slurry filling joints with white cement and colour pigment to match with colour of stone etc. complete.	270.00	636.00	R.M	171720.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166					3096950.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
6.04	Providing and laying pre-polished white marble minimum 16 mm thick sizes 1200mm x 900mm slab or part thereof in entrance/ corridor/ Officers' Quarters flooring as per design and pattern over bed mortar 20 mm thick 1:4 (Cement: sand) and floated with grey cement slurry @ 4.40 kg/sqm including machine cut machine polishing with hair fine joints with moulded exposed edges(for entrance), filling joints with white cement including rubbing and polishing complete etc. as per drawing and direction of the Engineering i in i charge.	2840.00	1649.00	Sq.m	4683160.00
6.05	Providing and laying pre-polished minimum 16 mm thick white marble in Skirting of entrance/ corridor/ Officers' Quarters over 12mm thick of Bed cement mortar 1:3 (1 Cement : 3 Coarse sand) and jointed with cement slurry @ 3.3 kg/sqm including pointing in white cement mixed with white pigment of matching shade of the Marble including rubbing and polishing etc. complete. Height of skirting shall be 150mm made out of marble.	3070.00	236.00	R.M	724520.00
6.06	Supplying and fixing 18 mm thick, mirror polished, pre-moulded and pre-polished, machine cut GRANITE sizes 1200mmx600mm/550mm or part thereof for kitchen platform/basin counter of required size, approved shade, colour and texture laid over 20 mm thick in Cement Mortar 1:4 (1 cement: 4 course sand), floated with grey cement slurry @ 4.40 kg/sq.m, joints treated with white cement with matching pigment, moulding and polishing to edge to give high gloss finish etc. complete at all levels. (area of each slab be more than 0.50sqm) complete.	70.00	3133.00	Sq.m	219310.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166					5626990.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
6.07	Proving and fixing 1st quality Ceramic glazed wall tiles 200mmX300mm conforming to IS: 15622 (thickness to be specified by the manufacturer) of approved make, in all colour and shades except burgundy, bottle green, black, in skirting, and dados, over kitchen platform, in wall above wash basin, in wall below kitchen sink etc over 12 mm thick cement mortar 1: 3 (1 cement : 3 course sand) and jointed with grey cement slurry @ 3.30 kg/sqm, including pointing in white cement mixed with pigment of matching shade etc. complete.	960.00	1081.00	Sq.m	1037760.00
6.08	Internal Cement Plaster in cement-sand mortar 1:4, minimum 12mm. thick smooth finish to brick/ Cement concrete work (excluding R.C.C. slab/beam Soffits) & all complete.	11050.00	140.00	Sq.m	1547000.00
6.09	Internal Cement Plaster in cement-sand mortar not less than 6mm thick smooth finish to soffits of R.C.C. slabs/beam & waist slab of Staircase in cement mortar 1:4 mix including chipping & all complete.	4050.00	117.00	Sq.m	473850.00
6.10	External Cement plaster 1:4, minimum 12mm thick, over concrete surface including water- proofing compound (@ 1kg per 50 kg of cement) & all complete.	340.00	152.00	Sq.m	51680.00
6.11	External Cement plaster 1:4, minimum 15mm thick, over brick/concrete surface including water- proofing compound (@ 1kg per 50 kg of cement) & all complete.	3700.00	216.00	Sq.m	799200.00
6.12	Providing and applying Ready Mix Wall putty (white cement based) approved make having minimum 1.5 mm. thick to walls, beams, slabs etc. including preparation of base.	15050.00	82.00	Sq.m	1234100.00
6.13	Applying exterior wall with Acrylic Smooth exterior paint (Anti-fungal) of required shade, two or more coats including priming coat of exterior cement primer. Consumption of paints as per manufacturer's specification for newly plastered surface.	3990.00	152.00	Sq.m	606480.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166					5750070.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
6.14	Supplying and fixing machine cut, machine polished approved WHITE Marble stone of in single piece in window sill, 16 mm thick over cement mortar 1:5 of 20 mm thick and floated in neat cement slurry filling joints with white cement to match with floor, polishing, etc. complete.	70.00	1237.00	Sq.m	86590.00
6.15	Distempering with washable 1st quality acrylic distemper paint of approved quality & shade in two or more coats over a coat primer to internal wall complete as per manufacturer's specification.	2475.00	91.00	Sq.m	225225.00
6.16	Wall/ceiling painting with plastic emulsion paint of approved quality & shade in two or more coats over a coat primer to internal wall complete as per manufacturer's specification.	8575.00	119.00	Sq.m	1020425.00
6.17	Oil bound Distemper paint of approved quality & shade in two or more coats over a coat primer to ceiling and wall. The rate is including surface preparation as per direction.	4019.00	70.00	Sq.m	281330.00
6.18	52 mm thick cement concrete flooring in stilt with concrete hardener topping, under layer 40 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix: 2 graded stone aggregate 6 mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications. This includes cost of cement slurry etc. complete.	532.00	398.00	Sq.m	211736.00
6.19	Plain cement skirting in C.M. 1:4, 12mm thick and 125 mm high with neat cement finish matching with flooring.	115.00	39.00	R.M	4485.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166					1829791.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
6.20	Galvanized Chicken wire mesh or (24 gauge, 10mm.size) of approved quality 150 mm wide, fixed at the Junctions of brick/concrete work and other locations as directed including fixing them by means of "U" shaped Gr.I., wire nails of adequate size before plastering.	1170.00	82.00	R.M	95940.00
6.21	Forming the grooves 12mmx12mm in green plaster surfaces maintaining the line and level etc. complete.	2330.00	33.00	R.M	76890.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166					172830.00

6. TRADE SUMMARY OF FLOORING & FINISHING WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 162	:Rs. 30,96,950.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 163	:Rs. 56,26,990.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 164	:Rs. 57,50,070.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 165	:Rs. 18,29,791.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 166	:Rs. 1,72,830.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 1,64,76,631.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
7	WATER PROOFING: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
7.01	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations through approved agency under guarantee of 10 Years .	470.00	810.00	Sq.m	380700.00
a)	Applying and grouting a slurry coat of neat cement using 2.75 kg/Sqm of cement admixed with proprietary water proofing compound conforming to IS: 2645 over the RCC slab including adjoining walls upto 300mm height including cleaning the surface before treatment.				
b)	Laying brick bats with mortar using broken/brick bats 25mm to 115mm size with 50% of cement mortar of mix 1 : 5 (1 cement 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 over 20mm thick layer of cement mortar of mix 1 : 5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 to required slope and treating similarly the adjoining walls upto 300mm height including rounding of the junctions of walls and slabs with minimum radius of 450mm and tucking the treatment in the vertical surface etc.				
c)	After two days of proper curing applying a second coat of cement slurry using 2.75 Kg/m ² of cement admixed with water proofing compound conforming to IS: 2645.				
d)	Finishing the surface with 20mm thick joint less cement mortar of mix 1 : 4 (1 cement 4 coarse sand) admixed with water proofing compound conforming to IS : 2645 including laying glass fiber cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300 x 300mm square 3mm deep.				
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.169					380700.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
e)	The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and through one of the approved agencies under guarantee of 10 years. With average thickness as 120mm. (Flat area covered between inside of the parapet wall [unfinished] shall be measured i.e., watta shall not be measured).				
7.02	Extra payable due to extra additional thickness of water proofing work over 120 mm thick average, surface water proofing treatment as described above 7.01 (for measuring average thickness of cement based surfaces water proofing treatment mentioned in this item, thickness of rounding / caves near parapet walls / curbs and the portion carried over in the parapet wall shall not be considered.	10.00	5000.00	Cum	50000.00
7.03	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portion of W.C. , kitchen and the like consisting of:	505.00	438.00	Sqm.	221190.00
a)	I course of applying cement slurry @ 4.4 kg/m ² mixed with water proofing compound conforming to IS : 2645 in recommended proportions including rounding off junction of vertical and horizontal surface.				
b)	II course of 20mm cement plaster 1 : 3 (1 cement 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface.				
c)	III course of applying blown or residual bitumen applied hot at @ 1.7 kg/m ² of area.				
d)	IV course of 400 micron thick PVC sheet. (overlaps at joint of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/m ² of area.				
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.169					271190.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
7.04	Cement based water proofing treatment conforming to latest IS code to sunk floors of toilets including filling in deep sunk floors with water proof brick bat coba, with cement mortar of mix 1:4 (1 cement 4 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 all as per specifications of and through one of the approved agencies under a guarantee of 10 years. The rate shall be including pressure grouting.	80.00	4515.00	Cum.	361200.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.169					361200.00

7. TRADE SUMMARY OF WATER PROOFING WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 167	:Rs. 3,80,700.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 168	:Rs. 2,71,190.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 169	:Rs. 3,61,200.00
=====	
C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs.10,13,090.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
8.00	ALUMINIUM AND GLAZING WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)				
8.01	Providing and fixing fully glazing colour anodized of minimum 20 microns, two track/three track aluminium WINDOWS (sliding) & ventilators (top hung) or outer frame vertical mullions, fixing the glazing and mosquito proof net with glazing clips of required size with EPDM gaskates. Shutter of the window shall be fixed to the frame with locking arrangement. The frames are to be fixed to the brick work / concrete with necessary rawl plugs, fasteners and fisher screws etc. all as per shop drawing. No and size of screws shall be decided as per the size of opening and maximum wind speed as defined in relevant IS Codes. Glazing and mosquito proof net will be measured and paid separately.	3300.00	478.00	Kg.	1577400.00
8.02	Providing in aluminium window, ventilator shutter etc. 5mm thick tinted float glass to be fixed as per specification mentioned in item no. 8.01 above etc. complete as per architectural drawings and the direction of Engineering-in-charge.	350.00	1210.00	Sqm.	423500.00
8.03	Providing in aluminium window, ventilator shutter etc. fly mosquito-proof net using stainless steel grade 304 wire gauge with wire dia 0.5mm and average width of aperture 1.4mm in both direction to be fixed as per specification mentioned in item no. 8.01 above etc. complete as per architectural drawings and the direction of Engineering-in-charge	380.00	350.00	Sqm.	133000.00
8.04	Providing in aluminium ventilator shutter etc. 5mm thick frosted glass to be fixed as per specification mentioned in item no. 8.01 above etc. complete as per architectural drawings and the direction of Engineering-in-charge.	25.00	1037.00	Sq.m	25925.00
CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.210					2159825.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9	SANITARY INSTALLATION, WATER SUPPLY AND DRAINAGE: (The quoted rate of items under this trade to include to work at any floor and at any height. All the C.P. fittings shall be of Jaquar make.)				
9.01	Proving & fixing G.I. water supply pipes "MEDIUM" quality ("B" class) 25 mm dia concealed to walls including all specials, fittings, Hessian wrapping, bitumen painting , refilling, chasing in walls and floors and making good of the plaster surface, etc. complete.	140.00	490.00	R. M	68600.00
9.02	Proving & fixing G.I. water supply pipes "MEDIUM" quality ("B" class) 20 mm dia concealed to walls including all specials, fittings, Hessian wrapping, bitumen painting , refilling, chasing in walls and floors and making good , of the plaster surface, etc. complete.	112.00	396.00	R. M	44352.00
9.03	Proving & fixing G.I. water supply pipes "MEDIUM" quality ("B" class) 15 mm dia concealed to walls including all specials, fittings, Hessian wrapping, bitumen painting , refilling, chasing in walls and floors and making good , of the plaster surface, etc. complete.	369.00	357.00	R. M	131733.00
9.04	Supplying & fixing ISI Marked 1st Grade of white vitreous Pedestal type W.C. pan (European pattern) having integrated Ø6 or 1½" trap of 400 mm height (approx) fixed to floor with C.P. brass screws and washers and making necessary connection with branch soil and vent pipe complete with white PVC seat cover, Low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. brass valve with polythene float, 32mm dia. PVC flush bend, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle. (110mm dia. PVC waste pipe and coloured flushing cistern shall be paid separately in the relevant items.)	26.00	3609.00	Each	93834.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					338519.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.05	Supplying & fixing ISI Marked 1st Grade of coloured vitreous Pedestal type W.C. pan (European pattern) having integrated Ø6 or 150 trap of 400 mm height (approx) fixed to floor with C.P. brass screws and washers and making necessary connection with branch soil and vent pipe complete with coloured PVC seat cover, Low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. brass valve with polythene float, 32mm dia. PVC flush bend, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle. (110 mm dia. PVC waste pipe and coloured flushing cistern shall be paid separately in the relevant items.)	2.00	4859.00	Each	9718.00
9.06	Supplying & fixing ISI Marked 1st Grade white vitreous Orissa pattern W.C. pan with integrated foot rests, size 580mm.X440 mm. fixed flush with floor including PVC " P" TRAP , Low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. brass valve with polythene float, 32mm dia. PVC flush bend with extra PVC pipe for IWC with fittings, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle making necessary 110mm dia PVC waste pipe connections up to vertical stack pipe, complete. (110 mm dia. PVC waste pipe and white flushing cistern shall be paid separately in the relevant items.)	26.00	4137.00	Each	107562.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					117280.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.07	Supplying & fixing ISI Marked 1 st Grade coloured vitreous Orissa pattern W.C. pan with integrated foot rests, size 580mm.X440 mm. fixed flush with floor including PVC नॉPòTRAP , coloured Low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. Brass valve with polythene float, 32mm dia. PVC flush bend with extra PVC pipe for IWC with fittings, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle making necessary 110mm dia PVC waste pipe connections up to vertical stack pipe, complete. (110 mm dia. PVC waste pipe and coloured flushing cistern shall be paid separately in the relevant items.)	1.00	5641.00	Each	5641.00
9.08	Providing and fixing white low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. Brass valve with polythene float, 32mm dia. PVC flush bend with extra PVC pipe for IWC with fittings, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling ,brass union, jam, nuts, handle, 15mm. C.P. brass angular stop cock etc. complete.	52.00	1895.00	Each	98540.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					104181.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.09	Providing and fixing coloured low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. Brass valve with polythene float, 32mm dia. PVC flush bend with extra PVC pipe for IWC with fittings, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle, 15mm. C.P. brass angular stop cock etc. complete.	3.00	2921.00	Each	8763.00
9.10	Providing and fixing Wash Basin of white glazed Vitreous China size 550 x 400mm with C.P. brass Central Hole Pillar Cock with aerator, 15mm. C.P. brass stop cock and 32mm C.P. brass waste coupling, 32mm dia PVC waste pipe, 10mm dia. CP pipe inlet, unions, joints, etc. supported on painted C.I. bracket etc. complete.	52.00	4690.00	Each	243880.00
9.11	Providing and fixing Wash Basin of COLOURED glazed Vitreous China size 550 x 400mm with C.P. brass Central Hole Pillar Cock with aerator, 15mm. C.P. brass stop cock and 32mm C.P. brass waste coupling, 32mm dia PVC waste pipe, 10mm dia. CP pipe inlet, unions, joints, etc. supported on painted C.I. bracket etc. complete.	2.00	5970.00	Each	11940.00
9.12	Providing and fixing Wash Basin of white glazed Vitreous China size 550 x 400mm with pedestal, C.P. brass Central Hole Pillar Cock with aerator, 15mm. C.P. brass stop cock and 32mm C.P. brass waste coupling, 32mm dia PVC waste pipe, 10mm dia. CP pipe inlet, unions, joints, etc. supported on painted C.I. bracket etc. complete.	26.00	5970.00	Each	155220.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					419803.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.13	Providing and fixing Wash Basin of COLOURED glazed Vitreous China size 550 x 400mm with pedestal, C.P. brass Central Hole Pillar Cock with aerator, 15mm. C.P. brass stop cock and 32mm C.P. brass waste coupling, 32mm dia PVC waste pipe, 10mm dia. CP pipe inlet, unions, joints, etc. supported on painted C.I. bracket etc. complete.	2.00	7239.00	Each	14478.00
9.14	Providing and fixing Chrome Plated 20 mm dia brass 600mm long towel rail.	82.00	1193.00	Each	97826.00
9.15	Providing and fixing 15mm dia. C.P. brass Bib cock with Wall Flange.	109.00	734.00	Each	80006.00
9.16	Providing and fixing 15mm dia. C.P. brass Angular male/ female / long thread stop cock.	56.00	700.00	Each	39200.00
9.17	Providing and fixing 110 mm dia. PVC floor trap WITH GRATING including bedding in cement mortar 1:5 brick-work bund for raising level ,making good the surface, , jointing with vertical stag etc. complete.	109.00	834.00	Each	90906.00
9.18	Providing and fixing 15mm dia. C.P. brass concealed stop cock, extra heavy body with adjustable Wall Flange.	54.00	866.00	Each	46764.00
9.19	Providing & fixing 600x450mm , 6mm thick mirror approved make & quality with 6mm thick ply backing with teak wood beading 50 mm x 25 mm of fixed to walls with wooden plug, C.P. brass screws etc. complete.	20.00	2401.00	Sq.m	48020.00
9.20	Providing and fixing 15mm dia. C.P. brass long body Bib cock with Wall Flange.	54.00	949.00	Each	51246.00
9.21	Providing and fixing 15mm dia. C.P. swan neck bibcock with Wall Flange for sink.	27.00	1275.00	Each	34425.00
9.22	Providing & fixing G.I.(A Class) Connecting pipe for waste and joining to traps etc -32mm dia including all specials.	219.00	402.00	R.M	88038.00
9.23	15mm dia C.P. brass extension piece with flange 100mm long.	219.00	128.00	Each	28032.00
9.24	Supplying and fixing CP (Chrome plated) brass Soap Dish.	82.00	367.00	Each	30094.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					649035.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.25	Providing & fixing CP brass glass self 600 mm long.	82.00	1042.00	Each	85444.00
9.26	Providing and fixing 15 mm dia. C.P. brass three in one wall mixture.	28.00	2683.00	Each	75124.00
9.27	Providing and fixing 15 mm dia. C.P. brass telephonic shower.	28.00	1505.00	Each	42140.00
9.28	Providing and fixing 15mm dia Chrome Plated brass Shower Arm, 200mm long.	55.00	1021.00	Each	56155.00
9.29	Providing and fixing 15mm dia Chrome Plated brass Shower Rose, 100mm dia.	55.00	936.00	Each	51480.00
9.30	Providing & fixing stainless steel sink of "NEELKANTH/NIRALI" of similar approved make with drain board approx. overall size 1040mmx510mmx225mm with 32mm dia C.P. brass waste coupling, 32mm dia P.V.C. waste pipe up to floor level	27.00	7628.00	Each	205956.00
9.31	Supplying and fixing G.I. water supply pipes "MEDIUM" quality ("B" class) fixed to walls including all specials making hole in walls and floors and making it good where directed , painting exposed length and fixing with M.S. clamps and wooden brackets to wall etc. complete.				
	a.) 50mm dia.	168.00	565.00	R.M.	94920.00
	b.) 40mm dia.	132.00	380.00	R.M.	50160.00
	c.) 32mm dia.	96.00	340.00	R.M.	32640.00
	d.) 25mm dia.	60.00	305.00	R.M.	18300.00
	e.) 20mm dia.	50.00	223.00	R.M.	11150.00
	f.) 15mm dia.	50.00	223.00	R.M.	11150.00
9.32	Providing and fixing Gun metal gate valve full way opening (conforming to IS: 776- class I) with M.S. wheel completer with necessary unions and joints.				
	a) 50 mm dia.	10.00	4255.00	Each	42550.00
	b) 40 mm dia.	10.00	2803.00	Each	28030.00
	c) 32 mm dia.	10.00	2009.00	Each	20090.00
	d) 25 mm dia.	82.00	1318.00	Each	108076.00
	c) 20 mm dia.	20.00	1116.00	Each	22320.00
	c) 15 mm dia.	20.00	719.00	Each	14380.00
9.33	Mosquito-proof Brass coupling of 50 mm.dia for venting G.I. down take pipes of overhead Tanks, complete.	5.00	215.00	Each	1075.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					971140.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.34	Supplying and fixing PVC, UV ray protected Rain Water Pipe 110 mm dia. (working pressure 4kg/ cm ²) including all specials such as bends, junction, tees, off-sets, jointing with necessary adhesive and gasket etc. all as directed by the Engineer-in-charge and painting etc. complete.	6.00	323.00	R.M	1938.00
9.35	Supplying and fixing PVC, UV ray protected Rain Water Pipe 160 mm dia. (working pressure 4kg/ cm ²) including all specials such as bends, junction, tees, off-sets, jointing with necessary adhesive and gasket etc. all as directed by the Engineer-in-charge and painting etc. complete.	330.00	597.00	R.M	197010.00
9.36	Supplying and fixing SWR PVC., UV ray protected Soil Waste pipe 110 mm dia (working pressure 6kg/ cm ²) including all specials such as bends, junction, tees, off-sets, jointing with necessary adhesive and gasket etc all as directed by the Engineer-in-charge and painting etc. complete.	680.00	494.00	R.M	335920.00
9.37	Providing & fixing SWR PVC. Cowls to suit with 110mm dia PVC soil pipes all complete.	12.00	133.00	Each	1596.00
9.38	Supplying and fixing Gun metal check valves (Non-return valve) horizontal or vertical type with all accessories complete - 40 mm dia.	1.00	995.00	Each	995.00
9.39	150 x 150mm S.W. gully trap with 100mm outlet on 100mm thick P.C.C. 1:4:8 bedding and 125 mm. thick brick masonry chamber of required depth in cement mortar 1:6, P.C.C 1:2:4 coping with 20mm thick 1:4 plaster smooth finished internally and rough finished externally including Mosquito proof full size C.I. hinges cover and frame size 225x300mm (weighing not less than 7.5 Kgs.) including excavation, refilling, ramming, watering and disposing off surplus materials etc. complete.	36.00	1731.00	Each	62316.00
9.40	Supplying and fixing PVC grating of approved pattern & quality to suit 160 mm dia PVC rain water pipe.	15.00	174.00	Each	2610.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					602385.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.41	Providing, laying and jointing 100 mm dia glazed stoneware pipes with stiff mixture of cement mortar in proportion 1:1 (1 cement: 1 fine sand) including testing of joints, , P.C.C. 1:5:10 (1 cement : 5 coarse sand: 10 graded stone aggregate 40 mm nominal size) 150 mm all-round S.W. pipes including bed concrete , including excavation upto 1.5mtrs. depth, refilling, ramming, watering disposing off surplus materials within LIC plot etc complete as per standard design.	120.00	628.00	R.M	75360.00
9.42	Providing, laying and jointing 150 mm dia glazed stoneware pipes with stiff mixture of cement mortar in proportion 1:1 (1 cement: 1 fine sand) including testing of joints, , P.C.C. 1:5:10 (1 cement : 5 coarse sand: 10 graded stone aggregate 40 mm nominal size) 150 mm all-round S.W. pipes including bed concrete 482 mm width , including excavation upto 1.5mtrs. depth, refilling, ramming, watering disposing off surplus materials within LIC plot etc complete as per standard design.	144.00	918.00	R.M	132192.00
9.43	Inspection chamber. of 750mm x 750mm internal size, including excavation return fillings, ramming, watering, 1:4:8, 150mm thick P.C.C foundation bedding, 250mm thick brick masonry in cement mortar, 1:4 smooth cement finish 20mm thick cement plaster of cement mortar 1:4 internally & rough finished from externally (external plaster upto 600mm. depth from top level) benching and channels in P.C.C. 1:2:4 with surface smoothly finished with cement, 100mm thick cover slab in R.C.C 1:2:4 reinforced with 10mm. dia. tor steel at 100mm centre to centre distance, both ways, medium duty (circular) C.I. cover and frame (including its fixing in R.C.C cover slab) weighing 52 Kgs. (Rate to include cost of steel reinforcement, centering, shuttering) etc. depth upto 1.0 Mtr.	15.00	10988.00	Each	164820.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					372372.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
9.44	Inspection chamber. of 1200mm x 900mm internal size, including excavation return fillings, ramming, watering, 1:4:8, 150mm thick P.C.C foundation bedding, 250mm thick brick masonry in cement mortar, 1:4 smooth cement finish 20mm thick cement plaster of cement mortar 1:4 internally & rough finished from externally (external plaster upto 600mm. depth from top level) benching and channels in P.C.C. 1:2:4 with surface smoothly finished with cement, 100mm thick cover slab in R.C.C 1:2:4 reinforced with 10mm. dia. tor steel at 100mm centre to centre distance, both ways, medium duty (circular) C.I. cover and frame (including its fixing in R.C.C cover slab) weighing 52 Kgs. (Rate to include cost of steel reinforcement, centering, shuttering) etc. depth upto 1.0 Mtr.	8.00	16560.00	Each	132480.00
9.45	One Pc moulded drinking water storage tank made from high density poly ethylene (HDPE) in double wall construction "SINTEX" make as manufactured by M/S SINTER PLAST CONTAINERS. Plastic division, The Bharat Vijay Mills Ltd., Kalar North, Gujrat, Pin: 382721 or other equivalent and approved make with 480 mm dia mosquito proof double seal manhole cover and frame necessary locking arrangements with G.I inlet and out let connection of required size 25 mm dia G.I. over flow pipe upto terrace level with mosquito proof brass couplings and 25 mm dia wash out pipe with plug including hoisting and installing in position etc. complete.	16000.00	7.00	Litre	112000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.180					244480.00

9.00. TRADE SUMMARY OF WATER SUPPLY & SANITARY INSTALLATION WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 171	:Rs. 3,38,519.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 172	:Rs. 1,17,280.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 173	:Rs. 1,04,181.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 174	:Rs. 4,19,803.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 175	:Rs. 6,49,035.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 176	:Rs. 9,71,140.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 177	:Rs. 6,02,385.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 178	:Rs. 3,72,372.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 179	:Rs. 2,44,480.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 38,19,195.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
10	UNDERGROUND WATER STORAGE TANK & PUMP ROOM				
10.01	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means up to a depth of 1.50 m, below the existing ground level, over areas for foundations of columns, walls, retaining walls, rafts, beams, steps etc. in all types of soil and rock including shoring, strutting, dewatering if required, return filling in sides of foundations, trenches and plinth (under floor) in layers not exceeding 150mm thick, with approved excavated earth, well watered and rammed etc. Approved excavated earth to be spread in low lying areas at work site and disposing off the surplus/rejected excavated materials to the Contractor's own dump outside the work site as directed.	81.00	213.00	Cum	17253.00
10.02	--DITTO-- as item no. 10.01 above but depth beyond 1.50m. but not exceeding 3.00m. below the existing ground level.	50.00	308.00	Cum	15400.00
10.03	P.C.C., 1:3:6, in floor bedding 100 mm. thick below bottom slab and steps etc. (course graded aggregate 20mm and down gauge).	5.00	4563.00	Cum	22815.00
10.04	Brick on edge soling using CONVENTIONAL OVER BURNT (JHAMA) BRICKS with minimum crushing strength 75kg/sq.cm OF STANDARD DIMENSION with 25mm. thick layer of sand below and filling in joints properly including watering and consolidating etc. complete.	54.00	553.00	Sq.m	29862.00
10.05	RCC 1:1.5:3 in bottom slab, side wall, laid to slope including sumps & water proofing compound.	22.00	6286.00	Cum	138292.00
10.06	RCC 1:1.5:3 in top slab with water proofing compound screed board finish.	10.00	6525.00	Cum	65250.00
10.07	M.S. rung steps, made of 16mm dia. bars bent to shape as required including embedding in R.C.C. walls including painting.	0.11	7500.00	Quintal	825.00
10.08	C.I. manhole cover and frame size 45cm. dia. weight 35kg. Including locking arrangement and painting.	1.00	2495.00	Each	2495.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.182					292192.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
10.09	G.I. inverted "U" for vents 50mm dia. including all specials, mosquito proof G.I. mesh (fixed type) and coupling (approx. length 90cm.)	1.00	900.00	Each	900.00
10.10	Form work/centering and shuttering for R.C.C work only including strutting, propping etc., in all floors at all levels and lift including removal. Only Steel & Ply shuttering and steel props are allowed. No wooden shuttering materials, bamboos and ballies will be allowed for: Shuttering should be water tight.				
	a) for beam ,slab etc.	50.00	379.00	Sq.m	18950.00
	b) for Vertical Walls.	116.00	348.00	Sq.m	40368.00
10.11	External and internal Cement plaster 1:4, 12mm. thick, with neat cement finish, to concrete work including water-proofing compound.	225.00	197.00	Sq.m	44325.00
10.12	150mm wide 4 to 5mm thick PVC waterstops (150mm thin type/JWS-2) as manufactured by M/s. Amar Deo Plastic Industries, 7-9, Satguru Manik Industrial Estate, Western Highway, Goregaon, (East), Bombay- 400 063 or M/s.Jyoti Rubber Udyog (I) Pvt. Ltd. 4041, Ajmeri Gate, Delhi-110 006 or other equal and approved in construction joint of underground water storage tank properly jointed by heating to form a continuous water tight diaphragm, as per manufacturer's specifications.	29.00	325.00	R.M	9425.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.182					113968.00

10.00. TRADE SUMMARY OF UGR TANK & PUMP ROOM:

C/O TO TRADE SUMMARY VIDE PAGE NO. 181 :Rs. 2,92,192.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 182 :Rs. 1,13,968.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210 :Rs. 4,06,160.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
11	PAVEMENT AND ROADS				
11.01	Brick on edge soling using CONVENTIONAL OVER BURNT (JHAMA) BRICKS with minimum crushing strength 75kg/sq.cm OF STANDARD DIMENSION with 25mm. thick layer of sand below and filling in joints properly including watering and consolidating etc. complete.	690.00	553.00	Sq.m	381570.00
11.02	P.C.C., 1:2:4 with well graded stone chips of maximum size 20mm ,100mm. thick average screed finished in areas not exceeding 25 Sq.M and joints filled with bitumen and sand, including imparting the necessary gradient/ slope/ camber to the surface, including 150 MICRON P.V.C. sheet as directed etc. complete.	150.00	606.00	Sq.m	90900.00
11.03	P.C.C. 1:2:4, KERB BLOCK of 500 x 300 x 75 mm. thickness smoothly finished both sides jointed in cement mortar 1:3, fixed between land scaping areas and cement concrete pavement so as to remain 100 mm above finished pavement level including necessary excavation refilling curing etc. complete as directed.	100.00	217.00	R.M	21700.00
11.04	Providing and fixing inter-locking 75 mm thick CONCRETE PAVER block over 25mm thick Sand layer (made of M 40 Grade Concrete.).	550.00	769.00	Sq.m	422950.00
CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.210					9,17,120.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
12	COMPOUND WALL				
12.01	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means up to a depth of 1.50 m, below the existing ground level, over areas for foundations of columns, walls, retaining walls, rafts, beams, steps etc. in all types of soil and rock including shoring, strutting, dewatering if required, return filling in sides of foundations, trenches and plinth (under floor) in layers not exceeding 150mm thick, with approved excavated earth, well watered and rammed etc. Approved excavated earth to be spread in low lying areas at work site and disposing off the surplus/rejected excavated materials to the Contractor's own dump outside the work site as directed.	22.00	213.00	Cum	4686.00
12.02	Brick work using best quality conventional brick with minimum crushing strength 75kg/sq.cm with standard dimension in one or more brick thick in foundations and plinth in Cement mortar 1:5	5.00	5025.00	Cum	25125.00
12.03	R.C.C 1:1.5:3 in Beam, Columns & foundation excluding reinforcement (Reinforcement will be paid separately under item no.-4.01)	1.00	6528.00	Cum	6528.00
12.04	P.C.C. 1:2:4 in coping of required shape and size 100mm. thick sloping to 75mm. thick with water proof compound over brick masonry walls, piers, pillars, mullions etc. (Coarse graded aggregate 20mm & down gauge).	31.00	390.00	Sq.m	12090.00
12.05	External Cement plaster 1:4, 15 mm. thick, with sand faced finish, to brick & concrete work with water proofing compound.	230.00	216.00	Sq.m	49680.00
12.06	Smooth Acrylic Emulsion exterior paint (Anti fungal) in three coats to the external surfaces as per manufacturer's specification. The rate is including surface preparation as per direction	235.00	152.00	Sq.m	35720.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.185					133829.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
12.07	Brick work using best quality conventional brick with minimum crushing strength 75kg/sqcm with standard dimension in one or more brick thick in superstructure at any height in Cement mortar 1:6.	5.00	5749.00	Cum	28745.00
12.08	M.S. Grill over compound wall M.S.Grill/railing of approved design and pattern for compound wall railing (Decorative) etc. made of M.S. angles, flats, square bars, pipe etc. and to be fitted to the concrete/Brick work with necessary holdfasts, welding, grouting with P.C.C., 1:2:4 etc. including two coats of synthetic enamel paint over a coat of metal primer all as per drawings and the instruction of the Engineering-in-charge.	6.00	12920.00	Qtls	77520.00
12.09	Brick work in half brick thick walls using best quality conventional brick with minimum crushing strength 75kg/sqcm with standard dimension in superstructure in Cement Mortar 1:4 with 75 mm thick 1:2:4 R.C.C. horizontal bands at 1 meter centre to centre all along the brick-wall, reinforced with two numbers 8mm dia TMT steel bar (the rate shall be including R.C.C. and necessary shuttering. The reinforcement shall be measured and paid separately under item No. 4.01.) When the half brick wall does not touch the soffit of beams/slab, it also have R.C.C. band at the top.	60.00	734.00	Sq.m	44040.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.185					150305.00

12.00. TRADE SUMMARY OF COMPOUND WALL:

C/O TO TRADE SUMMARY VIDE PAGE NO. 184	:Rs. 1,33,829.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 185	:Rs. 1,50,305.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 2,84,134.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
13.00	ANTI-TERMITE TREATMENT WORK:				
13.01	Injecting Chemical emulsion chloropyrifos as per manufacturer's specification or preconstruction anti termite treatment and creating a chemical barrier as per IS-6313 PART II, 1981 (or latest) in wall trenches, foundations, top surfaces of plinth filling, junction of walls and floors along the external perimeter of the building, surroundings of pipes etc., complete. The work shall be executed through approved agency/agencies and with guarantee of 10 years. The rates shall be as per plinth area including as directed below. (Plinth area of the Building at ground shall be measured for payment.)	510.00	191.00	Sq.M	97410.00
CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.210					97410.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
14	SEPTIC TANK & SOAK PIT				
14.01	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means up to a depth of 1.50 m, below the existing ground level, over areas for foundations of columns, walls, retaining walls, rafts, beams, steps etc. in all types of soil and rock including shoring, strutting, dewatering if required, return filling in sides of foundations, trenches and plinth (under floor) in layers not exceeding 150mm thick, with approved excavated earth, well watered and rammed etc. Approved excavated earth to be spread in low lying areas at work site and disposing off the surplus/rejected excavated materials to the Contractor's own dump outside the work site as directed.	18.00	213.00	Cum	3834.00
14.02	--DITTO-- as item no. 14.01 above but depth beyond 1.50m. but not exceeding 3.00m. below the existing ground level.	12.00	257.00	Cum	3084.00
14.03	P.C.C. 1:3:6 in foundation pit for columns, rafts, walls steps etc. (coarse graded aggregate 20mm and down gauge)	2.00	4563.00	Cum	9126.00
14.04	Brick on edge soling using CONVENTIONAL OVER BURNT (JHAMA) BRICKS with minimum crushing strength 75kg/sq.cm OF STANDARD DIMENSION with 25mm. thick layer of sand below and filling in joints properly including watering and consolidating etc. complete.	10.00	553.00	Sq.m	5530.00
14.05	RCC 1:1.5:3 in top slab (min 150mm) with water proofing compound screed board finish.	2.00	6528.00	Cum	13056.00
14.06	M.S. rung steps, made of 16mm dia. bars bent to shape as required including embedding in R.C.C. walls including painting.	0.05	7500.00	Quintal	375.00
14.07	C.I. manhole cover and frame size 45cm. dia. weight 35kg. Including locking arrangement and painting.	1.00	2612.00	Each	2612.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.188					37617.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
14.08	Brick work using best quality conventional brick with minimum crushing strength 75kg/sqcm with standard dimension in one or more brick thick in foundations and plinth in Cement mortar 1:5	5.00	5025.00	Cum	25125.00
14.09	Form work/centering and shuttering for R.C.C work only including strutting, propping etc., and lift including removal. Only Steel & Ply shuttering and steel props are allowed. No wooden shuttering materials, bamboos and ballies will be allowed for: Shuttering should be water tight. a. for vertical wall	6.00	379.00	Sq.m	2274.00
14.10	External and internal Cement plaster 1:4, 12mm. thick, with neat cement finish, to concrete work including water-proofing compound.	50.00	152.00	sq.m	7600.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.188					34999.00

14.00. TRADE SUMMARY OF SEPTIC TANK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 187 :Rs. 37,617.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 188 :Rs. 34,999.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210 :Rs. 72,616.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
15	RAIN WATER HARVESTING				
15.01	Boring/drilling bore well of required dia for casing/strainer pipes by suitable method prescribed in IS:2800(part-I), including collecting samples from different strata, preparing and submitting strata chart/bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction of engineer-in-charge, upto 90m depth below ground level.	50.00	381.00	R.M	19050.00
15.02	Supplying, assembling, lowering and fixing in vertical position in bore well, unplasticized PVC medium well casing (CM) pipe of 150mm dia conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction of engineer-in-charge.	10.00	561.00	R.M	5610.00
15.03	Supplying, assembling, lowering and fixing in vertical position in bore well, unplasticized PVC medium well screen (RMS) pipes with ribs conforming to IS: 12818, including hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction of engineer-in-charge.	50.00	567.00	R.M	28350.00
15.04	Supplying, filling, spreading & leveling stone boulders of size range 5cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction of engineer-in-charge.	2.00	493.00	Cum	986.00
15.05	Supplying, filling, spreading & leveling gravels of size range 5mm to 10 mm, in recharge pit over the existing layer of boulders, in the required thickness, for all leads & lifts, all complete as per direction of engineer-in-charge.	2.00	828.00	Cum	1656.00
15.06	Supplying, filling, spreading & leveling gravels of size range 1.5mm to 2 mm, in recharge pit over the existing layer of gravels, in the required thickness, for all leads & lifts, all complete as per direction of engineer-in-charge.	2.00	847.00	Cum	1694.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.191					57346.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
15.07	Gravel packing in tube well construction in accordance with IS 4097, including providing gravel fine/medium/coarse in required grading and size as per actual requirement, all complete as per direction of Engineer in charge.	2.00	896.00	Cum	1792.00
15.08	Providing & fixing factory made precast RCC perforated drain covers, having concrete of strength not less than M-25 of size 1000x450x50mm, reinforcement with 8mm dia 4nos longitudinal & 9nos cross sectional TMT hoop bars including providing 50mm dia perforates @ 100 to 125mm c/c including providing edge binding with MS flats of size 50mmx1.6mm complete all as per direction of engineer-in-charge.	1.00	933.00	Each	933.00
15.09	Providing and fixing of 150 mm dia. RCC Hume pipe including jointing of pipe etc. complete with 50 mm thick sand bedding.	75.00	411.00	R.M	30825.00
15.10	Inspection chamber. of 750 x 750mm internal size, including excavation return fillings, ramming, watering, 1:4:8, 150mm thick P.C.C foundation bedding, 250mm thick brick masonry in cement mortar, 1:4 smooth cement finish 20mm thick cement plaster of cement mortar 1:4 internally & rough finished from externally (external plaster upto 600mm. depth from top level) benching and channels in P.C.C. 1:2:4 with surface smoothly finished with cement, 100mm thick cover slab in R.C.C 1:2:4 reinforced with 10mm. dia. tor steel at 100mm centre to centre distance, both ways, medium duty (circular) C.I. cover and frame (including its fixing in R.C.C cover slab) weighing 52 Kgs. (Rate to include cost of steel reinforcement, centering, shuttering) etc. depth upto 1.0 Mtr.	3.00	10988.00	Each	32964.00
15.11	Providing & fixing MS Ball Plug/Bottom Plug of 150mm dia. to the bottom of pipe assembly of tube well as per IS 2800(Part-I)	1.00	200.00	Each	200.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.191					66714.00

15.00. TRADE SUMMARY OF RAIN WATER HARVESTING:

C/O TO TRADE SUMMARY VIDE PAGE NO. 189	:Rs. 57,346.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 190	:Rs. 66,714.00
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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 1,24,060.00

SCHEDULE OF QUANTITIES FOR ELECTRICAL WORKS (PART-B)

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16	Internal Electrical Work				
16.01	Point Wiring : (In heavy duty PVC rigid conduit laid in slab, beam, column & wall) Rates quoted below shall be inclusive of cost of providing necessary circuit wiring from DBs to switch boards with 2 x 2.5 sqmm. PVC insulated wires copper conductor in heavy duty PVC rigid conduit along with a continuous run of 1 no. 1.5 sqmm. PVC insulated copper earth wire. (Multi-Standard PVC insulated FR copper wires shall be used). Providing wiring with 2 x 1.5 sqmm copper conductor PVC insulated wire along with 1 no. 1.5 sqmm copper earth wire in heavy duty PVC rigid conduit concealed in walls, beams slabs etc. with shock proof accessories like modular type SSK/Anchor (ROMA) switches, plug sockets, bakelite covered brass batten / Angle Holder / 3 plate Ceiling rose etc. inclusive of suitable size sheet metal modular switch boxes to be fixed in concealed manner, face plate with inner cover "Roma Tresa Glossy" suitable for holding modular switches & sockets, blanking plate & connection, earthing as required. Rates quoted shall be inclusive of the cost of necessary chasing of wall for concealing various accessories like conduit, junction boxes and switch box etc. (Neutral and earth connection with looping back system)				
(A)	Wiring as above for light and Exhaust Fan points	690.00	825.00	Each	569250.00
(B)	Wiring as above for ceiling fan points	135.00	825.00	Each	111375.00
(C)	Wiring as above but for 5/6 Amp 5 pin modular socket switch including earthing the 3rd pin of socket with 1.5 sqmm PVC insulated copper wire away from switch board.	140.00	1093.00	Each	153020.00
(D)	Wiring as above as per the above item no.16.01 (C) but on same switch board	165.00	562.00	Each	92730.00
(E)	Wiring as above for two way light point controlled by 2 way switches in stairs.	10.00	1011.00	Each	10110.00
(F)	Wiring as above for call bell point including providing and fixing ding dong bell and fixing modular type bell push.	28.00	990.00	Each	27720.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					964205.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.02	SITC of extension of light / fan point, looping of point wiring from fitting to fitting.	20.00	357.00	Each	7140.00
16.03	POWER Point- Wiring for 15 / 5 Amps Power plug point with 2 x 4.0 Sqmm PVC insulated copper conductor wire and continuous 1 no. earth wire with 2.5 sqmm.PVC insulated copper conductor wire in heavy duty PVC rigid conduit including providing and fixing 6 pin 15/5 Amp modular socket and switch inclusive of suitable size sheet metal modular switch boxes to be fixed in concealed manner, face plate with inner cover "Roma Tresa Glossy" suitable for holding modular switches & sockets, connection, earthing as required. (Multi-Standard PVC insulated FR copper wires shall be used) [For AC points]	55.00	1314.00	Each	72270.00
16.04	Same as above but with 2 x 2.5 +1 x 1.5 Sqmm Copper wire.	50.00	958.00	Each	47900.00
16.05	SITC of AC point, industrial plug sockets of 20 Amp SPMCB 'C' series & 20 Amp Heavy duty socket in MS box of standard make with three pin plug top to be provided in conceal / on surface of wall as per direction and making connections.	2.00	802.00	Each	1604.00
16.06	Supplying and fixing compact power unit for air conditioner of North-West make cat no. ACPU6MBT(J/G/H) complete with starter, 32 Amp 'C' series DP MCB, plug socket with matching plug top, metal box in concealed manner , including necessary connections & earthing. (For window / Split AC).	55.00	1364.00	Each	75020.00
16.07	Supplying and drawing with 4 x 10 sqmm PVC insulated flexible wire copper conductor 1100 Volts in suitable size heavy duty PVC rigid conduit along with 2 nos. 6 Sqmm copper insulated earth wire including necessary connection. (Multi-Standard FR wires shall be used)	650.00	691.00	RM	449150.00
16.08	Same as above but 4 x 6 sqmm but 1no 2.5 sqmm	100.00	422.00	RM	42200.00
16.09	Same as above but 2 x 10 sqmm but 1no 4 sqmm	40.00	356.00	RM	14240.00
16.10	Same as above but 2 x 6 sqmm but 1no 2.5 sqmm	250.00	241.00	RM	60250.00
16.11	Same as above but 2 x 4 sqmm but 1no 2.5sqmm	100.00	190.00	RM	19000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					788774.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.12	Supply fixing, testing and commissioning of suitable way Vertical TPN DB double door type, comprising and enclosing the following & blanking plate as required: 1) 63 AMP, FP MCB -- 01 Nos. 2) 63 AMP FP ELCB -- 01 No. 3) 6 - 32 AMP SP MCB -- 12 Nos.	28.00	10773.00	Each	301644.00
16.13	Supply fixing, testing and commissioning of suitable way TPN DB double door type, comprising and enclosing the following & blanking plate as required: 1) 63 AMP, FP MCB -- 01 nos. 2) 63 AMP FP ELCB -- 01 No. 3) 6-32 AMP SPMCB -- 12 nos.	2.00	8372.00	Each	16744.00
16.14	Same as above but comprising with 1 no. 63 AMP FPMCB (For PUMP Room)	2.00	2795.00	Each	5590.00
16.15	Supplying and laying of following size pvc insulated and pvc sheathed round/strip armoured XLPE Aluminium conductor power cable of 1.1 KV grade with 2 no. 8 SWG GI earth wire on wall with suitable size MS clamp / in existing pipe/ in existing trench complete with end terminations like gland, lugs etc. In Wall/Existing Trench/Existing Pipe.				
(A)	1no 3.5 X 150 sqmm (2 run)	50.00	1085.00	RM	54250.00
(B)	1no 3.5 X 120 sqmm	200.00	906.00	RM	181200.00
(C)	1no 3.5 X 70 sqmm - For Floor Panel	70.00	590.00	RM	41300.00
(D)	1no 3.5 X 35 sqmm	50.00	332.00	RM	16600.00
(E)	1no.2C X 6.0 sqmm but with 1 no. 12 SWG	250.00	143.00	RM	35750.00
(F)	1no.2C X 4.0 sqmm but with 1 no. 12 SWG	250.00	124.00	RM	31000.00
16.16	Excavation of cable trench in all kinds of soil including rock of all variety up to a depth of 600 mm & 300 mm wide, filling the bottom of the trench with 3 mm layer of fine sand & then laying the cable & covering with 1 st class KB brick on both sides of the cable continuously & filling the voids with sand, then laying the top layer of brick placed side by side in continuous series as protective cover. (Total no. of bricks being 16 nos. per meter run) & filling the trench with a layer of sand and the balance trench with excavated earth & consolidation. (Note: Rate is over and above the cost of the cable as mentioned in earlier items)	300.00	220.00	RM	66000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					750078.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.17	Supplying installation testing and commissioning of Sleek type cubical panel fabricated out of 1.6 mm (16 Gauge) sheet steel and suitable frame work having independent Compartments for MCCB's / MCB's etc. The panel shall be wall/floor mounted it should be degreased, anti rust treated with two coats of red oxide primer and finished with two coats of powder coated paint. The panel shall have ventilator slots covered with wire mesh from inside. The panel door shall be inter locked with switch gears and have neoprene gasket. The design of the panel shall be such as to offer maximum safety and ease for maintenance. The busbars shall be of tinned copper and supported on non inflammable epoxy cast iron insulators. The terminators of cable/wire shall be from top or bottom as per site requirement. Engraved name plates shall be provided for each feeder cubical panel shall consist of following switch gears including copper leads between busbars and switchgears. The panel should have provision for cable of incoming and outgoing cables. The cubical should be provided with suitable Voltmeter & Ammeter with required CTs with phase selector & indicator lamps for the phases to read/indicate incoming voltage & current and provision of DANGER Board as per suitable dimension. Drawing of panel should be got approved before fixing. Note: For above items, the panel should have provision to take incoming cable from S.E.B, DG set & outgoing for DBs. The rates are inclusive of 1 set of Voltmeter with selector switches & fuses, 3 no. C.T. coils. A drawing should be prepared by the contractor & got approved from the competent authority.				
(A)	FEEDER PANEL : Same as above item no. 9 but with following Switchgears:- 1) 400 Amp. 415 volt, 4 pole, 50 KA MCCB with adjustable thermal setting - 01 No. 2) Tinned copper Bus bars along with insulators suitable for 400 Amp, 415 Volt, 4 Pole -1 Set. 3) 250 AMP, 415 volt 4P MCCB with 35 KA breaking capacity. - 2 No. 4) 100 AMP, 415 volt 4P MCCB with 25 KA breaking capacity - 01 Nos.	1.00	87450.00	Set	87450.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					87450.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
	5) 63 AMP, 230 volt FP MCB, 'C' series with 10 KA breaking capacity - 03 Nos. 6) 63 AMP, 230 volt DP MCB, 'C' series with 10 KA breaking capacity - 01 Nos. 7) Space for Energy Meter for 15 Nos.				
(B)	MAIN PANEL : Same as above but with following Switchgears:- 1)250 Amp. 415 volt, 4 pole , 35 KA MCCB with adjustable thermal setting - 01 No. 2) Tinned copper Bus bars along with insulators suitable for 250 Amp, 415 Volt, 4 Pole -1 Set 3) 100 AMP, 415 volt, 4P MCCB with 25 KA breaking capacity - 01Nos. 4) 63 AMP, 440 volt FP MCB, 'C' series with 10 KA breaking capacity - 15 Nos. 5) 63 AMP, 230 volt DP MCB, 'C' series with 10 KA breaking capacity - 02 Nos. 6) Space for Energy Meter for 15 Nos.	2.00	85210.00	Set	170420.00
16.18	Pump Panel : Supply, erection, testing and Commissioning of Pump Panel with 01 no 63 Amp FP MCB, 01 no. 63 Amp FP Changeover switch and 02 nos. DOL Starter with single phase preventer of approved make, suitable for 5HP Pump to be operated on 415 V with Three phase supply no-volt release with overload relay range suitable for above pumps, Complete in all respects on suitable size angle iron frame/M.S. board work grouted on wall in pump room.	2.00	19550.00	Set	39100.00
16.19	Supply and fixing MV Danger notice plate /caution board having inscription in Hindi / English and local language.	5.00	52.00	Set	260.00
16.20	Supply & Installation of earth electrode made of 40 mm dia. B class G.I. pipe of 3.0 meter long as per IS-3043 -1987 code of practice & its latest version with brick stationary chamber, RCC slab cover of 50 mm thick with lifting arrangement, including providing charcoal & salt in alternate layer, GI funnel for watering, clamping arrangement with bolts & nuts at the top of GI pipe electrode for connecting the earth wires as per the sketch enclosed. NOTE: The earth electrode shall have 12 mm dia. Holes drilled with spacing of 15 cm & 7.5 cm up to 2.5 meter length of the pipe from the bottom as shown in the enclosed sketch.	8.00	3057.00	Set	24456.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					234236.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.21	Supply & laying two runs of no.8 SWG G.I. earth wire 50 cm below the G.L or on surface of the wall or laying inside the protection pipe for connections between the earth electrode and the electrical main board/ sub-main board /meter board and making connections at both the ends.	160.00	29.00	RM	4640.00
16.22	Supply and laying 15 mm dia B class G.I. pipe 50 cm below the G.L or on surface or concealed wall for mechanical protection of the 8 SWG G.I earth wire including excavation and refilling, cutting the wall and making good the same to original finish.	80.00	115.00	RM	9200.00
16.23	S/Laying cable entry/protection pipe of "B" Class G. I. Pipe of following size to be laid horizontal in trench at road crossings/pathways/passages including cutting the concrete if required and making good the same.				
(A)	GI Pipe-150mm dia	20.00	1049.00	RM	20980.00
(B)	GI Pipe-100mm dia	30.00	735.00	RM	22050.00
(C)	GI Pipe-50mm dia	30.00	420.00	RM	12600.00
16.24	Supply & laying of 100 mm dia RCC hume pipe as per direction.	50.00	320.00	RM	16000.00
16.25	Supply & laying of 150 mm dia RCC hume pipe as per direction.	50.00	390.00	RM	19500.00
16.26	Supplying & fixing the following sizes M.S junction/ switch boxes, 16 SWG thick in the concealed/surface manner including cutting the wall and making good the same.				
(A)	MS Box-300 x 250x 50 mm deep	15.00	315.00	Each	4725.00
(B)	MS Box-250 x 200 x 50 mm deep	15.00	288.00	Each	4320.00
(C)	MS Box-175 x 100x 50 mm deep	25.00	236.00	Each	5900.00
(D)	MS Box-150x 100x 50 mm deep	25.00	157.00	Each	3925.00
(E)	MS Box-100x 100x 50 mm deep	25.00	131.00	Each	3275.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					127115.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.27	SITC of Post top lantern fittings of Crompton make Cat. No. CFPT1145 / SP or BM / BC or equivalent approved make with 1 no. 45 Watt CFL - DF along with all accessories choke, condenser etc. including supply & fixing MS grills for safety & protection of fittings, to be fitted on Gate pillar including providing & grouting 50mm. dia B class GI pipe of 600mm. long in Gate pillar, cable loop box of locking arrangement including 6Amp SP MCB, Neutral link connector etc. including providing required length of 3x1.5 sq.mm. PVC insulated Cu. FR wire for connecting the Gate light fittings from the loop box and necessary earth bolt with proper earthing. Pipe and loop box is to be painted with one coat of anti-corrosive red oxide and two coats of silver paints.	2.00	5457.00	Each	10914.00
16.28	do as above but fitting to be installed on top of street light pole and Supply & erecting 4.5 meters long 50mm dia. GI pipe of B class with 300mm x 300mm x 12mm base plate size welded to the bottom of the pipe with providing necessary cement concrete foundation of 1:2:4 ratios with provision of 2 nos. "B" class GI pipes of 32mm dia. 1.5 Mtr. Long for incoming & outgoing armoured cable of size 2 x 2.5 sqmm in & out of pedestal in concealed manner and of suitable size of water proof and hinged type cable loop box of locking arrangement including 6Amp SP MCB, Neutral link connector etc. including necessary earth bolt with proper earthing. Pipe and loop box is to be painted with one coat of anti-corrosive red oxide and two coats of silver paints, including providing required length of 3x1.5 sq.mm. PVC insulated Cu. FR wire for connecting the street light fittings from the loop box. (Drawing to be got approved before installation). The pedestal shall be painted with 2 coats cement paint of approved colour. Rate should include all the above things.	10.00	7870.00	Each	78700.00
16.29	SITC of street light luminaries of approved make similar to PHILIPS CAT no. HGS 120/ 136 HPF fluorescent STL	4.00	1732.00	Each	6928.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					96542.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.30	Supply, Erection, testing and commissioning of 1400 mm sweep ceiling fans with condenser double ball bearing, down rod, canopies, shackles, blades etc but without speed regulator suitable for operation on 230/250 volts 50 cycle single phase AC supply.	136 .00	1680.00	Each	228480.00
16.31	Supply & Fixing of Electronics plate / socket type rotary step type fan regulators suitable for ceiling fan.	136.00	472.00	Each	64192.00
16.32	Supplying and fixing 300mm sweep Exhaust fan suitable for use 230/250 volts 50 cycle single phase AC supply including providing and fixing with 6mm thick commercial ply board complete with connection.	30.00	1427.00	Each	42810.00
16.33	Supply and fixing of 1x28 watt box type fluorescent fitting with 1x28W T5 FTL WITH ELECTRONIC CHOKE. (Cat No Philips make TCH204 IX TL5 or equivalent approved make)	220.00	892.00	Each	196240.00
16.34	Supplying and fixing bulk head fittings with 9W PL of Philips make FXC101 or equivalent approved make.	5.00	586.00	Each	2930.00
16.35	Supplying and fixing light fittings with 18W CFL of Philips make or equivalent approved make.	5.00	700.00	Each	3500.00
16.36	Supplying and fixing of CFL fitting suitable for installation above mirror in toilets with 9W CFL lamp.	5.00	550.00	Each	2750.00
16.37	Supplying and fixing Surface mounting ceiling fitting CFL down lighter with 2x13 W / 2x 18 W CFL	5.00	1312.00	Each	6560.00
16.38	Supplying, erection, testing and commissioning of 5 HP Three phase monoblock centrifugal pump having MINIMUM capacity 325 LPM to against a head of 40 Mtrs. , suitable for operation on 415 V 50 Hz.. A/C Supply with necessary provision for connection suction & delivery pipe lines, providing & grouting foundation bolts, making electrical Connections, earthing as required. The make of the pump sets shall be KIRLOSKAR/CROMPTON/ BEACON.	2.00	25000.00	Set	50000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					597462.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.39	Supply & fixing of 32 mm heavy duty PVC rigid conduit ISI mark in concealed manner with necessary cutting and making good of all damages with original in complete.	50.00	89.00	RM	4450.00
16.40	Same as above but 25 mm PVC conduit.	50.00	69.00	RM	3450.00
16.41	Same as above but 20 mm PVC Conduit.	50.00	60.00	RM	3000.00
16.42	Supply, Installation, Testing and Commissioning 2 pair 0.5 mm size telephone wire through existing PVC conduit / casing & capping from tag block to the locations as directed.	1500.00	13.00	RM	19500.00
16.43	Do as above but with 10 pair cable	75.00	73.00	RM	5475.00
16.44	Supply, installation & commissioning of 10 Pair telephone box of approved make with locking & key arrangement fabricated with MS sheet & powder coated to be fixed in concealed manner including making good the damages.	2.00	787.00	Each	1574.00
16.45	Do as above but with 20 pair telephone box	2.00	1050.00	Each	2100.00
16.46	Supply & fixing of Modular RJ-11 Socket & Telephone box suitable for RJ 11 terminals including mounting box & top cover, to be fixed in concealed manner in wall/partition by providing & fixing on channels with necessary bolts & nuts or as directed at site including connection.	55.00	420.00	Each	23100.00
16.47	Supply & Drawing Co-Axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid & protected with existing conduit.	1110.00	26.00	RM	28860.00
16.48	Supply and fixing 6 way Tag Block for cable TV connection	35.00	787.00	Each	27545.00
16.49	Supply & fixing of TV Socket outlet modular type i/c mounting box to be fixed in concealed manner in wall / partition by p/f channel with necessary bolt & nut or as directed at site.	110.00	157.00	Each	17270.00
16.50	Supply, installation, testing & commissioning of Lighting arrestor.	3.00	1330.00	Each	3990.00
16.51	Supply & fixing of 25 × 5 mm GI earth strip fixed properly with saddles etc for connecting the earth electrode to the ground earth station	150.00	104.00	RM	15600.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 201					155914.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
16.52	Supply, Installation, Testing & Commissioning of Standalone Solar Street lights including providing necessary Solar module of 100Wp, 50mm dia GI pipe of approx length 4.5 Mtr (for mounting of solar panel, light fixture, Pole mounted box, Adaptors as necessary), LED lamp 12W with necessary drivers, Weather proof box suitable for mounting on pole and house MCB, Battery backup with 12V 40 AH tubular gel type Lead acid batteries, Charge Controller Unit	2.00	35000.00	Set	70000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.201					70000.00

16. TRADE SUMMARY INTERNAL ELECTRICAL AND STREET LIGHT WORK :

C/O TO TRADE SUMMARY VIDE PAGE NO. 192	:Rs. 964205.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 193	:Rs. 788774.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 194	:Rs. 750078.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 195	:Rs. 87450.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 196	:Rs. 234236.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 197	:Rs. 127115.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 198	:Rs. 96542.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 199	:Rs. 597462.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 200	:Rs. 155914.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 201	:Rs. 70000.00

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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs.3871776.00
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Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
17.	LIFT WORK				
17.01	Supply, Installation Testing & Commissioning of 06 Passenger capacities, Automatic Passenger Lift with V3F drive & as per the specification laid down in Technical Specification and Technical details of Lift of this tender. Make :OTIS/ KONE/ SCHINDLER/ MITSUBISHI ELECTRIC/ JOHNSON/ THYSSENCRUPP)	2.00	1600000.00	Set	3200000.00
CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.210					32,00,000.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.	FIRE FIGHTING WORK				
18.01	M.S. Pipe (Under Ground) Supplying, laying testing and commissioning of following sizes of M.S. pipes heavy duty , confirming to IS or its latest version including accessories such as tees , bends, reducers, flanges , heavy duty rubber gasket, nut and bolts, jointing, welding etc. Necessary cement concrete Anchor block as per site condition as directed at site, including excavation soil / rock as per site condition, minimum 0.5 m deep trench and refilling the trench properly. If any concrete flooring or road is to be cut, rates shall include cutting of the same and furnishing the same to original finish. H. G. flanges shall be welded with the pipe. Entire pipe which is buried in ground shall be wrapped and painted with anticorrosion black paint and applying hot bitumen on pipe after covering two layers of bituminized hessian cloth etc. complete in all respect.:				
(A)	150 mm. dia	20.00	1530.00	RM	30600.00
(B)	100 mm. dia	10.00	1270.00	RM	12700.00
18.02	Supply, laying, testing and commissioning of following size of M.S. Pipe heavy duty Conforming to IS or its latest version including special accessories like tees, bends, reducers, elbows, flanges, jointing and welding , M.S. clamps as directed at site etc. Complete in the shaft for lthe riser and as per site requirement including painting two coats of primer and two or more coats of post office red paint etc, complete in all respect.				
(A)	150 mm. dia	35.00	1380.00	RM	48300.00
(B)	100 mm. dia	10.00	1020.00	RM	10200.00
(C)	80 mm. dia	10.00	820.00	RM	8200.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					110000.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.03	Supplying, fixing testing and commissioning of single headed external yard hydrant comprising of flanges inlet of 63 mm single female instantaneous outlet of gun metal complete with black cap, chains with specials accessories as required as per IS: 5290 or its latest version, necessary incoming and outgoing flanges threaded or welded to MS. pipe including heavy duty rubber gasket, necessary nuts and bolts complete in all respects as required.	4.00	7000.00	Set	28000.00
18.04	Supplying, fixing, testing & commissioning, of double headed internal hydrant on floor/terrace comprising with double flanged inlet of 63m.m double female instantaneous out - let of gun metal complete with black cap, chains with special accessories as required as per IS 5290 or its latest version necessary incoming & out going flanges threaded/welded to MS pipe incl. heavy duty rubber gasket, necessary nuts,bolts complete in all respect.	7.00	9860.00	Set	69020.00
18.05	Supplying ,fixing, testing & commissioning of Wet Riser First Aid Hose Reel full swinging type painted with red enamel paint, wall mounted, fitted with 30 meters length of 20 mm dia high pressure DUNLOP RUBBER HOSE PIPE with gun metal 20mm screwed inlet for connecting to hose reel, valve, along with 25mm dia MS pipe from main riser up to hose reel including gasket flanges, nut & bolts, welding etc.as required as per IS specifications and connecting the same with the system(IS 884-1969 or its latest version) including shut off nozzle.	7.00	6355.00	Each	44485.00
18.06	Supplying, fixing & testing 63 mm branch pipe of necessary length with 20 mm dia GM nozzle suitable for connection from hydrant valve to hoses etc complete.	7.00	1840.00	Each	12880.00
18.07	Supplying & fixing, standard Fireman's Axes heavy duty insulated handle suitable for 11 KV supply.	7.00	410.00	Each	2870.00
18.08	Supplying, fixing, testing & commissioning of 63 mm 15 meters long reinforced rubber lined canvas Fire Hose pipe with Male & Female instantaneous coupling (To be connected to the above Gun Metal Hydrant) single / double confirming to latest IS with ISI mark.	15.00	3665.00	Each	54975.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					212230.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.09	Supplying, fixing, testing & commissioning of drainage arrangements for the vertical wet riser with necessary length of 40mm dia 'C' class GI pipe from system to lowest point of drainage arrangement complete along with 40 mm dia GM heavy duty gate valve and necessary nuts & bolts, flanges, heavy duty rubber gasket, welding etc. as required at site.	1.00	1680.00	Set	1680.00
18.10	Supplying, fixing, testing & commissioning of CYLINDRICAL TYPE AIR VESSEL 300 mm dia, 1.50 mtr fabricated made out of 6 mm thick MS plate with dish end with necessary AIR RELEASE VALVE, 25 MM DIA HEAVY DUTY GUN METAL WHEEL VALVE OF LEADER MAKE, WATER RELEASE VALVE necessary nipples, unions, elbows & heavy duty suitable pressure gauge including pipes to be connected with the ring main/wet riser with heavy duty rubber gasket, welding, nuts, bolts, flanges, MS support / angle iron frame work & cement concrete anchor blocks as required at site etc complete.	1.00	7990.00	Each	7990.00
18.11	Supplying, fixing, testing & commissioning of following sizes of double flanges sluice valve of steel/ cast iron body screw down type confirming to IS 780, brass rod spindle, hand wheel etc. complete in all respect with BRONZE/ GM gate parts capable with standing pressure up to 14 KG./ sq.cm. Hydraulic pressure complete.				
(A)	150 mm dia	1.00	8655.00	Each	8655.00
(B)	100 mm dia	1.00	7520.00	Each	7520.00
18.12	Supplying, fixing, testing & commissioning of following size double flanged C.I. Non-return valve as per IS- 5312 or its latest version, brass hinge pin, nuts & bolts, welding, washers, rubber gasket insertions etc. complete.				
(A)	150 mm dia	1.00	10585.00	Each	10585.00
(B)	100 mm dia	1.00	7180.00	Each	7180.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					43610.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.13	Supplying & fixing Fire Hose cabinet box made out of 16 gauge MS sheet including two coats of primer with 4 mm thick glass door in front painted "FIRE" in red luminous paint. The size of the box should be 900 mm x 600 mm x 300 mm capable of accommodating a pair of hose with coupling, nozzle & yard hydrant. The box should be floor mounted type with locking arrangement and lever for opening the door after breaking the glass.	4.00	3030.00	Each	12120.00
18.14	Providing and fixing double hinged shutter (2Nos) with 4 mm thick glass front door & frame made out of 16 gauge M.S sheet for housing landing valves, hose reel, hose pipe, branch pipe etc painted "FIRE" with locking arrangements, keys etc complete of size approx (1.0 x 1.0 M).	7.00	4735.00	Each	33145.00
18.15	TERRACE PUMP : Supplying, fixing, installing, testing and commissioning of electric driven FIRE FIGHTING TERRACE PUMP SET suitable for necessary incoming & out going connections G.I. Pipes and accessories, flanges, gasket, nuts & bolts, sockets, bends, reducer along with necessary welding and control cable of suitable size including providing thimbles, lugs, etc, as required for connection of the pump. The rates shall be inclusive for control cable as well as alignment. The motor pumping set shall be consisting of the following. (i) Providing and fixing horizontal mounted FIRE FIGHTING TERRACE PUMP having CAST IRON BODY, GUN METAL / BRONZE IMPELLER, STAINLESS STEEL SHAFT & capable of delivering 900 LPM against a total head of 45 meters so as to ensure a minimum pressure of 2 Kg/Sq. cm. At the highest & farthest out let complete with specified flow including pressure gauge. (ii) AC Motor totally enclosed, fan cooled, 3 phase, 50 cycles (Hz), suitable for above pump with dip proof enclosure & flexible coupling confirming to IS 4961 or its latest version. (iii) Common bed plate of mild steel channel and vibration damping arrangement by providing and fixing DUNLOP MAKE CUSHING FOOTINGS ALONG WITH NECESSARY NUTS & BOLTS. (iv) Suitable 1:2:4 concrete foundation for above motor pumping set.	1.00	29000.00	Set	29000.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					74265.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.16	SITC of Necessary Starter with suitable Ammeter , Voltmeter with selector switch, indicating lamps single phase preventer totally automatic star delta starter , with required accessories for automatic operation as stated above for pump at terrace, complete in all respect including all connections.	1.00	5910.00	Set	5910.00
18.17	Supplying and laying of 3.5x35 Sqmm P.V.C insulated P V C sheathed aluminium conductor armoured cable, 1100 volt grade with two run of 8 SWG G.I. Earthwire. Partly on wall / Existing cable tray / Readymade trench along with necessary clamp, underground trends by excavating 600 mm deep, bricks & Sand directed with thimbles, ferrules, numbering of cable including making connection with gland & aluminium lugs etc complete.	125.00	360.00	RM	45000.00
18.18	Providing and making 1200 x 1200 mm clear inside valve chambers as required depth min 600mm to invert 200 mm PCC 1:3:6 bedding at bottom, 200/230 mm brick walls in C.M. 1 : 4 plastering inside smooth finish, excavating soil/rock and back filling as directed & complete.	1.00	5925.00	Each	5925.00
18.19	DO as above but 1200x900 mm chamber.	2.00	5320.00	Each	10640.00
18.20	Supplying and fixing heavy duty C.I. Cover and frame suitable for above chambers.	100.00	80.00	Kg	8000.00
18.21	Supplying and fixing a set of fire buckets with round bottom, each set comprising of 3 nos. buckets each of 9 (nine) Ltrs. capacity including providing and fixing suitable stand made out of G.I. pipe "B" class, brackets with hooks for holding buckets, painting with red paint and lettering "FIRE" on each buckets and filling them with sand as required .	3.00	2540.00	Set	7620.00
18.22	Supplying & fixing of following fire extinguishers with initial filling, wall bracket including nuts & bolts etc. complete.				
(A)	4.5/5 Kg CO2 Type	14.00	7400.00	Each	103600.00
(B)	5 Kg. DCP Powder (ABC Type)	14.00	2540.00	Each	35560.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					222255.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.23	Supply, installation testing & commissioning of 4 zones Manual Fire Alarm panel complete with modern technology, card system, necessary transformers, solid state batteries re-chargeable type, battery charger, with public address system, indication lights, (L.E.D).	1.00	12425.00	Set	12425.00
18.24	Supplying, installation, testing and commissioning of manual fire Alarm stations (pill boxes) complete with auxiliary double contact lamp, front Glass, Hammer, push Button in M.S box painted with red post office paint concealed / surface on wall column including necessary incoming and outgoing connections etc, all complete.	10.00	458.00	Each	4580.00
18.25	Supplying, installation, testing & commissioning of response indicator housed in 16 SWG MS sheet enclosure along with 2mm acrylic sheet and LED etc, complete.	5.00	275.00	Each	1375.00
18.26	Supplying, fixing and laying of following sizes of MS conduit and accessories wall/CEILING/ flooring. The rates shall include for chasing and cutting of walls flooring, etc as required at site and making good the same in the original finish				
(A)	20 MM dia conduit.	50.00	60.00	RM	3000.00
(B)	25 MM dia conduit.	50.00	69.00	RM	3450.00
18.27	Supplying, Laying & drawing following sizes of PVC insulated multistrand copper conductor fire retardant wires through existing conduit pipe already laid or through P.V.C channel (base and cover) already provided including making necessary incoming and outgoing connections for fire alarm systems.				
(A)	2x1.5 Sq mm FR Wire	75.00	38.00	RM	2850.00
(B)	3x1.5 Sq mm FR Wire	100.00	54.00	RM	5400.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					33080.00

Item No	Description	Quantity	Rate (Rs)	Unit	Amount (Rs)
18.28	Supplying & laying 3x1.5 Sq mm copper conductor P V C insulated armored cable partially on surface of wall / duct /pipe / concealed including making connection etc complete.	120.00	144.00	RM	17280.00
18.29	Supplying & Fixing EXIT Sign made of good quality, self luminous type glow sign at every staircase landing.	14.00	1035.00	Each	14490.00
18.30	Providing and fixing floor marker on acrylic sheet properly painted with self luminous paint.	14.00	1215.00	Each	17010.00
18.31	Supply installation testing & commissioning of optical type smoke detector with LED (flickering) type etc complete.	10.00	1480.00	Each	14800.00
18.32	Supply installation testing & commissioning of electronics hooter cum speaker with 4 watt output sound as per ISI specifications housed in MS box of proper size painted with red post office paint including necessary incoming & outgoing connections etc complete.	2.00	520.00	Each	1040.00
CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.209					64620.00

18. TRADE SUMMARY FIRE FIGHTING WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 203	:Rs. 110000.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 204	:Rs. 212230.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 205	:Rs. 43610.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 206	:Rs. 74265.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 207	:Rs. 222255.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 208	:Rs. 33080.00
C/O TO TRADE SUMMARY VIDE PAGE NO. 209	:Rs. 64620.00

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C/O TO GENERAL SUMMARY VIDE PAGE NO.210	:Rs. 760060.00
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SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

GENERAL SUMMARY

TRADE	TRADE SUMMARY	C/O FROM PAGE NO.	AMOUNT
1	DEMOLITION WORK OF EXISTING FOUNDATION	144	39,56,705.00
2	CONCRETE , FORM WORK & PLOT FILLING	151	3,07,15,226.00
3	BRICK WORK	152	57,26,889.00
4	STEEL & IRON WORK	154	2,46,51,940.00
5	WOOD WORK AND JOINERY	161	86,67,489.00
6	FLOORING AND FINISHING	166	1,64,76,631.00
7	WATER PROOFING	169	10,13,090.00
8	ALUMINIUM DOORS, WINDOWS, VENTILATOR & GLAZING	170	21,59,825.00
9	WATER SUPPLY AND SANITARY INSTALLATIONS	180	38,19,195.00
10	UNDERGROUND WATER STORAGE TANK & PUMP ROOM	182	4,06,160.00
11	PAVEMENTS AND ROADS	183	9,17,120.00
12	COMPOUND WALL	185	2,84,134.00
13	ANTI-TERMITE TREATMENT	186	97,410.00
14	SEPTIC TANK & SOAK PIT	188	72,616.00
15	RAIN WATER HARVESTING	191	1,24,060.00
16	INTERNAL ELECTRICAL WORK AND STREET LIGHT WORK.	201	38,71,776.00
17	LIFT WORK	202	32,00,000.00
18	FIRE FIGHTING WORK	209	7,60,060.00
TOTAL ESTIMATED COST OF THE PROJECT		RS.	10,69,20,326.00

SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, FIRE FIGHTING SYSTEM, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 27 NOS. OF OFFICERS' QUARTERS AT JEEVAN ANAND, FRAZER ROAD, PATNA, BIHAR

SUMMARY

TOTAL ESTIMATED COST (CIVIL+ELECTRICAL) :Rs.10,69,20,326.00

LESS: PRIME COST (T.I. No. -5.15 page no. 160) (-) :Rs. 3,00,000.00

TOTAL COST AFTER DEDUCTION OF PRIME COST :Rs.10,66,20,326.00

PERCENTAGE ABOVE / BELOW / AT PAR (+/-) :Rs.
ON THE ABOVE (..... %)
(Strike out whichever are not applicable)

TOTAL COST AFTER OFFER GIVEN :Rs.
BY CONTRACTOR

ADD: PRIME COST (T.I. No. -5.15 page no. 160) (+) :Rs. 3,00,000.00

SUBMITTED TENDER AMOUNT :Rs.

In words:
(Rupees.....) only.

CARRY OVER THIS AMOUNT (QUOTED TENDER AMOUNT) TO LETTER TO CHIEF ENGINEER FROM CONTRACTOR ON PAGE NO. 6

(SIGNATURE OF CONTRACTOR)