Central Bankura Integrated Palmgur Cluster

TENDER DOCUMENTS

Common Facility Centre (CFC) Building Construction
Chhatna, Bankura
West Bengal

Prepared by: R.S. Consultants

98, Subodh Park, Bansdroni, Padma Apartment,
1st Floor, Kolkata - 700070

Tender Published: 23rd January, 2021
Sale of Tender form: 25.01.2021 (11 AM) – 04.02.2021 (6 PM)
Last Date of Submission: 06.02.2021 at 6 PM
Tender opening date: 09.02.2021 at 1 PM

DRCSC
Implementing Agency
Development Research
Communication and Services centre

Technical Agency
Vivekananda Institute of
Biotechnology





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(VOL-1)

DEVELOPMENT RESEARCH COMMUNICATION AND SERVICES CENTRE

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Registered Office : 18B, Gariahat Road (South), Dhakuria, Kolkata - 700 031
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Donations to DRCSC are exempted u/s 80G of Income Tax Act, 1961

DRCSC
ESTD - 1982

Establishment of Common Facilities Centre (CFC) at Chhatna, Bankura, West Bengal under SFURTI Scheme

Re-Tender Notice

NIT: DRCSC/CBIPGC/03 **Dt: 23.01.2021**

DRCSC invites sealed tender from reputed Contractors / Engineering firms for total **3600 Sq. feet** (two storied) civil and electrical work of Common Facility Centre for Central Bankura Palmgur Cluster at Siuligora Mouza, Post+PS: Chatna in Bankura dist. under the scheme SFURTI of Ministry of MSME, Govt. of India with support from KVIC. The tender document are available at the following address DRCSC, 58A, Dharmotola Road, Bosepukur, Kasba, Kolkata-700042 (working days only). The application fee of **Rs.1000/-** (non-refundable) to be paid by DD in favour of Central Bankura Integrated Palmgur Cluster or from KVIC's website www.kvic.org.in

Tender Value: 45 Lakhs (Inclusive of all Taxes)

Sale of Tender form: 25.01.2021 (11 AM) - 04.02.2021 (6 PM)

Last Date of Submission: 06.02.2021 at 6 PM

Tender opening date: 09.02.2021 at 1 PM

The details of works and Terms and Conditions are available in the Tender documents

Chief Functionaries (Secretary)
Development Research Communication and Services Centre,
58A, Dharmotola Road, Bosepukur, Kasba
Kolkata-700042

NOTICE INVITING TENDER

To

_____
_____
_____
_____

TENDER FOR CONSTRUCTION OF THE 3600 Sq. FEET (two storied) COMMON FACILITY CENTRE ON FOOD PROCESSING BUILDING AT VILL & MOUZA: SHIULIGARYA, J.L. NO. 105, P.O. + P.S-CHHATNA, CHHATNA-I GRAM PANCHAYET, PIN CODE -722132, DIST - BANKURA

Dear Sir,

1) **Development Research Communication And Service Centre (DRCSC)** , hereby invites sealed tenders on ITEM RATE basis for above mentioned works for their Food Processing Centre Building At Chhatna , Bankura

2) Total Tender amount of the CFC Building is **INR 45 Lakhs** inclusive of all Taxes

3) The tender forms can be collected from the office of DRCSC office address, 58A, Dharmatola Road, Bosepukur, Kasba, Kolkata 700042 **from 27.01.2021** during working hours between 10.00 am to 18:00 pm on payment of Rs 1000/- in cash/DD in favour of Central Bankura Integrated Palmgur Cluster except Holidays and Sundays.

4) Submission of Tender

The Tenders are to be submitted in two sealed envelope marked as Techno Commercial Bid & Financial / Price Bid, clearly identified with contents in the prescribed format indicating the price schedule for individual works, material specifications and makes to the concerned office. Technical Bid and Financial Bid should also be clearly mentioned on envelop. **Contact Person Mr. Sourav Ghosh Ph-9432013248 (Between 11 am to 5 pm)**

5) Your tender duly filled in signed and sealed, should be addressed Development Research Communication And Service Centre & should be submitted in person to the Office of the Client on or before 06/02/2021 **Earnest Money** of **Rs 10,000/-** to be submitted in the form of Demand Draft in favour of **"Development Research Communication Services Centre"** payable at Kolkata which shall be adjusted towards the security deposit of the successful contractor. Earnest Money of unsuccessful tenderer shall be returned within 30 days from Bid Opening.

6) Tenders received late on account of any reason whatsoever and telegraphic tenders will not be entertained.

7) Normally t*he client discourages the stipulation of any conditions by the tenderer.*

8) The Tender shall be ***valid*** for a period of ***60 days***, from the last date of submission of the tender.

9) For any further information on the tender, the tendered should meet relevant person from the Client's / Architect's office with prior appointment

10) The Client shall not be bound to accept the lowest tender and reserves the right to reject any or all the Tenders without assigning any reason therefore.

11) All decisions as to the selection of Contractors, award of work, will be made by The Owner.

12) Bid will be opened on **9th February'2021** (Tentative) in presence of all Bidder's authorized representatives.

13) Tenderer should study all relevant drawings, available in the office of the Client

14) Before submission of the bid and clarify all his doubts in Techno Commercial Offer.

15) The tendered firm should submit tender for the whole works. Tender for partly works will not be accepted.

16) The Technical Bid will be opened and considered first. The financial Bid of only eligible firms/agencies will be opened.

Yours faithfully,

For DRCSC Dated:

INSTRUCTIONS TO TENDERERS

1. The brief description of work to be carried out and its scope are given in the "Synopsis" of these documents.

2. The contractor should note that information, if any, as regards to the site and local conditions, as contained in these tender documents has been given merely to assist the contractor and is not deemed to be complete.

2.1 The contractor should note and bear in mind that the Owner shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge, as aforesaid, on the part of the contractor shall be at their risk and cost and no charges or claims whatsoever consequent upon the lack of any information, knowledge or understanding shall be entertained or payable by the Owner either during tender stage or during the construction period.

2.2 The rates settled shall include all charges for centering ,shuttering, including form work ,scaffolding, staging, plant and equipment, storage sheds, watching and lighting, by night as well as day including Sundays and Holidays, temporary plumbing ,sanitation and electric supply, to operate all machineries etc for execution of work uninterruptedly, protection of the public and safety of adjacent roads, streets, cellars, vaults, ovens, pavements, walls, houses, buildings and all other erections, matters or things and the Contractor shall take down and remove any or all such as scaffolding, staging etc., as occasion shall require or when ordered so to do, and fully reinstate and make good all matters and things disturbed during the execution of work and to the satisfaction of the Engineer. **The rates quoted in the Annexure-1 shall be inclusive of all taxes, duties and levies including Excise duty, general tax, octroi duty, Tax on works contract etc. Workers and employees statutory obligations, ESI, PF as applicable etc. etc.GST should be separately quoted and shall be paid. All other statutory taxes, TDS, etc shall be deducted accordingly.**

Rates quoted shall be for the complete work including material, labour, tools and plants, profit and applicable taxes

2.3 The Contractor shall not be entitled to any compensation for any loss suffered by him on account of delays, in commencing or executing the work, whatever the cause of delays may be, including delays arising out of modifications to the work entrusted to him or in any sub-contract connected therewith or delays in awarding contracts for other trades of the project or in

commencement or completion of such works or in procuring Government controlled or other building materials or in obtaining water and power connections for construction purposes or for any claim in respect thereof. The Owner does not accept liability for any sum towards loss of overheads & profits of the contractor besides the tender amount, subject to such variations as are provided for herein.

3.0 Time is the essence of the contract and the works must be completed within the 4 Months (Four Months from Issue of Work Order / LOI whichever is earlier)

4.0 The Contract shall accompany the following information and documents:

a) A construction programme in the form of Barchart showing the sequence of operation together with the estimated time for major activities.

b) Full details of any special methodology or technique the Contractor proposes to use for execution of work.

c) The Contractor's proposals for supervising the work, including the CV's of the various grades of technical & supervisory personnel/other staff proposed to be deployed during the execution period.

d) Schedules of labour requirements (Labour Histogram) showing categorywise break-up of the labour force, for each month of execution period.

e) Proposal for major work facilities to be erected on the site including workshops, offices, storage areas and testing laboratories.

f) List of proposed sub-contractors / associate if any, along with their credentials in respect to the trades of works together with their address.

g) True copy of latest Income Tax & GST Clearance Certificates & license under Labour Regulations issued by the competent authorities in favour of the Tenderer.

i) List of the equipment's to be erected/ installed/deployed at the site for timely completion of the works.

5.0 Mobilisation advance will be given to the successful tenderer **ON REQUEST** BY the bidder but at the sole discretion of the Owner if the Contractor apply for a Mobilisation advance on submitting a Bank Guarantee in prescribed format (**To be obtained from client during availing**) @ 10 % of

the Contract Value within 21 days of receipt of the L.O.I The disbursement of the Mobilisation advance shall be at the discretion of the Owner.

Free Supply and Contractor's supply

6.0 All materials and labour required shall be supplied by Contractor only. No material shall be supplied by Client. The billing will be as per the actual quantity as per the specification as described in the Bill of Quantities worked out from the drawing.

The contractor shall make his arrangement for supply of all machineries, Consumables and any other allied items required for the execution of that particular item.

Cement Godown sufficient for minimum 15 days requirement and steel yard for minimum 20 days shall be arranged at your cost and time . Your rates for the contract shall be inclusive of unloading of cement and steel at site. The empty Cement Bags shall be returned to the owner as far as in good condition.

7. The successful tenderer shall have to make arrangements at your own cost for the labour hutments, toilet facilities , drinking water with sewage facilities and abide by all the Rules and Regulations as imposed by DSRCS within their campus from time to time.

8. The Quantities indicated in the Schedule OF Rates are only indicative and approximate and are likely to vary or sometimes likely to be omitted at the full discretion of the Employer /Consultant. The Contractor shall have no claim to any payment as compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been carried out; neither shall he have any claim for compensation by reason of any alterations having been made in the original specification, drawing, designs and instructions which shall involve any curtailment of the work as originally contemplated and the contractors quoted rates shall not alter on these account due to variation nor it will vitiate the contract in whatsoever form.

9. Wherever two different rates for the same item of works are quoted the lesser of the two rates will be considered for arriving at the rates of the similar item .

10. Rates to include :

i) Rates to be inclusive of all profit , all taxes, duties for complete work etc . Only GST shall be charged extra which shall be paid. No extra claim shall be made on account for any taxes unless otherwise imposed by The

Government after the date of last date of submission of the Tender. Rates to be considered for all materials delivered to site only

ii) Supplying as per the specification with the execution Complete including loading, unloading, and transportation including transit insurance of all materials from your source to Site by any authorized agency /agencies at your cost and risk.

iii) Contractor to work in proper co-ordination with other fellow contractors.

iv) Safety Measures , Labour Insurance, P.F , E.S.I as per Government Norms to be considered. Fitness Certificate For Hoisting Equipments to be obtained prior to use.

v) Labour hutments, Temporary toilets, Cement Storage Facility etc to be arranged at your cost .

vi) No price Escalation will be entertained from the time of submission till the completion of work if the work is awarded to him/ them.

vii) All rates to be inclusive of all labour and materials as required except the the items if issued free by the Client as mentioned in the clause 10 of instruction to the Tenderer.

viii) Contractor to mobilize Labour, Materials and Equipments within 7 (Seven Days) From issue of the Work Order OR Purchase Order.

Bio Data Of The Contractor:

Name of the Firm:

Contact Person :

Address And Phone Number:

Income Tax and Sale Tax
Clearance Certificate:

Registration Number :

PAN NO:

Name and Address of the Banker:

List OF Major Works Executed:

Project Details With Year Of Completion	Time Alloted For completion	Time Reqd .For Completion	Value Of Work In Lacs
1)			
2)			
3)			

NB: Contractor may attach separate Sheet If Necessary.

Signature of the Contractor

ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made on the _____ day of _____ _____ between Development Research Communication And Services Centre (hereinafter called "the Employer/Client") of the one part and _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous of executing the Civil & allied works and has caused drawings and specifications describing the work for construction to be prepared by M/s. R.S. CONSULTANTS , 98, SUBODH PARK , PADMA APPARTMENT , KOLKATA -700070

AND WHEREAS the said DRAWINGS, the specifications and the Schedule of items and quantities have been signed by and on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the conditions set forth herein and Schedule of Items and quantities, General conditions, Special conditions of contract, including all other conditions are mentioned in the tender document, specifications and an all correspondences exchanged by or between the parties from the submission of tender till the award of work, both letters inclusive, (all of which are collectively hereinafter referred to as "the said conditions") the work shown upon the said drawings and / or described in the said specifications and included in the schedule of items and quantities at the respective rates therein set forth amounting to the sum as therein arrived at or such other sum as shall become payable thereunder (hereinafter referred to as "the said contract amount").

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said contract amount to be paid at the times in the manner set forth in the said conditions, the contractor shall upon and subject to the said conditions execute and complete the work shown upon the said drawings and described in the said specifications and the schedule of items and quantities.

2. The Employer shall pay the contractor the said contract amount or such other sum as shall become payable, at the times and in the manner specified in the said conditions as per actual measurement and billed item wise.

3. The Consultant in the said conditions shall mean the said M/s. R.S Consultants 98 Subodh Park , Padma Appartment , Near Usha Gate Bansdroni Kolkata 700070 or, in the event of their ceasing to be the Consultant for the purpose of this contract for whatever reason, such other person or persons as shall be nominated for that purpose by the Employer, provided always that no person

subsequently appointed to be Consultant under this contract shall be entitled to disregard or overrule any previous decision or approval or direction given or expressed in writing by the Consultant for the time being.

4. The said conditions and Appendices thereto shall be read and considered as forming part of this Agreement, and the parties hereto shall respectively abide by submit themselves to the said conditions and perform the agreements on their part respectively in the said conditions contained.

5. The plans, agreements and documents mentioned herein shall form the basis of the contract.

6. This contract is neither a fixed lump sum contract nor a piece work contract but is a contract to carry out the work in respect of the building as per the scope described and to be paid for according to actual net measured quantities at the rate contained in the Schedule or rates and probable quantities or as provided in the said conditions.

7. The Employer reserves to itself the right of altering the drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this contract and no claim whatsoever in these regards shall be entertained.

8. Time shall be considered as the essence of this contract and the contractor hereby agrees to commence the work on the day on which he is instructed to take possession of the site or from seventh day after the date of issue of formal work order, whichever is later and to complete the entire work within 20 months subject nevertheless to the provisions for extension of time.

9. All payments by the Employer under this contract will be made only at Mayapur.

10. That the several parts of this contract has been read by the contractor and fully understood by the Contractor.

IN WITNESS WHEREOF the Employer and the If the Contractor have set their respective hands to these Presents and two duplicates hereof the day and year first herein above written.

SIGNED AND DELIVERED

By the hand of Shri

_____

(Name and
Designation)_____

In the presence of

i) _____

Address

_____

ii) _____

Address

_____

Witness

_____

In the presence of

(1)

_____

Address

_____

(2)

_____

Address

_____

GENERAL CONDITIONS OF CONTRACT

Except where provided for in the description of the individual items in the schedule of quantities and in the specifications and conditions laid down hereinafter and in the drawings, the work shall be carried out as per standard specifications and under the direction of the Employer / Consultant.

1. INTERPRETATION

In constructing these conditions, the specifications, the schedule of quantities, tender and Agreement, the following words shall have the meaning herein assigned to them except where the subject or context otherwise requires :-

i) Employer : The term Employer shall denote Development Research Communication And Services Centre having office at 58A , Dharmatola Road, Bosepukur , Kasba , Kolkata 700042 or any of its employees as representative authorised on their behalf.

ii) Consultant : The term Consultant shall mean M/s. R.S.Consultants having heir office at 98, Subodh Park , Padma Appartment, Near Usha Gate Bansdroni Kolkata : 700 070, or in the event of their ceasing to be the consultant for the purpose of this contract, such other person/s as the Employer shall nominate for the purpose.

iii) Contractor: The term Contractor shall mean M/s. _____ and his / their heirs, legal representatives, assigns and successors.

iv) Site : The site shall mean the site where the work are to be executed as shown with the boundary on the site plan including any building and erections thereon allotted by the Employer for the Contractor's use.

v) Site Engineer / Project Management Consultant (PMC): The Site Engineer/ Project Management Consultant shall be the person/organisation appoint by the Employer for administration of construction work.

vi) Drawing : The work is to be carried out in accordance with drawings, specifications, the schedule of quantities and any further drawings or any other instruction, which may be given by the Employer / Consultant, during the execution of the work.

All drawings relating to work given to the Contractor together with a copy of schedule of quantities are to be kept at site and the Employer / Consultant, shall be given access to such drawings or schedule of quantities whenever necessary.

Detail fabrication drawings of structural steel are required to be prepared by the Contractor and have these approved by Consultants before taking up execution.

The Contractor shall ask in writing for all clarifications on matters occurring anywhere in drawings, specifications and schedule of quantities or to additional instructions at least 15 days ahead from the time when it is required for implementation so that the Employer / Consultant may be able to give decision thereon.

vii) "The Work" shall mean the work to be executed or done under this contract.

viii) "Act of Insolvency" shall mean any act as defined by the Presidency Town Insolvency Act or in Provincial Insolvency Act or any amending statutes.

ix) "The Schedule of Quantities" shall mean the schedule of quantities as specified and forming part of this contract.

x) "Priced Schedule of Quantities" shall mean the schedule of quantities duly priced with the accepted quoted rates of the contractor.

2. SCOPE

The work consists of general construction and other allied work for Food Processing Building and ancillary structures in accordance with the drawings and "Schedule of quantities". It includes furnishing all materials, as specified ,labour, tools and equipment as mentioned in excess of free issue by the Owner necessary for and incidental to the construction and completion of the work in conformity with designs, drawings, specifications, bill of quantities, etc. Should any detail, essential for efficient completion of the work be omitted from the drawings / specification, it shall be the responsibility of the contractor to inform the Employer / Consultant and to furnish and install such detail with Employer's / Consultant's concurrence, so that upon completion of the proposed work the same becomes acceptable.

Employer / Consultant may in their absolute discretion issue further drawings and / or written instructions, details, directions and explanations, which are here after collectively referred to as "The Employer's / Consultant's instructions" in regard to :

a : The variation or modification of the design quality or quantity of work or the addition or omission or substitution of any work.

b : Any discrepancy in the drawing or between the schedule of quantities and / or drawing and / or specification.

c : The removal from the site of any defective material brought thereon by the contractor and the substitution of any other material thereof.

d : The demolition, removal and / or re-execution of any work executed by the Contractor/s.

e : The dismissal from the work of any person employed thereupon.

f : The opening up for inspection of any work covered up.

g : The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the Defect Liability period.

The contractor shall forthwith comply with and duly execute any work comprised in such Employer's / Consultant's instruction provided always that verbal instruction, directions and explanations given to the Contractor or his representative upon the work by the Employer / Consultant shall, if involving a variation, be confirmed in writing to the Contractors within seven days. No work for which rates are not specifically mentioned in the priced schedule of quantities, shall be taken up without written permission of the Employer / Consultant. Rates of items not mentioned in the priced schedule of quantities shall be fixed by the Employer in consultation with the Consultant as provided in Clause "Variation".

3. DETAILED DRAWINGS AND INSTRUCTIONS

The Employer through its consultant shall furnish with reasonable promptness additional instruction by means of drawings or otherwise necessary for proper execution of the work. All such drawings and instructions shall be consistent with contract documents, true documents thereof and reasonably inferable therefrom.

The work shall be executed in conformity therewith and the Contractor shall not work without proper drawings and instructions.

Immediately after receipt of the work order of the contract, the contractor shall prepare a progress schedule and submit the same to the Employer through the Consultant for approval which shall indicate the dates for the starting and completion of the various stages of constructions.

4. COPIES FURNISHED

The Contractor on the signing thereof of the Contract shall be furnished by the Employer through its Consultant free of charge with a copy of the priced schedule of quantities / rates, two copies of each of the said drawings and one copy of specification and two copies of all further drawings issued during the progress of the work. Any further copies of such drawings required by the contractor shall be supplied on payment by the contractor of the charges therefore.

5. OWNERSHIP OF DRAWING

All drawings, specification and copies thereof furnished by the Employer through its Consultant are the property of the Employer. They are not to be used on other work, and with the exception of the signed contract set, are to be returned to the Employer on request on completion of the work.

6. FAILURE BY CONTRACTORS TO COMPLY WITH EMPLOYER'S / CONSULTANT'S INSTRUCTION

If the contractor after receipt of written notice from the Employer and / or the Consultant requiring compliance of any instructions within ten days fails to comply with such instructions, the Employer through the Consultant, may employ other person, to carryout any such instructions whatsoever that may be necessary to give effect thereto and pay all cost in connection therewith. The contractor shall either pay the Employer the cost incurred by the Employer in connection therewith or the Employer may realise the cost from any money due or to become due to the Contractor.

7. CONTRACTOR SHALL VISIT THE SITE

It shall be deemed that the Contractor has made himself thoroughly acquainted with the local site condition, nature and requirements of the work, facilities of transport condition, availability of labour and materials including developing of temporary access road and storage for materials and removal of rubbish. The contractor shall provide in his rate for cost of carriage, freight and other charges as also for any special difficulties and including police restriction for transport etc. for proper execution of work as indicated in the drawings. The contractor will not be entitled to any claim or compensation for difficulties faced or loses incurred on account of any site condition which existed before the commencement of the work or which in the opinion of the Employer / Consultant, might be deemed to have reasonably been inferred as so existing before commencement of work.

The Employer reserves the right and also to discharge any or all of the contractors for each section or to split up and distribute any item of work to any firm or firms, without assigning any reason.

The contractor should note that the contract is strictly on the item rate basis and their attention is drawn to the fact that the rates for each and every item should be correct, workable and self-supporting. If called upon by the Employer / Consultant, detailed analysis of any or all the rates shall be submitted. The Employer / Consultant shall not be bound to accept the Contractor's rate analysis.

The work will be paid for as "measured work" on the basis of actual work done and not as "lump sum" contract.

All items of work described in the schedule of quantities are to be deemed and paid as complete work in all respects and details including preparatory and finishing work involved, directly related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection.

The Employer has power to add to / omit from any work as shown in drawings or described in specifications or included in schedule of quantities and intimate the same in writing but no addition, omission or variation shall be made by the contractor without authorisation from the Employer. No variation shall vitiate the contract.

The tenderer shall note that his tender shall remain valid for consideration for a period of 3 (three) months from the date of submission of tender.

8. AGREEMENT

The contractor shall sign the agreement as per draft agreement annexed within 15 days from the date of issue of formal work order and he shall pay for all stamps and legal expenses, incidental thereto. However, the written acceptance of the Contract by the Employer / Consultant will constitute a binding contractor between the Employer and the person so tendering whether such formal agreement is or is not subsequently executed.

9. PERMITS AND LICENSES

Permits and licenses for release of materials which are under Government control shall be arranged by the contractor on behalf of the Employer. The Employer will sign any form or application that may be necessary for the purpose.

It may be clearly understood that no compensation or additional charges can be claimed by the contractor for non receipt of any such controlled material in due time.

The contractor will, however, be eligible to a proportionate extension of time on this account which in the opinion of the Employer / Consultant is reasonable . The Contractor shall at his own cost arrange for storage shed adequate for taking delivery and storing of the materials including any incidentals cost for obtaining permits and licenses etc. The costs for storing, transporting, handling etc. are to be included by the contractor in his quoted rate.

10. GOVERNMENT AND LOCAL RULES

The Contractor shall conform to the provisions of all local By laws and Act relating to the work and to the Regulations etc. Of the Government and Local Authorities and of any Company with whose system the premises is proposed to be connected. The Contractor shall give all notices required by the said Act, Rules, Regulations and By laws etc. and pay all fees payable to such authority / authorities for execution of the work involved. The cost, if any shall be deemed to have been included in his quoted rates, taking into account all liabilities for licenses, fees for footpath encroachment and restorations etc. and shall defend all actions arising from such claims or liabilities.

11. TAXES AND DUTIES

The tenderers must include in their tender prices quoted for all duties, royalties, cess, excise, work contract tax , or any other taxes or local charges, as applicable. No extra claim on this account will in any case be entertained. **GST (TO BE INDICATED SEPERATELY) SHALL BE CHARGED EXTRA AND PAID .**

12. PROVISIONAL SUMS (P. S.)

All provisional sum described in the schedule of quantities as P.S. shall be exclusively allotted to the purchase of materials and not for any handling / fixing to be done by the contractor. Such costs of handling and fixing with profit (including transport charge if required) shall be separately included in the contract price as described in the schedule of quantities. The disposal of the amounts covered under this head will be absolutely at the discretion of the Employer. Contractor is to make payments for these materials to the suppliers on certificate or order issued by the Employer / Consultant and realise the payment from the Employee thus made through his bills for work done.

13 QUANTITY OF WORK TO BE EXECUTED

The quantities shown in the Schedule of quantities are intended to cover the entire new structure indicated in the drawing but the Employer reserves the right to execute only a part or the whole or any excess thereof without assigning any reason therefor. If at any time after the commencement of the work, the Employer / Consultant shall for any reason whatever not require the whole work thereof as specified in the tender to be carried out the Consultant / Employer shall give notice in writing of the fact to the contractor who shall have no claim to any payment as compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been carried out; neither shall he have any claim for compensation by reason of any alterations having been made in the original specification, drawing, designs and instructions which shall involve any curtailment of the work as originally contemplated.

14. OTHER PERSONS ENGAGED BY THE EMPLOYER

The Employer reserves the right to execute any part of the work included in this contract or any work which is not included in this contract by other Agency or persons and the Contractor shall allow all reasonable facilities and use of any scaffolding etc. for the execution of such work. All the agencies employed by the Employer on the work shall act in close co-ordination extend mutual assistance to enable completion of the work satisfactorily.

15 . EARNEST MONEY ,SECURITY DEPOSIT / RETENTION MONEY/MOBILISATION ADVANCE

Earnest Money Rs 30000/- to be paid in form of Demand Draft in favour of Development Research Communication And Services payable at Kolkata. The earnest money to unsuccess full tenderers shall be returned within 30 days from Bid opening .

Security deposit equivalent to 5 % of the contract value shall be submitted in form of performance bond or Bank Guarantee or Demand draft as

mentioned less the earnest money already paid to the client within 10 days of issuing of LOI .
Retention money will be deducted from each R.A. Bill @ 10% of the RA Bill per month .

Mobilisation advance @10% shall be deducted from the each RA Bills . The whole of mobilization advance be deducted and adjusted when 75 % of the work value has been achieved

When the certificate of virtual completion is issued to the contractor, 50% of security deposit mentioned above shall be refunded provided that the contractor will have fulfilled all the conditions of contract and further provided that Owner has no claim on the said deposit and the contractor has provided necessary bank guarantee for the amount.
The other half of the security deposit built up from bills will be returned to contractor after the expiry of the defects liability period subject to deductions for any appropriations thereof required to be made by the Owner as per conditions of contract along with the total retention money deducted from each RA Bills . Contractor should note that no interest will be allowed on the security deposit/ Retention Money.

16 CONTRACTOR TO PROVIDE EVERYTHING NECESSARY

The Contractor shall provide everything necessary for the proper execution of the work according to the intent and meaning of the drawing, schedule of quantities and specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred therefrom and if the Contractor finds any discrepancies therein he shall immediately and in writing refer the same to the Employer / Consultant whose decision shall be final and binding. The Contractor shall provide himself for ground and fresh water for carrying out the work at his own cost. The Employer shall on no account be responsible for the expenses incurred by the Contractor for hired ground or fresh water obtained from elsewhere.

The rates quoted against individual items will be inclusive of everything necessary to complete the said items of work within the contemplation of the contract, and beyond the unit price no extra payment will be allowed for incidental or contingent work, labour and / or materials inclusive of all taxes and duties whatsoever except for specific items, if any stipulated in the tender documents.

The Contractor shall supply, fix and maintain at his own cost for the execution of any work, all tools, tackles, machineries and equipment's and all the necessary centering, scaffolding, staging, planking, timbering, strutting, shoring, pumping, fencing, boarding, watching and lighting by night as well as by day required not only for the proper execution and protection of the said work but also for the protection of the public and safety of any adjacent roads, streets, walls, houses, buildings, all other erections, matters and things and the contractor shall take down and remove any or all such centering, scaffolding planking, timbering, strutting, shoring etc. on occasions as required or when ordered so to

do and shall fully reinstate and make good all matters and things disturbed during the execution of work to the satisfaction of the Employer / Consultant.

The Contractor, if required, shall also provide such temporary road on site as may be necessary for the proper performance of the contract and for his own convenience but not otherwise. Upon completion, such road shall be broken up and leveled where so required unless the Employer shall otherwise direct.

The Contractor shall at all times give access to workers employed by the Employer or any men employed on the building and to provide such parties with proper, sufficient and if required, special scaffolding, hoists and ladders and provide them with water and lighting and leave or make any holes, grooves etc. in any work, where directed by the Employer / Consultant as may be required to enable such workman to lay or fix pipes, electrical wiring, special fittings etc. The agreed rate of the contract shall accordingly include all these above mentioned contingent work.

17. TIME OF COMPLETION / EXTENSION OF TIME AND PROGRESS CHARTS

a) Time of Completion :

The entire work is to be completed in all respects within the stipulated period of 4 (Four) calendar months from issue of LOI or Workorder whichever is earlier. The work shall be deemed to be commenced within 7 (Seven) days from the issue of formal work order or the date on which the Contractor is instructed to take possession of the site, whichever is later. Time is the essence of the contract and shall be strictly observed by the Contractor.

The work shall not be considered as complete until the Employer / Consultant have certified in writing that this has been completed and the Defects Liability Period shall commence from the date of such certificate.

b) Extension of Time :

If in the opinion of the Employer / Consultant the work be delayed for (a) delayed handing over of site (b) by reason of any exceptionally inclement weather, or (c) by reason of instructions from the Employer / Consultant in consequence of proceedings taken or threatened by or disputes, with adjoining or neighboring owners or (d) by the work, or delay
of other contractors or tradesmen engaged or nominated by the Employer / Consultant and not referred to in the specification or (e) by reason of authorised extra and additions or (f) by reason of any combination of workman or strikes or lockout affecting any of the building trades or (g) from other causes which the Employer / Consultant may consider are beyond the control of the contractor, the Employer / Consultant at the completion of the time allowed for the contract shall make fair and reasonable extension of time for completion in respect therefor.

In case of such strikes or lock-outs, as are referred to above, the contractor shall immediately give the Employer / Consultant written notice thereof. Nevertheless, the contractor shall use his best endeavors to prevent delay, and shall do all that as may be reasonably required, to the satisfaction of the Employer / Consultant to proceed with the work and on his so doing it will be ground of consideration by the Employer / Consultant for an extension of time as above provided. The decision of the Employer as to the period to be allowed for an extension of time for completion hereunder (which decision shall be final and binding on the contractor) shall be promulgated at the conclusion of such strike or lock-out and the Employer shall then, in the event of extension being granted, determine and declare the final completion date. The provision in clause 19 with respect to payment of liquidated damages shall, in such case be read and construed as if the extended date fixed by the Employer / Consultant were substituted for and the damage shall be deducted accordingly.

c) Progress of work / work program :

During the period of construction the contractor shall maintain proportionate progress on the basis of a programme chart submitted by the Contractor immediately before commencement of work and agreed to by the Employer / Consultant. Contractor should also include planning for procurement of scarce material well in advance and reflect the same in the programme chart so that there is no delay in completion of the project.

18. LIQUIDATED DAMAGES

The contractor shall pay to the owners liquidated damages for losses, damages that may arise or may be suffered by the owners on account of delays bad or inferior workmanship, or any defects in the work executed by the contractor. And shall not be less than Rs.10000/- per week, subjected to maximum of 5% of the contract value or as determined by the CONSULTANT with the agreement of the owners, failing which the decision of the Arbitrator shall be final and binding on all parties.

19 ACTION WHEN WHOLE OF SECURITY DEPOSIT/RETENTION MONEY IS FORFEITED

In any case in which under any clause or clauses of this contract, the contractor shall have rendered himself liable to pay liquidated damages amounting to the whole of his security deposit (whether paid in one sum or deducted by installments) the Employer / Consultant shall have power to adopt any of the following courses as they may deem best suited to the interest of the Employer :-

a) To rescind the contract (of which rescission notice in writing to the contractor under hand of the Employer shall be conclusive evidence) and in which case the security deposit of the contractor shall stand forfeited and be absolutely at the disposal of the Employer.

b) To employ labour paid by the Employer and supply materials to carry out the work, or any part of the work, debiting the contractor with the cost of the labour and price of material (of the amount of which cost and price of a certificate of the Consultant shall be final and conclusive against the Contractor) and crediting him with the value of the work done, in all respects in the same manner and at the same rates as if had been carried out by the contractor under the terms of this contract. The certificate of the Consultant as to the value of the work done, shall be final and conclusive against the contractor.

c) To measure up the work of the contractor, and to take such part thereof as shall be unexecuted, out of his hands, and to give it to another contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess the certificates in writing of the Consultants shall be final and conclusive) shall be binding and paid by the original contractor and may be deducted from any money due to him by the Employer under the contract or otherwise or from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.

In the event of any the above courses being adopted by the Employer the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements, or make any advances on account of or with a view to the execution of this work or the performance of the contract. And in case the contract shall be rescinded under the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereto actually performed under this contract, unless and until the Employer will have certified in writing the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

20. TOOLS, STORAGE OF MATERIALS, PROTECTIVE WORKS AND SITE OFFICE REQUIREMENTS

The Contractor shall provide, fix up and maintain in an approved position proper office accommodation for the Contractor's representative and staff, which offices shall be open at all reasonable hours to receive instruction notices or communications and clear away on completion of the work and make good all work disturbed.

All drawing maintained on the site are to be carefully mounted on boards of appropriate size. They are to be protected from ravages of termites, ants and other insects.

The Contractor, if called for, shall provide at his own cost all artificial light required for work and to enable other contractors and sub-contractors to complete the work within the specified time.

The Contractor, if called for, shall provide a suitable temporary hut for the watchmen and clear away the same when no longer required and to provide all necessary attendance, lights etc. required.

The Contractor, shall arrange for temporary latrines for the use of workers and field staff and keep the same in a clean and sanitary condition to the satisfaction of the Public Health Authorities and shall cause such latrines and soil to be cleared away whenever necessary and shall make good all the work disturbed by these conveniences.

Every precaution shall be taken by the Contractor to prevent the breeding of mosquitoes on the work during the construction and all receptacles, cisterns, water tanks etc. used for storage of water must be suitably protected against, breeding of mosquitoes. The Contractor shall indemnify the Employer against any breach of rules in respect of anti-malarial measures. The Contractor shall not fix or place any placards or advertisement of any description or permit the same to be fixed or placed in or upon any boarding gantry, building structure other than those approved by the Employer.

Protective Measures

The contractor from the time of being placed in possession of the site must make suitable arrangements for watching, lighting and protecting the work, the site and surrounding property by day, by night, on all days including Sundays and other holidays.

The Contractor shall indemnify the Employer against any possible damage to the building, roads or member of the public in courses of execution of the work.

The Contractor shall provide necessary temporary enclosures, gates, entrances etc. for the protection of the work and materials and for altering and adopting the same as may be required and removing on completion of the work and making good all work disturbed. The responsibility for the custody of the materials issued free by Client shall be that of the Contractor 's and he shall make suitable arrangements for security personals and identify secured places at site at his cost.

Storage of materials

The Contractor shall provide and maintain proper sheds for the proper storage and adequate protection of the materials etc. and other work that may be executed on the site including the tools and materials of sub-contractors and remove the same on completion at his own cost. Sheds for storage of cement are to have pucca floor raised above the ground. Cement godown shall be constructed for storing about two weeks requirements of cement and stored as per norms with a stack of 10 bags each, two ft opening all around with two ft. passage between each stack. Structure shall be waterproof from all the sides and top. Cement should be stored one ft. above the ground level and have

pucca raised floor. No extra cost shall be paid for the Cement godown or any storage facility.

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

Tools

All tools, equipment's and instruments as instructed by the Employer / Consultant and considered necessary for the work shall be provided by the Contractor for the due performance of this contract.

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

The mistries and the supervisors on the work shall carry with them always a steel tape, a spirit level, a plumb bob and a square and shall check the work to see that the same is bring done according to the drawing and specifications. The site Engineer will use any or all measuring instruments or tools belonging to the contractor as he chooses for checking the work executed or being executed on the contract.

The Contractor should cover in his rates for making provisions for all reasonable facilities for the use of his scaffolding, tools and plant etc. by sub-contractors for their work.

21. CLEARING SITE AND SETTING OUT WORKS

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

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

22. DATUM

The average ground level will be considered as the crown of the nearest road, which should be taken as "Datum" which is however, subject to final confirmation by the Employer / Consultant. All levels shown in the drawings are to be strictly adhered to.

23. BENCHES

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

These benches will consist of timber posts of adequate length and minimum diameter 75 mm to be driven in the ground at suitable distance as directed encased with brick work. The wire nails will be driven on the top of timber posts on the centre lines of columns, walls, inside and outside face of foundation trenches. Centre line of walls, columns etc. may be clearly indicated and checked at any time if it is so required.

24. CONTRACTOR IMMEDIATELY TO REMOVE ALL OFFENSIVE MATTERS

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

25. ACCESS

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

26. MATERIALS, WORKMANSHIP, SAMPLES, TESTING OF MATERIALS

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

If required by the Employer / Consultant, the Contractor shall have to carry out tests on materials and workmanship in approved materials testing laboratories or as prescribed by Employer / Consultant at his own cost to prove that the materials etc. under test conform to the relevant I.S. standards or as specified in

the specification. No extra payment on this account should in any case be entertained.

Mandatory Tests for to ascertain the quality of work may be furnished by the contractor , which should be only indicative and not exhaustive. Any other tests, special or routine, on any material or workmanship, advised to be done by the Employer / Consultant for any reason shall be done by the contractor for which no additional payment will be made.

All the materials, stores & equipment's required for full performance of the work under the contract must be provided through normal channels and must include charge for sales tax, import duties, and other charges as applicable and must be best of their kind available and the Contractor/s must be entirely responsible for the proper and efficient carrying out of the work. The work must be done in the best workmanship manner. Samples of all materials to be used shall be submitted to the Employer / Consultant and written approval from the Employer / Consultant shall be obtained prior to placement of order. A list of materials of approved make and brand is annexed. Materials mentioned in the said list shall be used. In case materials specified in the list are not available the Contractor/s may use the equivalent product with prior permission from the Employer / Consultant. As regards equivalent product / material the opinion of the Employer / Consultant shall be final and binding on the Contractor.

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

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

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

27. REMOVAL OF IMPROPER WORK

The Employer / Consultant shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or times as may be specified in the order of any materials which in the opinion of the Employer / Consultant are not in accordance with specification or instruction, the substitutions or proper re-execution of any work executed with materials or workmanship not in accordance with the drawings and specifications or instruction. In case the Contractor refuses to comply with the order Employer / Consultant shall have the power to employ and pay other

agencies to carry out the work and all expenses consequent thereon or incidental thereto as certified by the Consultant shall be borne by the contractor or may be deducted from any money due to or that may become due to the contractor. No certificate which may be given by the Consultant shall relieve the Contractor from his liability in respect of unsound work or bad materials.

28. SITE ENGINEER / PROJECT MANAGEMENT CONSULTANT (P. M. C.)

The term "Site Engineer / Project Management Consultants (P. M. C.)" shall mean the person / firm if, any, appointed and paid by the Employer to superintendent the work. The Contractor shall afford the Site Engineer / P. M. C. every facility and assistance for examining the work and materials and for checking and measuring work and materials. The Site Engineer / P.M.C. shall have no power to revoke, alter, enlarge or relax any requirements of the Contract or to sanction any day work, additions, alterations, deviations or omission or any extra work whatever, except in so far as such authority may be specially conferred by a written order of the Employer.

The Site Engineer / PMC shall have power to give notice to the Contractor or to his foreman, of non-approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the Employer / Consultant is obtained. The work will from time to time be examined by the Consultant / Employer or his authorised representative and the Site Engineer / PMC. But such examination shall not in any way exonerate the Contractor from the obligation to remedy any defects, which may be found to exist at any stage of work or after the same is complete. Subject to the limitations of this clause the Contractor shall take instruction only form the Consultant / Employer.

29. CONTRACTOR'S EMPLOYEES

The Contractor shall employ technically qualified and competent supervisors for the work who shall be available (by turn) throughout the working hours to receive and comply with instruction of the Employer / Consultant. The Contractor shall engage at least one experienced Technical representative as Site-in-Charge for execution of the work. The Contractor shall employ in connection with the work persons having the appropriate skill or ability to perform their job efficiently.

The Contractor shall employ local labours on the work as far possible.

No labourer below the age of eighteen years and who is not an Indian National shall be employed on the work.

Any labourer supplied by the Contractor to be engaged on the work on day-work basis either wholly or partly under the direct order or control of the Employer or his representative shall be deemed to be a person employed by the contractor.

The Contractor shall comply with the provisions of all labour legislation including the requirements of:-

a) The Payment of Wages Act

b) Employer's Liability Act

c) Workman's Compensation Act

d) Contract Labour (Regulation an Abolition) Act, 1970 and Central Rules 1971.

e) Apprentices Act 1961

f) Any other Act or enactment relating thereto and rules framed there under from time to time.

g) Child Labour act.

The Contractor shall abide by all the safety rules and regulations as imposed by the Concerned Department from time to time.

The Contractor shall keep the Employer saved harmless and indemnified against claims of any of the workmen and all costs and expenses as may be incurred by the Employer in connection with any claim that may be made by any workman are recoverable from the Contractor.

The Contractor shall comply at his cost with order of requirement of any Health Officer of the State or any local authority or of the Employer regarding the maintenance of proper environmental sanitation of the area where the Contractor's labours are housed or accommodated, for the prevention of small-pox, cholera, plague, typhoid, malaria and other contagious diseases. The contractor shall provide, maintain and keep in good sanitary condition adequate sanitary accommodation and provide facilities for pure drinking water at all time for the use of men engaged on the work and shall remove and clear away the same on completion of work. Adequate precaution shall be taken by the Contractor or prevent nuisance of any kind on the work or on the lands adjoining the same.

The Contractor shall arrange to provide first aid treatment to the labourers engaged on the work. He shall within 24 hours of occurrence of any accident at or about the site or in connection with execution of work, report such accident to the Employer and also to the competent authority where such report is required by law.

30. DISMISSAL OF WORKMEN

The Contractor shall on the request of the Employer / Consultant immediately dismiss from work any person employed thereon by him, who may in the opinion of the Employer / Consultant be unsuitable or incompetent or who may misconduct himself. Such discharge shall not be the basis of any claim for compensation or damages against the Employer / Consultant or any of their officer employee.

31 ASSIGNMENT

The whole of the work included in the contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or

underlet or any part, share or interest therein nor, shall take a new partner, without written consent of the Employer and no subletting shall relieve the Contractor from the full and entire responsibility of the contract or from active superintendence of the work during their progress.

32 NOMINATED SUB-CONTRACTOR

All specialists, Merchants, Tradesmen and others executing any work or supplying and fixing any goods for which prime cost prices or provisional sums are included in the Schedule of Quantities / Rates and / or specification who may be nominated or selected by the Consultant / Employer are hereby declared to be sub-contractors employed by the contractor and are herein referred to as nominated sub-contractors.

No nominated sub-contractor shall be employed on or in connection with the work against whom contractor shall make reasonable objection or save where the Employer and Consultant shall otherwise agree who will not enter into a contract provided :

a) That the nominated sub-contractor shall indemnify the Contractor against the same obligation in respect of the sub-contract as the Contractor is under in respect of this contract.

b) That the nominated sub-contractor shall indemnify the Contractor against claims in respect of any negligence by the sub-contractor, his servants or agents or any misuse by him or them of any scaffolding or other plants and property of the contractor or under any Workman's Compensation Act in force.

c) Payment shall be made to the nominated sub-contractor within 14 days of his receipt of the Consultant's certificate provided that before any certificate is issued the contractor shall upon request furnish to the Consultant proof that all nominated sub-contractors accounts included in previous certification have been duly discharged, in default thereof the Employer may pay the same upon a certificate of the Consultant and deduct the amount thereof from any sums due to the con tractor. The exercise of those power shall not create privity of contract between the Employer and the Sub-contractor.

33. DAMAGE TO PERSONS AND PROPERTY, INSURANCE ETC.

The Contractor shall be responsible for all injury to the work or workmen, to persons, animal or things and for all damages to the structural and / or decorative part of property which may arise from the operations or neglect of himself or of any Sub-contractor or of any of his or a sub-contractor's employees, whether such injury or damage arise from carelessness, accident or any of his or a sub-contractor's employees, or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include inter-alia, any damage to buildings whether immediately adjacent or otherwise and any damage to roads, streets, footpaths or ways as well as damage caused to the buildings and the work forming the subject of this contract by rain, wind or other inclemency of the weather. The Contractor shall indemnify the Employer and hold harmless in respect of all and any expenses arising from any such injury or damages to persons or property as

aforesaid and also in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim.

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

34. INSURANCE

Unless otherwise instructed the Contractor shall insure the work and keep them insured until the virtual completion of the contract against loss or damage by fire and / or earthquake, flood or damages from whatever cause by a Contractors All Risk Insurance policy for the full value of the contract including Third Party Liability for a minimum value of 1% of the accepted tender value per occurrence subject to a maximum of Four (4) occurrence per year. The insurance must be placed with a company approved by the Employer, in the joint names of the Employer and the contractor for such amount and for any further sum if called upon to do so by the Employer, the premium of such further sum being allowed to the Contractor as an authorised extra.

The Contractor shall deposit the policy and receipt for premiums paid with the Employer within 30 days from the date of issue of work order unless otherwise instructed. In default of the Contractor insuring as provided above, the Employer on his behalf may so insure and may deduct the premiums paid from any money due, or which may become due to the contractor. The Contractor shall as soon as the claim under the policy is settled or the work reinstated by the Insurance Company should they elect to do so proceed with due diligence with the completion of the work in the same manner as though the fire has not occurred and in all respects under the conditions of the contract. The Contractor in case of rebuilding or reinstatement after fire shall be entitled to extension of time for completion as the Employer may deem fit.

The Contractor shall effect the insurance necessary and indemnify the Employer entirely from all responsibility in this respect. The insurance must be placed with a company approved by the Employer and must be effected jointly in the name of Contractor and the Employer and the policy lodged with the latter. The scope of insurance is to include damage or loss to the contract itself till this is made over in complete state.

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

35. ACCOUNT RECEIPTS AND VOUCHERS

The Contractor shall upon the request of the Employer / Consultant furnish them will all the invoices, accounts, receipts and other vouchers that they may be required in connection with the work under this contract.

If the Contractor shall use materials less than what he is required under the contract, the value of the difference in the quantity of the materials he was

required to use and that he actually used shall be deducted from his dues. The decision of the Employer shall be final and binding on the Contractor as to the amount of materials the Contractor is required to use for any work under this contract.

36. MEASUREMENT OF WORK

The Contractor will record and submit to the Project Management Consultant / Site Engineer / Consultant / Employer with the details of measurements for their scrutiny and signature. The Contractor should submit the bill with such endorsement of PMC / Site Engineer / Consultant / Employer.

On receipt of the bill, the Site Engineer shall intimate the contractor that he requires the work to be measured, and the contractor shall forthwith attend or send a qualified agent to assist the Site Engineer or the Consultant's representative in taking such measurements and calculations and to furnish all particulars or to give all assistance required by them. Contractor to keep all measurements of items which may be concealed after a period of time and maintain joint records of the same.

The Contractor or his Agents may at the time of measurements take such notes and measurements as he may require. All authorised extra work, omissions and all variations made without the Consultants knowledge, if subsequently sanctioned by him in writing, with the approval of the Employer shall be included in such measurements. The final measurement should be done within one month from the date of completion of work jointly by the Employer and / or his representative and if the contractor fails to comply, the decision on the measurements taken by the employer will be final and binding.

37. METHOD OF MEASUREMENT

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

38. ACTION WHERE NO SPECIFICATION

In the case of any of work for which there is no such specification in Technical Specification such work shall be carried out in accordance with the I.S. Specification and in the event of there being no I. S. Specification, then in such case the work shall be carried out in all respects in accordance with the instructions and requirements of the Consultant / Employer.

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

The Contractor(s) shall not deposit materials at locations, which will cause inconvenience to the public. The Consultant may require the contractor to remove any materials, which are considered by him to be a danger or inconvenient to the public and cause them to be removed at the contractor's cost.

40. PAYMENTS

a) All bills shall be prepared by the Contractor in the form prescribed by the Employer / Consultant, (format enclosed). Normally one interim bill shall be prepared each month subject to minimum value for interim certificate as stated in these documents or a Gross Bill Of Rs 8,00,000/- (Rupees Eight Lacs Only) (Negotiable) **AND NOT BEFORE 30 DAYS OF THE LAST BILL**. The interim bill in proper forms must be duly accompanied by detailed measurements, duly endorsed by the Site Engineer / PMC in support of quantities of work done and must show deduction for all previous payments, retention money, etc. Advance / adhoc payments for work will not be made. However, adhoc payments may be made at the discretion of Consultant / Employer in case of exigency.

The Employer shall issue certificate after due scrutiny of the Contractor's bill stating the amount due to the Contractor from the Employer and the Contractor shall be entitled to payment thereof, by the Employer within the period of "honouring certificates" mentioned in these documents.

The amount stated in an interim certificate shall be the total value of work properly executed upto the date of the bill less the amount to be retained by the Employer as the retention money and less installments previously paid under these conditions.

The materials to be considered for secured advance if any shall be nonperishable in nature and only include the value of the said materials and goods as and from such time as they are reasonably, properly and not prematurely brought to or placed adjacent to the work and then only if adequately protected against weather or other casualties and considered acceptable by the Consultants / Employer. An indemnity bond is to be submitted in an appropriate format approved by the Employer whenever Secured Advance against materials are prayed for.

If the Employer has supplied any materials or goods to the Contractor, the cost of any such materials or goods will be progressively deducted from the amount due to Contractor in accordance with the quantities consumed in the work. Disbursements of any secured advance is totally at the discretion of the employer.

All the interim payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the contract or any part thereof in any respect or the accruing of any claim, nor shall, it conclude determine or affect in any way the powers of the Employer under these conditions or any of them as to the final settlement and adjustment of the accounts or other wise or in any other way vary or affect the contract. The final bill shall be submitted by the Contractor to the Consultant within one month of the date of certificate of completion furnished by the Consultant and payment shall be made after the same is duly verified and certified by the Consultant.

b) FINAL PAYMENT

The final bill shall be accompanied by a certificate of completion from the Consultant along with all other documents required to be submitted by the Contractor under these conditions. Payment of final bill shall be made after deduction of Retention Money as specified in these conditions which sum shall be refunded in the manner stated in these conditions. The acceptance of payment of the final bill by the Contractor would indicate that he would have no further claim in respect of the work executed.

41. VARIATION / DEVIATION

The Contractor may when authorised and shall when directed in writing by the Consultant / Employer add and or omit or vary the work shown in the drawings or described in the specification or included in the priced schedule of quantities. The Contractor on his own accord shall make no addition, omission or variation without such authorisation from Employer. A verbal authority or direction by the Consultant / Employer if confirmed by the Contractor in writing within 7 days shall be deemed to have been given in writing.

The price of all such additional will be worked out on the basis of rates quoted for similar items in the contract wherever existing or an engineering rate analysis based on prevalent fair price of labour materials at site of work including wastage and other components as required plus 15% for overhead and profit etc works contract sales Tax at prevailing rate will be payable extra over the stipulated OH/project percentage. The tender rates shall hold good for any increase or decrease in tender quantities.

No claim for an extra shall be allowed unless it has been executed by the authorisation of Employer / Consultant.

No variation shall vitiate the contract.

42. SUBSTITUTION

Should the Contractor desire to substitute any materials and workmanship he / they must obtain the approval of the Employer / Consultant in writing for any such substitution well in advance. For materials designated in this specification by such term as “Equal” or “other approved” etc. Specific approval of the Employer / Consultant shall be obtained in writing prior to execution.

43. PREPARATION OF BUILDING WORK FOR OCCUPATION & USE ON COMPLETION

The whole of the work will be thoroughly inspected by the Contractor and deficiencies / defects put right, all windows and doors cleaned including cleaning and oiling, if necessary of all hardware. All floors, staircases and every part of the building both inside & outside shall be left neat and clean as to ensure immediate occupation to the satisfaction of the Employer.

On completion of above, the contractor shall inform the Employer that he has completed the work and it is ready for inspection.

44. CLEARING SITE ON COMPLETION

On completion of the work the Contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary work of every kind and leave the whole of the site and the work clean and in workman like condition to the satisfaction of the Employer / Consultant.

45. DEFECTS AFTER COMPLETION

The Contractor shall make good from time to time at his own cost and to the satisfaction of the Employer / Consultant all defects, shrinkage, settlements or other faults which may appear within 12 (twelve) months after completion of the work and considered as the "defect liability period". In default the Employer may employ and pay other persons to amend and make good such damages, losses and expenses consequent thereon or incidental there to shall be made good and borne by the Contractor and such damages, loss and expenses shall be recoverable from him by the Employer or may be deducted by the Employer, in lieu of such amending and making good by the Contractor deduct from any money due to the Contractor a sum equivalent to the cost of amending such work and in the event of the amount retained being insufficient recover the balance from the Contractor from the amount retained under these conditions together with any expenses the Employer may have incurred in connection therewith.

46. CONCEALED WORK

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

47. ESCALATION

The rates quoted shall be firm throughout the tenure of the contract (including extension of time, if any granted) and will not be subject to any fluctuation due to increase in cost of materials, labour, sales tax, service tax octroi etc. unless specifically provided for this document.

48. IDLE LABOUR

Whatever the reasons may be, no claim for idle labour, additional establishment cost, hire and labour charges of tools and plants would be entertained under any circumstances.

49. SUSPENSION

If the Contractor, except on account of any legal restraint upon the Employer preventing the continuance of the work or in the opinion of the Employer shall neglect or fail to proceed with the due diligence in the performance of his part of the contract or if he shall more than once make fault, the Employer shall have the power to give notice in writing to the contractor requiring the work be proceeded within a reasonable manner and with reasonable despatch, such notice purport to be a notice under this Clause.

After such notice shall have been given, the Contractor shall not be at liberty to remove from site of the work or from any ground contiguous thereto, any plant or materials to subsist from the date of such notice being given until the notice shall have been complied with. If the Contractor shall fail for 15 days after such notice has been given to proceed with the work as therein prescribed, the Employer may proceed as provided in Clause 53 (Termination of Contract by the Employer).

50. TERMINATION OF CONTRACT BY EMPLOYER

If the Contractor being a company go into liquidation whether voluntary or compulsory or being a firm shall be dissolved or being an individual shall be adjudicated insolvent or shall make an assignment or a compensation for the benefit of the greater part, in number of amount of his creditors or shall enter into a Deed or arrangement with his creditors, or if the Official Assignee in insolvency, or the Receiver of the Contractor in insolvency, shall repudiate the contract or if a Receiver of the Contractor's firm appointed by the court shall be unable, within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Employer that he is able to carry out and fulfill the contract and if so required by the Employer to give reasonable security there for, of if the Contractor shall suffer execution to be issued, or shall suffer any payment under this contract to be attached by or on behalf of and of the creditors of the contractor or shall assign, charge or encumber this contract or any payments due or which may become due to the Contractor, thereunder, or shall neglect or fail to observe and perform all or any of the acts matters of things by this contract, to be observed and performed by the Contractor within three clear days after the notice shall have been given to the contractor in manner hereinafter mentioned requiring the Contractor to observe or perform the same or shall use improper materials or workmanship in carrying on the work, or shall in the opinion of the Employer not exercise such due diligence and made such due progress as would enable the work to be completed within due time agreed upon and shall fail to proceed to the satisfaction of the Employer after three clear days notice requiring the contractor to do so shall have been given to the contractor as hereinafter mentioned, or shall abandon the contract, then and in any of the said cases, the Employer may notwithstanding any previous waiver determine the contract by a notice in writing to the effect as hereinafter mentioned, but without thereby affecting the powers of the Employer of the obligations and liabilities of the contract the whole of which shall continue in force as fully as if the contract had not been so determined and as if the work subsequently executed had been executed by or on behalf of the contractor (without thereby creating any trust in favour of the contractor). Further the Employer or his agent or servants may enter upon and take possession of the work and all plants, tools,

scaffolding, sheds, machinery, steam and other power, utensils and materials being lying upon premises or the adjoining lands or road and sell the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the work or by employing any other contractors or other person to complete, and the contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other contractors or other persons or person employed from completing and finishing or using the materials and plants for the work. When the work shall be completed or as soon as thereafter as conveniently may be, the Employer shall give notice in writing to the contractor to remove his surplus materials and plants and should the contractor fail to do so within a period of 14 days after receipt by him of the said notice, the Employer may sell the same by

Public Auction and shall give credit to the contractor for the amount so realised. Any expenses or losses by the Employer in getting the work carried out by other contractors shall be adjusted against the amount payable to the contractor by way of selling his tools and plants or due on account of work carried out by the contractor prior to engaging other contractors or against the Security Deposit.

51. ARBITRATION

A) All disputes or differences of any kind whatsoever which shall at any time arise between the parties hereto touching or concerning the work or the execution or maintenance thereof of this contract or the rights touching or concerning the work or execution or maintenance thereof of this contract or the construction remaining operation or effect thereof or to the right or liabilities of the parties arising out of or in relation thereto whether during or after determination, force closure or breach of the contract (other than those in respect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract to the other of them and to the Appointing Authority who shall be appointee for this purpose by the Employer be referred for adjudication to a sole Arbitration to be appointed as hereinafter provided.

B) It is also a term of the contract that if Contractor(s) do / does not make any demand for arbitration in respect of any claim(s) within 90 days of receiving intimation from Employer / Consultant that the bill after due verification is passed for payment of a lesser amount, or he has accepted the payment as per clause 44 whichever is earlier or otherwise, the Contractor's right under this agreement to refer to arbitration shall be deemed to have been forfeited and Employer / Consultant shall be relieved and discharged of their liability under this Agreement in respect of such claims, Further, it is agreed that for the purpose of this clause, such notice is deemed to have been received by the Contractor(s) within 2 days of posting of the letter by Employer / Consultant or when delivered by hand immediately after receipt thereof by the Contractor(s) whichever is earlier. Further, a letter signed by the officials of Employer / Consultant that the letter so posted to the Contractor(s) shall be conclusive.

For the purpose of appointing the sole Arbitrator referred to above, the Appointing Authority will send within thirty days of receipt by him of the written notice, aforesaid to the Contractor a panel of three names of persons who shall be presently unconnected with the organisation for which the work is executed form the following categories of Arbitrators.

i. Retired High Court / Supreme Court Judges, who have experience in handling Arbitration cases.

ii. Members of the Council of Arbitration ;

iii. Fellow of the Institution of Engineers, or Indian Institute of Architects ;

iv. Eminent Retired Chief Engineers from State / Central P.W.D. / Public Sector Undertakings, of good reputation and integrity.

C) The Contractor shall on receipt by him of the names as aforesaid select any one of the persons named to be appointed as a sole Arbitrator and communicate his name to the Appointing Authority within thirty days of receipt by him of the names. The Appointing Authority shall thereupon with out any delay appoint the said person as the sole Arbitrator. If the Contractor fails to communicate such selection as provided above within the period specified, the Appointing Authority shall make the selection and appoint the selected person as the Sole Arbitrator.

D) If the Appointing Authority fails to send to the Contractor, the panel of three names as aforesaid within the period specified, the Contractor shall send to the Appointing Authority a panel of three names of persons out of the above mentioned four categories of Arbitrators who shall all be unconnected with either party. The Appointing Authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint him as the sole Arbitrator within 30 days of receipt by him of the panel and inform the Contractor accordingly. If the Appointing Authority fails to communicate such selection within the period specified, the Contractor shall be entitled to appoint one of the persons as the sole Arbitrator and communicate his name to the Appointing Authority.

E) If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever, another sole Arbitrator shall be appointed as aforesaid.

F) The work under the Contract shall however, continue during the arbitration proceedings and no payment due or payable to the Contractor shall be withheld on account of such proceedings.

G) The Arbitrator shall be deemed to have entered into the reference on the date he issues notice to both the parties fixing the date of the first hearing.

H) The Arbitrator may form time, with the consent of the parties, enlarge the time for making and publishing the award.

I) The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion.

J) The fees, if any, of the Arbitrator, shall if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award including the fees if any of the Arbitrator who may direct to and by whom and in what manner, such costs or any part thereof shall be paid and may fix or settle the amount of costs to be so paid.

K) The award of the Arbitrator shall be final and binding on both the parties.

Subject to aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modifications or re-enactment thereof and the rules made thereunder, and for the time being in force, shall apply to the Arbitration proceeding under this clause.

SPECIAL CONDITIONS OF CONTRACT

1. GUARANTEE

Wherever provision for submission of a guarantee has been advised, he same shall be contract submitted form the specialised agency along with a counter guarantee by the main Contractor engaged for the work. The guarantee shall be furnished on a non-judicial stamp paper of appropriate value. If the Contractor is required to submit guarantee / guarantees for any items / item for a period of more than 12 months. The guarantee in case of these items shall remain valid even after expiry of the defect liability period of 12 months as stipulated in the Contractor.

2. POSSESSION PRIOR TO COMPLETION

The Employer shall have the right to take possession of or use any completed or partially completed part of the work. Such possession or use shall not be an accepted of any work not completed in accordance with contract agreement.

3. INCOME TAX / SALES TAX /GST ON WORK CONTRACT

Statutory deduction of Income Tax / Sales Tax on work contract shall be made form all interim and final payments as per extant statute. GST SHALL BE INDICATED SEPERATELY AND SHALL BE PAID

4. MOBILISATION ADVANCE

Refer Clause 5 of INSTRUCTION TO THE TENDERER

5. WATER

The rates quoted by the Contractor shall include all expenditure for providing all the water for the full contract period required for the work, including that for the work people and all staff on the site. He shall make his own arrangement for the supply of good tested quality water suitable

for use in the work and the work people. If Municipal urban water supply is available, the Contractor shall make arrangements to obtain the same. All expenses including charges shall be borne by the Contractor. If Municipal water is not available or inadequate, he shall make other arrangement like sinking tubewells or making bore-wells, or transport from outside tanker or any other suitable means entirely at his cost and no separate payment for the same will be made.

6. POWER

The Contractor shall at his own cost arrange for necessary power for construction and area lighting for the entire period of contract. If however, separate power is available in the premises, the Contractor shall make his own arrangement to obtain necessary connection from one point and maintain an efficient service of electric lights and power and shall pay for all the requisite charge for the same including the amount for the power consumed . In case such power is not available at site the Contractor shall make all necessary arrangements for Diesel Generator to supplement the power required for construction , area lighting , wielding equipments etc.

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

7. FIRST-AID FACILITIES

The Contractor shall at his own expense arrange to ensure availability of medical attendance promptly when necessary. He shall provide properly equipped first-aid station, in charge of qualified persons at suitable location within easy reach of the workman and staff. The Contractor shall also provide for transport of serious cases to the nearest Hospital. The Contractor shall be responsible for any liability which may be excluded from the other insurance policies referred in Clause 31 and also for all other damages to any person, animal or property arising out of incidental to the negligence or defective carrying out of this contract. He shall also indemnify the Employer in respect of any cost, charges or expenses arising out of any claims or proceedings and also in respect of any award of compensation and damages arising therefrom.

The Employer shall with the concurrence of the Consultant be entitled to deducted the amount of any damage, compensation, cost charges and expenses arising from or occurring from or in respect of any such claims

or damages from any or all sums due or become due to the Contractor without prejudice to the Employer other rights in respect thereof.

8. FIRE FIGHTING ARRANGEMENTS

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

9. REPORTS AND RETURNS

Contractor shall maintain at site daily records of progress with regard to the work carried out, labour engaged and construction equipment deployed. These daily records shall be made available / accessible to the Employer's Site Engineer / Consultant as and when required by him.

Enlarged progress photographs are also to be submitted by the Contractors as and when advised by the Consultant / Employer at no extra cost to the Employer.

10. Any other apparatus if deemed necessary and called for by the Employer / Consultant shall also be provided by the Contractor at his own expenses.

The Contractors shall get the materials tested in local Govt. Engineering College / Polytechnic / approved laboratory at his / their own cost and the results should be preserved carefully & attached with the respective running bills.

11. **The Contractor,** while reporting on completion of their work shall furnish along with to the Consultant – (i) as done completion drawing on ammonia prints, (ii) inventory of all fittings fixed by him in the work, (iii) Enlarged completed photographs o the work.

12. DISCREPANCIES AND ADJUSTMENT OF ERRORS

The several documents forming the contract are to be taken as mutually explanatory of one another, detailed drawing being followed in

preference to small scale drawings and figured dimensions in preference to scaled dimensions.

In case of discrepancy between schedule of quantities, the specifications / and / or the Drawings, the following order of preference shall be observed :

a : Drawings ;

b : Description in the Schedule items and Quantities

c : Technical Specification

If there are varying or conflicting provisions made in any one documents forming part of the Contract, the accepting authority of the employer shall be the deciding authority with regard to the intention of the document.

Any error in description, quantity or rate in schedule of quantities or any omission there form shall not vitiate the Contract or release the Contractor form the execution of the whole or any paint of the work, comprised therein according to drawings, and specifications or form any of his obligations under the contract.

13 . SUPPLY OF MATERIALS BY CLIENT / CONTRACTOR

UNLESS OTHERWISE MENTIONED ALL MATERIALS , EQUIPMENTS , CONSUMABLES , LABOURS ETC SHALL BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST FOR THE CONSTRUCTION PURPOSE

TECHNICAL SPECIFICATION

SECTION- A

MATERIALS

1. Materials shall be of approved quality. A list of materials of approved brand and manufacturer is indicated in the 'List of materials of Approved Brand and/or Manufacture. The list is given to ensure the standard of quality and performance.
2. Contractors shall obtain approval of representative of Employer/Consultant on sample of all materials before placing order and the approved sample shall be carefully preserved in an appropriate manner at the site office for verification by the representative of Employer/Consultant.
3. For standard bought out items, the sizes manufactured by the firms listed shall prevail in case of discrepancy with the sizes mentioned in the schedule without any financial adjustment.
4. Materials shall be tested at site/any approved Testing Laboratory. The Laboratory Test Certificate in original shall be submitted to the representative of Employer/Consultant. Test results are also to be recorded at site registers appropriately.

5. Wherever work as per manufacturer's specification is indicated, it will be obligatory on the part of the contractor to submit manufacturer's specification to Consultant/Employer. The quoted rates shall be deemed to include for the complete work specified by the manufacturer even though not specifically mentioned in the schedule of items.

   Moreover, the quoted rates shall be deemed to include for the complete work specified by the manufacturer even though not specifically mentioned in the schedule of items.

6. It shall be obligatory for the contractor to furnish certificates, if demanded by the representative of Employer/Consultant, from manufacturer or the material supplier, stating that the work has been carried out by using their material.

7. All materials supplied by the representative or Employer/Consultant/any other specialist firm shall be properly stored and the Contractor shall be responsible for its safe custody until they are required on the works and till the completion of work.

8. All equipments and facilities for carrying out field tests on materials shall be provided by the Contractor without any extra cost.

9. Unless otherwise shown on the Drawings or mentioned in the "Schedule of Quantities" or anywhere in the contract, the quality of materials, workmanship, dimensions etc. shall be as specified hereunder.

9.1 **Material for fillings**

Shall be selected materials as specified for filling and shall be free from building rubbish or organic decomposed material. They shall be obtaining either from excavation or brought from outside, as specified, in the schedule of items.

9.2 **Cement**

Cement unless otherwise specified should be PPC , conforming to IS: Standards shall be used. The use of cement other than ordinary Portland Puzzolona Cement will not be allowed unless specifically advised by representative of Employer/Consultant.

Cement shall be stored in dry weatherproof godown/shed built by the Contractor at his own cost in order to prevent deterioration by dampness or intrusion of foreign matter. Not more than 10 bags should be kept in one stack and it shall be stored in such a manner as to permit easy access for proper inspection. It shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt i.e. first received being first used. Cement deteriorated and/or clodded shall not be used on work but shall be removed at once from the site at Contractor's cost.

Daily record of cement received and consumed shall be maintained by the Contractor in the cement register at site and submitted to representative of Employer/Consultant, if called for. Theoretical consumption vis-à-vis materials brought at site by the Contractor shall also be submitted with proper documents with every bill for verification. The consumption of cement for different items of work shall be as given in the tender and in its absence as per C.P.W.D. schedule. Consumption of cement in the corresponding items of work under the contract shall be computed on the basis of the quantities shown in the able subject to a variation of plus/minus three percent. The weight of 1 cum. of cement shall be taken as 1440 Kg.

9.3 **Lime**

Lime shall be made from approved Lime Stone or Kinker and properly burnt and shall be of appropriate class for specific work given in IS: 712-1984. It shall be free from excess of un burnt kinker or lime stone ashes or other extraneous materials and shall be stored to prevent damage by rain, moisture or air slaking. Lime shall be used within 14 days from the date of stacking and damaged lime shall not be used but shall be removed from the site of work forthwith at contractor's cost.

9.4 **Fine Aggregate**

Shall be from natural source, chemically inert, clean, sharp, hard, durable and well graded and free from deleterious materials not exceeding the permissible limit as per IS : 383-1970. The Silt Content shall be within 8%. If it is in excess, washing shall be done in an approved manner to bring it within allowable limit.

The fine aggregate for concrete shall be graded and the Fineness Modules shall be between 2.60 to 3.20.

The fine aggregate shall be stacked carefully on a clean bard dry surface so that it will not get mixed up with deleterious foreign materials. If such a surface is not available, brick floor or a thin layer of lean concrete shall be prepared. The percentage of deleterious materials shall be within the permissible limits as specified in IS 383-1970.

9.5 **Coarse Aggregate**

Shall consist of crushed or broken stone 95% of which shall be retained on 4.75 mm IS test Sieve. It shall be obtained from crushing Granite, Trap, Basalt or similar approved stones. Coarse aggregate shall be chemically inert when mixed with cement and shall

be roughly cubical in shape and free from soft friable, thin, laminated or flaky pieces. The maximum percentage of deleterious materials shall not exceed those specified in IS:383:1970. The coarse aggregate used in the work shall conform to the grading as per limits specified in IS: 383-1970.

9.6 **Steel Reinforcement**

High Strength Deformed Bars

Unless specified otherwise, high strength deformed bars shall conform to IS : 1786-1985 of grade Fe 500 and obtained from approved manufacturer.

Where mild steel bars are specified they shall conform to IS - 432 Grade I and shall be obtained from approved manufacturer.

9.7 **Bricks**

The bricks shall be locally available kiln burnt bricks of generally regular and uniform size, shape and colour, uniformly well burnt throughout but not over burnt . They shall be free from cracks or other flaws.

They shall show a fine grained, uniform, homogenous and dense texture on fracture and be free from lumps of lime, laminations, cracks, air holes, soluble salts causing efflorescence or other defects which may in any impair their strength, durability, appearance, usefulness for the purpose intended.

The size of brick shall be nominally 250 mm x 125 mm x 75 mm or 230 mm x 115 mm x 65 mm with a tolerance on dimension of $\pm$ 8%.

After immersion in water, absorption by weight shall not exceed 20 percent of the dry weight of the brick when tested according to IS 1077 - 1970. The bricks shall have a minimum average compressive strength as specified in the nomenclature of the items. The compressive strength of any individual bricks on testing shall not fall below the average compressive strength by more than 20%. The rating of efflorescence of bricks shall not be more than 'Moderate'.

The bricks to be used for the work shall be approved by the representative of Employer/Consultant beforehand.

9.8 **Water**

Water for mixing Cement/Lime mortar of concrete shall not be salty or Brackish and shall be clean, reasonably clear and free from injurious quantities of deleterious materials. It shall not contain any sugar or excess of oils, acid and injurious alkali, salts, organic matter which will either weaken the mortar or concrete or cause efflorescence or attack the steel in reinforced cement concrete.

Water shall be obtained from sources approved by the representative of Employer/Consultant, Potable water is generally considered satisfactory for mixing an curing concrete, mortar, masonry etc. Water shall be tested once before undertaking the construction work in an approved testing laboratory to establish its suitability. All charges connected therewith shall be borne by the Contractor. The pH value of water shall generally be not less than 6.

9.9 **Timber**

Timber for carpentry/joinery works of all description shall be as specified in schedule and seasoned, naturally or artificially as indicated therein. These shall be free from knot, shakes, fissures, flaws, sub-cracks and other defects to a reasonable extent. Representative of Employer/Consultant's decision in this regard is final and binding. The moisture content for timber normally should not exceed the following limits :

i)	Timber for frames	:	14%
ii)	Timber for planking/shutters etc.	:	12%

Tolerance upto maximum 5% on above is permissible.

In measuring cross sectional dimensions of timber for the frames/shutters styles, rails or panel members, tolerance upto 1.5 mm shall be allowed for each planed surface.

9.10 **Steel Windows & Doors**

Steel windows and doors shall be fabricated out of approved steel sections. They shall be obtained from approved manufacturers.

9.11 **Ceramic Tiles**

White or coloured ceramic glazed / unglazed tiles shall be obtaining from approved manufacturer and shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing and colour shall be of unformed shade. Tolerance in dimension shall be of uniform shade. Tolerance in dimension and colour $\pm$ 1.0 mm in sizes and $\pm$ 0.5 mm in thickness.

9.12 **Kota/Cudappah Stone**

Slab shall be of selected quality, hard, sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. They shall be hand/machine cut to the specified thickness. The tolerance in thickness shall be $\pm$ 2 mm.

9.13 **Glazing**

Glass used for glazing shall be sheet glass/float glass/Toughened as specified, clear or obscured as directed by the Employer/Consultant of approved quality, free from flaws, specks, bubbles.

9.14 **C.I. Rain Water Pipe**

All C.I. pipes and fittings shall be of approved manufacturer free from cracks, chipped edges or corners and other damages. The pipes shall be IS stamped.

9.15 **Collapsible Gates**

These shall be of approved manufacturer and fabricated from MS section consisting of vertical double channels each 18 x 9 x 3 mm at 100 mm c/s braced with flat iron diagonal 18 x 5 mm and top and bottom rails of either I's or E's with minimum web of 40 x 12 mm and flange 40 x 6 mm. The roller wheels shall be of grey iron casting and rivets shall be snap headed and not less than 6 mm dia.

The gates shall be provided with necessary bolts and nuts, locking arrangements, stoppers, handles etc. even if not specified.

9.16 **Rolling Shutter**

Providing and fixingapproved make Roling Shutter fabricated from 18 G x 75 black steel laths of convex corrugation with M.S pressed side guides and bottom rail (both made of 3 mm thick plate) brackets ,door suspension shaft, high tension coil type rolling spring (made out of best spring steel wire)best quality of double row ball bearing (at every 1 m spacing) top housing box /hood made out of 20 gauge sheet locking arrangements for padlocks on both side ,pulling handles , top cover including of 2 coats of spray painting of enamel paint over a shop coat of anti corrosive paint of zinc chromate (measurements clear width + 150 mm & clear height + 450 mm)

9.17 **Paints**

Dry distemper, oil bound distemper, water primer, oil paint, enamel paint, flat oil paint, plastic emulsion paint, anti-corrosive cement paint shall be form an approved manufacturer as listed. Ready mixed paints as received from the manufacturer without any admixture shall be used, except for addition of thinner, if recommended by the manufacturer.

Plastic emulsion paint for internal use and weather coat paint for external purpose shall be used as per Manufacturer's specification.

9.18 **Cement Admixture**

Cement admixture are to be obtained from approved manufacturer with the explicit approval of the representative of Employer/Consultant. The use of admixture containing Calcium Chloride, Fluorides, Nitrate and Sulphate is prohibited. The representative of Employer/Consultant's decision as regards use of admixture is final and binding.

9.19 **Hardware Fittings**

The Hardware fittings, Ferrous or Non-ferrous shall be obtained from approved manufacturer and IS stamped, if available. The MS/Iron fittings are to be oxidized and Aluminium fittings powder coated.

9.20 **Mortars**

Cement mortar shall be proportions specified for each type of work in the schedule. It shall be composed or cement and sand. The ingredients shall be accurately gauged by measure and shall be well and evenly mixed together, care being taken not to add more water than is required. No mortar that has begun to set shall be used.

If hand mixing is done in lieu of mechanical mixture, then it shall be done on pucca water-proof platform. The gauged materials shall be put on the platform and mixed dry. Water will then be added and the whole mixed again until it is homogenous and of uniform colour. The contractor shall use 10% extra cement for hand mixing for which no extra payment will be made.

9.21 **Codes**

Wherever reference to codes are made, they shall mean the latest revision of the particular IS Code under reference.

LIST OF MATERIALS OF APPROVED BRAND AND/OR MANUFACTURE

CEMENT	:	, PPC
	:	Ultratech / Ambuja / Or Equivalent
STEEL	:	JSW, SRMB, ELEGANT OR Equivalent
CERAMIC TILES	:	
i) UNGLAGED	:	'Johnson' / 'Kajaria '/Nitco
ii) GLAZED	:	1st quality of :
		i)H & R Johnson / 'Kajaria
WATER PROOFING COMPOUND	:	'CICO', Sika Qualcrete', 'Pidilite', 'Roffe' of approved grade
REDOXIDE ZN-CHROMATE	:	'Shalimar', 'Asian Paints'
WATER PROOF CEMENT PAINTS	:	"Snowcem Plus", or similar approved brand
GLAZING TOUGHENED GLASS:	'	SAINT GOBAIN or Equivalent
SHEET / PLATE GLASS	:	SAINT GOBAIN/ Modi or equivalent
SYNTHETIC ENAMEL PAINT	:	'Luxol (Berger)/ Asian
EMULSION PAINT	:	ICI, Berger, Jenson & Nicholson
FLUSH DOOR SHUTTERS	:	,Century (ISI - Stamped),GREEN PLY

HARDWARE FITTINGS

1.	Ferrous	:	Mowjee' / Earl-Behari
2.	Non-ferrous	:	Dorma Or Equivalent
COLLAPSIBLE GATES ROLLING SHUTTERS		:	Manufacturer to be got pre-approved.
ALUMINIUM DOOR		:	Manufacturer to be got pre-approved (MAKE HINDALCO /JINDAL)

WATERPROOFING TREATMENT : (Brick Coba Treatment)		Shalimar Tar Products Hindusthan Water Proofing India Waterproofing Co. Techno Construction & Waterproofing (P) Ltd., Cal.
TILE FIXING ADHESIVE	:	Pidilite / Roffe
CHLORPYRIPHOS ENDOSULFANE	:	'HOECHST', or similar approved equivalent
HDPE PIPES	:	'Everest', GIPS, or equivalent
SANITARY FITTINGS	:	HINDWARE/ PARRY WARE OR EQUIVALENT
CP FITTINGS	:	CERA / JAQUAR OR EQUIVALENT
ALUMINIUM	:	HINDALCO , JINDAL
FIRE PROOF DOOR	:	CONFORMING TO BS 476/3614
Natural Stones	:	Samples to be got approved by Consultant

SECTION - B

EARTH WORK

1.0 **GENERAL**

The excavation will generally refer to open excavation of foundation area wet or dry in all sorts of soils at any depth unless otherwise specified except hard rocks for which separate provisions are made.

2.0 **EXAMINE THE SITE**

The contractor shall visit and ascertain the nature of the ground to be excavated and the work to be done and shall accept all responsibility for the cost of the work involved.

3.0 **SETTING OUT**

The contractor shall clear the entire site by cutting/uprooting jungles, bushes, grass, vegetation growth and threes and generally level the site and set out the centre line of the building or other involved works and get the same approved from representative of Employer/Consultant. It shall be the responsibility of the contractor to install substantial reference marks, bench marks etc. and maintain them as long as required by the representative of Employer/Consultant. The contractor shall assume full responsibility for proper setting out, alignment, elevation and dimension of each and all parts of the works.

4.0 **GROUND LEVEL AND SITE LEVEL**

Before starting the excavation the existing ground level of the entire plot shall be taken by the contractor in consultation with the representative of Employer/Consultant and a proper record of these levels kept, which shall be jointly signed by the contractor and the representative of Employer/Consultant.

5.0 **EXCAVATION AND PREPARATION OF FOUNDATION FOR CONCRETE OTHER THAN HARD ROCK**

Excavation shall include removal of all material of whatever nature including mooram, soft work, boulders, old foundations, concrete, asphalt or paved surface etc. at all depths and whether wet or dry necessary for the construction of foundation and sub-structure including mass excavation for underground reservoir, cess pits, septic tanks etc. where applicable, exactly in accordance with lines, levels, grades and curves shown in the drawings or as directed by the representatives of Employer/Consultant. The bottoms of excavation shall be leveled both longitudinal and transversely or as directed by the representative of Employer/Consultant. Should the contractors excavate to a greater depth or width than shown on he drawings or as directed by the representative of Employer/Consultant, he shall at his own expense fill the extra depth or width in cement concrete in proportion as directed by the representative of Employer/Consultant but in no case with concrete of mix leaner than 1:5:10 cement concrete.(Only Solid Measurements shall be considered for Measurement)

The contractor shall report to the representative of Employer/Consultant when the excavations are ready to receive concrete. No concrete shall be placed in foundations until the contractor has obtained representative of Employer/Consultant's approval. In case the excavation is done through different strata of soil and if the same is payable as per provision in the schedule of quantities the contractor shall set the dimensions of the strata decided by the representative of Employer/Consultant for payment. If no specific provision is made in the schedule of quantities it will be presumed that excavation shall be in all types of strata except hard rock and the contractor's rate shall cover for the same, which are treated as a single entity.

After the excavation is passed by the representative of Employer/Consultant and before laying the concrete, the contractor shall get the depth and dimensions of excavation, levels, nature of strata (as applicable as per schedule of quantities, and measurement recorded from the representative of Employer/Consultant.

5.1 **Shoring**

The sides of the excavations, if required, should be protected by shoring in such a way as is necessary to secure them from falling in, and the shorting shall be maintained in position as long as necessary. The contractor shall be responsible fort the proper design of the shoring to hold the sides of the excavation in position and ensure safety of persons and properties etc. The shoring shall be removed as directed after the items for which it is required are completed. No extra payment will be made for shoring.

5.2 **Protection**

If instructed by the representative of Employer/Consultant all foundation pits, and similar excavations shall be strongly fenced and marked with red lights at night to avoid accidents. Adequate protective measures shall be taken to see that the excavation doe not affect or damage adjoining structures. All measures required for the safety of the trenches, the people working in and near the foundation trenches, and people in the vicinity shall be taken by the contractor at his own cost. The contractor will be entirely responsible for any injury or damage to property caused by his negligence or accident due to his constructional operations.

5.3 **Stacking of Excavated Materials**

All materials excavated will remain the property of the Employer. The excavated materials, at the first instance, shall be sorted as directed by the representative of Employer/Consultant and stacked appropriately by the sides of trenches as directed by the representative of Employer/Consultant before they are disposed off and leveled within the site at locations directed by the representative of Employer/Consultant. Materials suitable and useful for back filling, plinth filling or leveling of the plot or other use shall be stacked in convenient places in such a way so as not to obstruct free movement of men, animals and vehicles or encroach on the area required for constructional purposes. The cost on account of sorting out useful materials / disposal within the site will not be additionally paid for.

5.4 **Back Filling / Plinth Filling**

All shoring and form work shall be removed after their necessity cases and trash of any sorts shall be cleaned out from the excavation. All space between foundation masonry or concrete and the sides of excavation shall be refilled to the original surface with approved excavated materials in layers 15 cm. in thickness watered and rammed with iron and wooden rammers weighing 7-8 Kg. with a base of 20 cm square or 20 cm diameter. The filling shall be done after concrete or masonry is fully set and done in such a way as not to cause undue thrust on any part of the structure. Where suitable excavated materials is to be used for refilling, it shall be brought from the space where it is temporarily stacked and used in refilling. When sand filling is done, it shall be consolidated by flooding with water. No excavation of foundations shall be filled in or covered up until all measurements of excavation, masonry concrete and other works below ground level are jointly recorded. Black cotton soil shall not be used for back filling or in plinth filling.

5.5 **Dewatering**

Rate for excavation shall include bailing or pumping out water which may accumulate in the excavation during the progress of work either from seepage, springs, rain or any other cause and diverting surface flow if any by bunds or other means. Pumping out water shall be done in such approved manner as to preclude the possibility of any damage to the foundation trench, concrete or masonry or any adjacent structure. When water is set in foundation trenches or in tank excavations, pumping out water shall be from auxiliary pit of adequate size dug slightly outside the excavation. The depth of auxiliary pit shall be more than the working foundation trench levels. The auxiliary pit shall be refilled with approved excavated materials after the dewatering is over.

The excavation shall be kept free from water :

a) during inspection and measurement.

b) When concrete and/or masonry walls are in progress and till they come above the natural water level, and

c) Till the representative of Employer/Consultant consider that the concrete mortar is sufficiently set.

5.6 **Surplus Excavated Materials**

All materials and spoils certified as surplus and not useful, shall be removed by the Contractor from the site in an approved manner at locations to be arranged by him in conformity with local regulations. The quantity to be disposed of shall be got pre-approved by Employer/Consultant. The item of removal of surplus excavated materials shall only be undertaken by the Contractor only when specific instructions in this regard has been obtained from the representative of Employer/Consultant. The rate for the item will be mutually decided when such removal is advised.

6.0 **METHOD OF MEASUREMENT**

6.1 **Excavation**

Excavation shall be measured in cum. as per drawing, the length and width being governed by the maximum dimensions of soling/bed concrete/structural concrete as in drawing(**Solid Measurements**) and depth considered as the difference between average foundation level in a pit and average of pre-construction level there at. No extra measurements will be allowed for excavation for form work, shoring, working spaces or cut stability. No extra will be entertained for cost of dewatering and keeping trenches dry, protective shoring, if any needed. No increase in bulk after cutting will be entertained. No deduction will be made for volume of pile heads, tree trunks or other masonry structures not any extra on account of above is payable.

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6.2 **Filling**

Plinth filling shall be measured as net consolidation volume in cum. as per drawing.

SECTION - C

1.0 PLAIN AND REINFORCEMENT CEMENT CONCRETE

All concrete work shall be carried out by the Contractor under the supervision of a concrete foreman sufficiently experienced in this type of work.

Ingredients to be used in concrete and Reinforced concrete work :

Ingredients to be used in concrete should conform to the specifications as indicated under "Technical Specifications for Materials" given earlier.

As regards admixture, this shall be used with prior approval of representative of Employer/ Consultant.

1.1 Mix Proportion :

The mix proportions shall be selected to ensure that the workability of the fresh concrete is suitable for the conditions of handling and placing, so that after compaction it surrounds all reinforcements and completely fills the form work.

The determination of the proportions of cement, aggregates and water to attain the required strength & workability shall be made as follows :

a) By designing the concrete mix ; such concrete shall be called "Design mix Concrete" and will be permitted for use when complete quality control is ensured through use of weigh-batches, equipped field laboratory, approved transportation method and skilled technician.

b) By adopting nominal concrete mix; such concrete shall be called "Nominal Mix Concrete". The minimum cement content for nominal mix concrete shall be as under :

Grade of Concrete	Minm,Cement/cu.m. of concrete (in kg)
M 20	400
M 15	317
1:3:6	235
1:4:8	180

1.2 Design Mix Concrete

The mix shall be designed to produce the grade or concrete having the required workability and a characteristic strength not less than values given in Table - 'A'. The procedure given in Indian Standard should be preferred for the design but other standard methods may also be followed. As long as quality of material does not change a mix design done earlier may be considered adequate for later work.

When mix is designed, the records shall be maintained in the format annexed.

TABLE - A : GRADE OF CONCRETE

Grade of Concrete	Specified characteristic compressive strength	
	at 7 days	at 28 days
	N/sq.mm	N/sq.mm
M 10	7.00	10
M 15	10.00	15
M 20	13.50	20
M 25	17.00	25
M 30	20.00	30
M 35	23.50	35
M 40	27.00	40

1.3 Nominal Mix Concrete

Nominal mix concrete may be used for concrete of grade M5, M7.5, M10, M15 and M20. The proportion of materials for nominal mix concrete shall be in accordance with Table - 'B'. However, strength requirement is to be pre-established before resorting to mass work. The proportions of fine to coarse aggregates should be adjusted from upper limit to lower limit progressively as the grading of the Fine Aggregates becomes finer and the maximum size of coarse aggregates becomes finer and the maximum size of coarse aggregate becomes larger. Grade coarse shall be used.

The cement content in the mix specified in Table 'B' for any nominal mix to be proportionately increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction, so that the water cement ratio is specified is not changed.

In the case of vibrated concrete, the limit specified may be suitable reduced to avoid segregation.

The quantity of water used in reinforced concrete work should be sufficient, but not more than sufficient to produce a dense concrete of adequate workability for its purpose, which surround and properly grip all the reinforcement. Workability of concrete should be controlled by maintaining a water content that is found to give a concrete which is just sufficient wet to be placed and compacted without difficulty with the means available.

TABLE - B : PROPORTIONS FOR NOMINAL MIX CONCRETE

Grade of Concrete	Total quantity of dry aggregates by Mass per 50 Kg. of cement to be taken as the sum of the individual Masses of Fine and Coarse Aggregate (maximum) Kg.	Proportion of Fine Aggregate to Coarse Aggregate (By Mass)	Quantity of water per 50 Kg. of cement (Maximum Litres)
1	2	3	4
M 5	800	Generally 1: 2 but subject to an upper limit of 1:1 1/2 and a lower limit of 1:2 1/2	60
M 7.5	625		45
M 10	480		34
M 15	350		32
M 20	250		30

2.0 PRODUCTION AND CONTROL OF CONCRETE

In proportioning Concrete the quantity of both Cement coarse/fine Aggregate and water should be determined by weight in case of design mix, or volume in case on nominal mix. Where weight of cement is determined on the basis of mass of cement per bag, a reasonable number of bags should be weighed periodically to check the nett mass. Where the cement is weighted on the Site and in bags it should be weighed separately from the aggregates. Water should be either measured by volume in calibrated tanks or weighed. Any solid admixture that may be added may be measured by mass; liquid and paste admixture may be measured by volume or by mass. batching plant when used should conform to IS:4925. All measuring equipments should be maintained in a clean serviceable condition and their accuracy periodically checked.

Except where it can be shown to the satisfaction of the representative of Employer/ Consultant that supply of properly graded aggregate of uniform quality can be maintained over the period of work, the grading of aggregate should be controlled by obtaining the coarse aggregate in different sizes and blending them in right proportions, as required, the different sizes being stacked in separate stock-piles. The grading of coarse and fine aggregate should be checked as frequently as possible to ensure that the specified grading is being maintained. No change in proportions or substitutions in materials shall be made without additional tests to show that the quality and strength of concrete are satisfactory.

2.1 Mixing

Concrete shall be mixed in a standard mechanical mixer. The mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour and consistency. If there is a segregation after unloading from the mixer the concrete should be remixed. The mixing time may be 1-1/2 to 2 minutes generally. In exceptional circumstances such as mechanical breakdown of mixer, work in remote areas or when the quantity of concrete is very small, hand mixing will not be permitted .

Workability of concrete should be controlled by direct measurement of water content, and it should be checked at frequent intervals. For nominal mix workability measured by slump test may have values given in Table - 'C'.

TABLE - C

Sl. No.	Type of work	When vibrated	When not vibrated
01.	Mass concrete in RCC foundation footings, retaining walls and pavement	2.5 cms (1")	5 cms (2")
02.	Beams, slabs, columns with simple reinforcement	2.5 cms to 5 cms (1" to 2")	5 cms to 10 cms (2 " to 4 ")
03.	Thin sections with congested reinforcement	5 cms to 10 cms (2" to 4")	10 cms to 15 cms (4" to 6")

Note : Should conditions governing slump and workability change pointing to advisability of a increased slump, this shall only be done by decreasing the amount of aggregate and not by increasing the amount of water.

Design Mix : As Specified by the Consultant needs to be carried out at Site with batching plant as instructed by the Engineer In Charge all complete.

2.2 **Transportation**

The method of transportation shall be got pre-approved from Employer/Consultant.

Concrete shall be transported from the mixer to the formwork as rapidly as possible by methods which will prevent the segregation or loss of any of the ingredients and maintaining the required workability. In no case, more than 30 minutes shall elapse between mixing and consolidation in its position. During hot and cold weather, concrete shall be transported by deep containers. Other suitable methods to reduce the loss of water by evaporation in hot weather and heat loss in cold weather may also be adopted.

For buildings with height more than 18.0 metre, transportation of concrete by suitable and pre-approved mechanical devices is essential.

2.3 **Placing**

The concrete shall be deposited as neatly as practicable in its final position to avoid rehandling. The concrete shall be placed and compacted before setting commences ad should bot be subsequently disturbed. Methods of placing should be such as to preclude segregation. Care should be taken to avoid displacement of reinforcement or movement of form work. Concrete shall not be dropped into position from a height greater than 2.0 M.

2.4 **Compaction**

Concrete should be thoroughly compacted and fully worked around the reinforcement, embedded fixtures and into corners of the form work. Mechanical vibrators should generally be used. Over vibration or vibration of very wet mixes is harmful and should be avoided. Under vibration is also harmful.

Whenever vibration is to be applied externally the design of form work and the disposition of vibration should receive special consideration to ensure efficient compaction and to avoid surface blemishes.

Beams and columns shall be vibrated using immersion vibrators. Thin sections like walls of water tanks, chajjas, aprons etc. should be vibrated preferably using surface vibrators. It is better to vibrate in smaller intervals for short period of time, rather than at wider intervals for longer periods of time. The vibrator shall be used only to aid compaction and not to push concrete laterally in the forms.

3.0 CONSTRUCTION JOINTS

Concreting shall be carried out continuously upto construction joints, the position and arrangement of which should be indicated by the designer.

The locations of construction joints shall preferably be kept parallel to the principal reinforcement. Where it is unavoidable, and is at right angles to the principal reinforcement, it shall be kept at approx. 1/3rd to 1/4th of the span. All joints shall be vertically formed with proper wooden stop boards.

When work is to be resumed on a surface which has hardened, such surface shall be roughened. It shall then be swept clean and thoroughly wetted. For vertical joints neat cement slurry shall be applied on the surface before it is dry. For horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry or mortar shall be freshly mixed and applied immediately before placing of concrete.

Where concrete has not fully hardened, all latinate shall be removed by scrubbing the wet surface with wire or bristle brushes. Care being taken to avoid dislodgment of particles of aggregates. The surface shall be thoroughly wetted and all free water removed. The surface shall then be coated with a neat cement slurry. On this surface, a layer of concrete not exceeding 150 mm in thickness shall first be placed and shall be well rammed against old work, particular attention being paid to corner and close pots. Work therefore shall proceed in the normal way.

4.0 CURING

Unless otherwise specified, all exposed surface of concrete shall be kept continuously in a damp or wet condition by ponding or by covering with a layer of sacking canvas, hessian or similar materials and kept constantly wet for at least 7 days from the date of placing of concrete. Mere sprinkling of water on vertical surface shall not be allowed. The rate for RCC/plain concrete work shall include cost of curing.

Approved curing compounds may be used at no additional cost to the owner in lieu of moist curing with the permission of the representative of Employer/Consultant. Such compounds shall be applied to all exposed surface of the concrete as soon as possible after the concrete has set.

5.0 FACILITIES FOR PREPARATION AND TESTING OF CONCRETE AT SITE

In order to exercise the required degree of constant control over the concrete materials and its preparation the contractor is expected to set up and maintain at his own expenses a Testing laboratory at Site equipped with at least the following equipments :

i) Compression Testing Machine or capacity 80t/100t ;

ii) A set of standard sieves ;

iii) Measuring cylinders, adequate number of cube and cylinder moulds and slump cones ;

iv) Weighing balance ;

v) Vicat apparatus ;

vi) Curing tanks for Cubes ;

5.1 **Sampling, Testing and Acceptance of Concrete**

Samples from fresh concrete shall be taken and cubes shall be made, cured and tested at 28 days in accordance with IS 516

Tests shall be conducted for compressive strength on 15 cm x 15 cm x 15 cm Cubes of Concrete. Compaction Specimen shall be cast from a single batch of concrete and shall be of the same age at the time of testing. In order to get a relatively quicker idea of the quality concrete, additional tests of compressive strength tests at 7 days shall be carried out in addition to 28 days compressive strength specified in Table 'A' shall alone be the criterion for acceptance or rejection of the concrete.

5.2 **Frequency of Sampling**

The frequency of sampling shall be as indicated in the list of mandatory tests.

Works test cubes shall represent quality of concrete incorporated in the work and taken out insets of 6 cubes. The concrete for preparation of one set of 6 cubes shall be taken from one batch of mixed concrete discharged from mixer. The cube shall be moulded in accordance with I.S. Code of practice. Out of 6 cubes, 3 cubes shall be tested at an age of 7 days. In case of testing in an approved laboratory the contractor shall arrange to transport the cubes from site to the laboratory and forwarded the test results to the representative of Employer/Consultant. The contractor shall bear all expenses in connection with the preparation of test cubes, cost of concrete, labour and transportation charges to the approved laboratory etc. including laboratory testing charges and his rate for concrete item shall be quoted accordingly.

The Specimen shall be tested as per IS : 516. The samples may be tested at site, laboratory generally but should be tested in any other Government Test House or approved laboratory whenever asked for by the representative of Employer/Consultant for which no additional payment shall be made.

The work's concrete cubes shall be deemed to comply with the strength requirements if, the individual variation is not more than +/- 15% of the average test strength of three specimen.

For mix design, however, acceptance criterion will be decided based on "Standard Deviation" as per IS : 456.

5.3 **Concreting under special condition**

The specifications and references given in IS 456 for concrete in extreme weather condition should be adhered to.

6.0 DEFECTIVE OR POOR CONCRETE PROCEDURE FOR DEALING WITH

Concrete which does not meet the strength requirement shall be dealt with as under at the discretion of the representative of Employer/Consultant :

i) The structural adequacy of the parts affected shall be investigated and any consequential action as needed shall be taken. Costs of any such consequential action or any tests to be advised by the representative of Employer/Consultant is to be borne by the Contractor ;

ii) If it is advised by the representative of Employer / Engineer to retain the concrete having strength less than that specified payment shall be made at a reduced rate pro-rata to the strength obtained if not covered by Cl. (iii) below ;

iii) If the deficiency in the opinion of the representative of Employer/Consultant is such as to necessitate removal of the concrete from the structure, then on being so directed by his own expense shall remove the portion of the concrete certified as deficient, and replace by concrete of specified strength at no additional cost.

A register shall be maintained at site by the Contractor with the following details entered and initiated by the contractor and the representative of the Employer/Consultant.

i) Reference to specific structural members receiving the batch of concrete from which the cubes were cast ;

ii) Identification mark on cubes ;

iii) mix of concrete ;

iv) Date and time of casting ;

v) Crushing strength as obtained at the end of 7 days and 28 days for each set ;

vi) Laboratory in which tested and certificate reference ;

Concrete of each grade shall be assessed separately and shall be assessed daily for compliance. Concrete is liable to be rejected if it is porous or honey-combed, its placing has been interrupted without providing a proper construction joint, the reinforcement has been displaced beyond acceptable standard or construction tolerances have not been met. However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the representative of Employer/Consultant.

7.0 FORM WORK

The form work shall conform to the shape, lines and dimensions as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete and shall be sufficiently watertight to prevent loss of cement slurry from the concrete.

The allowable tolerance to formwork shall be as under :

i) Deviation from specified dimension : $\pm$ 3 mm of cross section of columns & beams

ii)	Plumb	:	1 in 1000 of height
iii)	Levels place	:	± 3 mm before any deflection has taken
iv)	General setting out	:	± 3 mm upto 4 meters and ± 5 mm beyond 4 meters

Craft paper or Polythene sheets shall be used by the Contractor to ensure water tightness without additional cost to the employer. **Form work or centering shall be constructed of steel or shuttering ply only** and adequately designed to support the impact load of full weight of wet concrete and labourer without deflection and retain its form during laying, ramming and setting of concrete. A camber in all directions of 6 mm for every 5 m span in all slab and beam centering shall be provided to allow for unavoidable sagging due to compression or other causes.

All props either timer or steel, shall be straight and of full height and no joints shall be allowed. Where timber props like bullies are used, they shall have a minimum diameter of 100 mm and shall be straight and adequately strong. Props shall be braced with wooden battens and where additional staging is necessary extra care shall be taken to use bigger diameter props with bracing at 4 or 5 levels at no extra cost. All props shall be supported on sole plates and double wedges. At the time of removing props, wedges shall be gently eased off and not knocked out.

All rubbish, chippings, shavings and saw dust shall be removed from the interior of the forms and shall be cleaned and thoroughly wetted or treated, if considered necessary, with any approved material before concrete is poured at contractor's own cost. Care shall be taken that or such approved material is kept out of contact with the requirements.

Form work shall be removed when the concrete has reached a strength of at least twice the stress to which the concrete may be subjected at the time of removal of formwork. This shall be stripped without shock or vibration and shall be eased offf carefully in order to allow the structure to take up its load gradually. Form shall not be disturbed until concrete has adequately hardened to take up the superimposed load.

In normal circumstances (generally where temperatures are above 20 degree centigrade and where ordinary Portland cement is used) form shall be struck after expiry of the following periods unless otherwise directed at site by the representative of Employer/ Consultant.

	Location	**Striking time in days**	
		PPC	**OPC**
a)	Vertical sides of walls, slabs, beams and columns	4	2
b)	Bottoms of slab upto 4.5 m span	14	7
c)	Bottom of slab above 4.5 m span & bottom of slab upto 6 m span	28	14
d)	Bottom of beams over 6 m span	28	21

8. REINFORCEMENT CLEANING, BENDING, PLACING, ETC.

8.1 Cleaning of Reinforcement

Before steel reinforcement is placed in position, the surface of the reinforcement shall be cleaned of rust, dust, grease and any other objectionable substances.

8.2 Bar Bending Schedule of Reinforcement

on receipt of structural drawing, contractor shall prepare bar bending schedule of reinforcement and shall get it approved by the representative of Employer/Consultant.

8.3 Cutting in Reinforcement

Before steel reinforcement bars are cut, the contractor shall study the length of bars required as per drawing and shall carry out cutting only to suit the sizes, required as per drawing.

8.4 Placing and Security

Reinforcement bars shall be accurately placed and secured in position and firmly supported or wedged by pre-cast concrete blocks of suitable thickness, at sufficiently close intervals so that they will not sag between the supports or get displaced during the placing of concrete or any other operation of the works. It is most important to maintain reinforcement in its correct position without displacement and to maintain the correct specified cover. The contractor shall be responsible for all costs for rectification required in case the bars are displaced out of their correct positions.

8.5 Binding Wire

The reinforcement shall be accurately tied wherever they cross each other or whenever required for with 20 guage black soft annealed steel wire. The cost of materials and labour required for binding the reinforcement shall be included in the contractor's quoted rate for reinforcement.

8.6 Welding

Welded in lieu of splices may be carried out only after authorisation in writing by the representative of Employer/Consultant. Welding shall be carried out as per relevant IS Code of practice. However, no extra payment shall be allowed for the same.

8.7 Bend, etc.

Bends, cranks etc. in steel reinforcement shall be carefully formed. Care being taken to keep bends out of winding. Otherwise all rods shall be truly straight. For any bend minimum radius of eight times diameter of the bar shall be used unless otherwise specified in the drawings. However, in respect of standard hooks the radius of bend shall be two times the diameter of bar. Heating of reinforcement bars to facilitate bending will not be permitted. The bars shall always be bent cold. In case of mild steel reinforcement bars of larger sizes where cold bending is not possible they may be bent by heating with written permission of the representative of Employer/Consultant. Bar when shall not be heated beyond cherry red colour and after bending, shall be allowed to cool slowly without quenching. The bars damaged or weakened in any way

in bending shall not be used on the work. high strength deformed bars shall in no case be heated to facilitate.

8.8 **Inspection of Reinforcement**

No concreting shall be commenced until the representative of Employer/Consultant have inspected the reinforcement in position and until their approval have been obtained. A notice of atleast 72 hours shall be given to the representative of Employer/Consultant by the contractor for inspection of reinforcement, if in the opinion of the representative of Employer/Consultant any material is not in accordance with the specification or the reinforcement is incorrectly spaced. bent or otherwise defective, the contractor shall immediately remove such materials from the site and replace with new and rectify any other defects in accordance with the instruction of the representative of Employer/Consultant to their entire satisfaction at his own cost.

8.9 **Cover for Reinforcement**

Cover shall be measured from the outer surface of main reinforcement. Cover shall be as follows :

a) At each end of a reinforcing bar, 25 mm or twice the diameter of such rod or bar, whichever is greater.

b) For longitudinal reinforcing in beams 25 mm or the diameter of such road or bar, whichever is greater.

c) For tensile, compressive, shear or in other reinforcement in slab 15mm or the diameter of such reinforcement whichever is greater.

d) For reinforcement in any other member such as a lintel, chajja, canopy or pardi, 15 mm or the diameter of such reinforcement, whichever is greater.

e) For main reinforcement in isolated footing (side and bottom) clear cover shall be 50 mm.

f) For column bars clear shall be 40 mm, unless otherwise specified in drawing.

g) For bars in slabs of strip footing and mat foundations clear cover shall be 50 mm. Slab bars shall be placed over beam bars in the case of beam and slab type foundations.

h) For any other types cover is specified in I.S. 456 shall be provided.

8.10 **Tor Steel**

Tor reinforcement bars manufactured by approved manufacturer conforming to Fe 550 Gr. IS 1786/1985 shall be used in work.

9.0 **PRE-CAST CONCRETE**

All thin pre-cast RCC members shall be cast using ply-board base and timbered side shuttering. Casting on floor over sand bed is not permitted.

Reinforcement cage to proper size as per design or instruction shall be placed after pouring concrete for the cover portion, duly levelled.

The top surface shall be finished smooth with additional cement in simultaneously operation.

De-shuttering shall be done carefully and rendering with cement mortar (1:3) shall be immediately carried out.

Pre-cast member shall be fixed in position only after 15 days curing.

10.0 METHOD OF MEASUREMENTS

10.1 Concrete

a) Actual net volume of work as actually executed and accepted based on the drawing and authorised variation if any shall be measured in Cu.m. unless stated otherwise. No deduction for reinforcements shall be made.

b) Pre-cast concrete work shall be measured in the same way as specified in the foregoing paragraph.

10.2 Form Work and Centering

a) Actual net area of form work in contract with concrete shall be measured in Sq.m. unless stated otherwise, small chamfers or fillets (each not exceeding 10 Sq.cm. in cross section) and voids not exceeding 200 sq.cm. each on the exposed surface shall be ignored as if those are not- existent.

b) No separate payment shall be made for form work in case of pre-cast units.

c) The work and payment thereof includes striping off after completion of the work.

10.3 Reinforcements

a) Actual net measurements by weight of reinforcement as actually used in the permanent works and accepted shall be paid for. Authorised extra for laps, hooks, steel chairs, spacer bars for keeping reinforcements in position shall be measured and paid for. The weight of binding wire or any fixture, shall be excluded from the measurement. The weight of bars shall be as per is Code taken upto three decimal places. No extra for wastage, unnecessary overlaps or rolling margin shall be paid for .

b) Bar neither shown in drawings nor instructed by the representative of Employer/Consultant but required for constructional facilities shall not be measured.

11.0 TYPICAL FORMAT FOR RECORDING MIX DESIGN RESULTS

Concrete mix design for M …….. (Grade of Mix) proposed to be use in ……..(designation and levels of structural members) Weight in kgms. of

Cement	Coarse Aggregate	Fine Aggregate		Aggregate / Cement ratio	Water/Cement ratio
1	2	3		4	5
Compacting factors 1199	Results of preliminary tests cube strength at 7 days/28 days	Gradation of		Fineness for Fine Aggregate (F.A.)	
		Coarse aggregate (C.A)	Fine Aggregate (F.A.)	Coarse aggregate (C.A)	Fine Aggregate (F.A.)
6	7	8	9	10	11
Specific Gravity of		Cement		Absolute Volume	Density of cube by water displacement method
Coarse Aggregate	Fine				
12	13	14		15	16

Signature of the Testing Laboratory Signature of the Contractor

SECTION - D

BRICK MASONRY

1.0 BRICK WORK

1.1 General

All brick work shall be carried out as shown on the drawings with set backs, projections, curvatures, cuttings, footings etc. No additional cost for use of cut bricks shall be allowed. Wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in the proportion of 1:6 shall be used. Flat brick arches shall be provided wherever required without any extra cost. Brick work shall be kept wet while in progress, till mortar has properly set. Minimum curing period for masonry work shall be 10 (ten) days. On holidays or when work is stopped , top of all unfinished masonry shall be kept wet. Should the mortar become dry, white or powdery, for want of curing, work shall be pulled down land rebuilt at the contractor's expense. All external brick work shall be done from outside by erecting rigid external scaffolds only.

2.0 BRICK MASONRY

2.1 Soaking

All bricks shall be immersed in water for twenty - four hours before being put into work so that they will be saturated and will not absorb water from the mortar.

2.2 Bats

No bats or cut bricks shall be used in the work unless absolutely necessary around irregular openings or for adjusting the dimension of different course and for closures, in which case, full bricks shall be laid at corners, the bats being placed on the middle of the courses.

2.3 Laying

Unless otherwise specified, the brickwork shall be laid in English bond. The brick shall be laid in cement mortar to line, level and thoroughly bedded in mortar and all joints shall be properly flushed and packed with mortar and no hollows left anywhere. brick shall be handled carefully so as not to damage their edges. They should not also be thrown from any height to the ground but should be put down gently. All courses shall be laid truly horizontal and all vertical joints made truly vertical. Vertical joints on the course and the next below should not come one another and shall not normally be nearer than quarter of a brick length. Fixtures, lugs, frames etc. if any, shall be built in at place shown in the plans while laying the courses only and not later by removal of bricks already laid unless otherwise instructed by the representative of Employer/Consultant.

Care shall be taken during construction to see that edges of bricks at quoins, sills, heads etc. are not damaged.

The vertically of the walls and horizontally of the courses shall be checked very often with plumb bob and spirit level respectively.

2.0 **Joints**

Joints shall be preferably not exceed 10 mm (about 3/8") in thickness. The joints shall be racked out not less than 10 mm (about 3/8") deep when the is green where pointing is to be done. When the brick surface are to be plastered, the joints shall be raked to a depth of 5 mm when the mortar is green so as to provide good key to plaster.

2.1 **Uniform Raising**

Brick work shall be carried up regularly in all cases where the nature of work will admit, not leaving any part 60 cm. lower then another. But where building at different levels is necessary, the bricks shall be stopped so as to give later a uniform level and effective bond. Horizontal courses should be to line and level, and face plumb as shown on the plan, the rate of laying masonry may be upto a height of 80 cm (about 32") per day if cement mortar is used, and 45 cm. (about 18") if lime mortar is used.

2.2 **Scaffolding**

The scaffolding must be strong and rigid stiffened with necessary cross bearers and always decked and beared on the sills with close boardings/ceilings to prevent swings and injury to persons or damage to materials. The contractor shall have to allow other tradesmen engaged by the Employer to make use of the scaffolding at no additional cost. Rates for brick work is to include all necessary costs for erection, maintenance and removal on completion of suitable scaffolding needed for the work. if for the interest of the work the contractor has to erect scaffolding in the other properties including local bodies/corporation, the arrangement for the same including licensing fees etc. shall be borne by the contractor and the Employer is kept free from any liability on this account.

3. **HALF BRICK WORK AND 75/65 MM THICK BRICK WORK**

The mortar mix for half-brick and 75/65 mm brick work shall be as specified in the schedule of quantities. half brick thick and brick on edges walls, shall be provided wire netting reinforcements. For half brick thick wall and brick on edge wall wire netting shall be provided at very third course and at alternate course respectively with wire netting 40 mm mesh made of 20 SWG soft G.I. iron wire, turned around the specified course for continuity.

4. **BRICK FLAT SOLING**

For soling the bricks shall be picked slightly over brunt of approved brand, sound, hard, durable, dense, clean, free from soft spots, cracks, decay and other defects. brick Bat shall not be used. All the fillings shall be watered and compacted to get maximum consolidation. All necessary trimming or filling for laying of the soling in line and required grade shall be done. The sub-grade shall be marked by stacks and string for required depth for laying of soling. The cushioning as well as filling of joints shall be done with local sand.

The bricks shall be laid on flat (unless otherwise specified) touching each other. Brick shall be laid in parallel rows breaking bond or in herring bond pattern as directed by the representative of Employer/Consultant and firmly embedded true to line and filled with local sand.

5.0 **MEASUREMENT**

The measurement shall be made net as per drawing or actual whichever is less. No deduction shall be made for ends of dissimilar upto 500 sq.cm in section.

SECTION - E

PLASTERING

1.0 Scaffolding

Scaffolding for carrying out plastering work shall preferably be double scaffolding having two sets of vertical support so that the scaffolding is independent of the walls.

1.1 Preparation of surface

All putlog holes in brickwork and junction between concrete and brick work shall be properly filled in advance. Joints in brick work shall be raked about 5 mm deep and concrete surface hacked to provide the grip to the plaster. Projecting burns of mortar formed due to gaps at joints in shuttering shall be removed.

The surface shall be scrubbed clean with sire brush/coir brush to remove dirt, dust etc. and the surface thoroughly washed with clean water to remove efflorescence, grease and oil etc. and shall be kept thoroughly wet prior to application of plaster.

1.2 Ordinary Cement Plaster

The preparation of surface shall be as stated above. The thickness and proportion of plaster shall be as specified in the schedule of items.

The mortar shall be applied evenly with force on the surface to be plastered. The mortar surface shall be finished at once by being rubbed over with a trowel till the cement appears on the surface. All corners, angles and junctions shall be truly vertical and horizontal as the case may be and neatly finished. Rounding of corners and junctions where required shall be done without extra charges. Plastering in narrow grooves or making designed grooves on plastered surface are not separately payable. The mortar shall be adhere to the surface in timely when set and there should be no hollow sound when struck.

The completed plastered surface shall be cured for a minimum period of 10 (ten) days.

2.0 NEERU FINISH

'Neeru' shall be made of pure fat lime conforming to appropriate Class mentioned in IS: 712.

The lime shall be slaked with fresh water and thereafter shifted and reduced to a thick paste by grinding in a mill.

'Neeru' thus prepared shall be kept moist

'Neeru' thus prepared shall be kept moist until use and shall be utilised within 15 days after preparation.

a thin layer of 'Neeru' shall than be applied on the plastered surface while it is still green. 'Neeru' shall be smooth finish is obtained. Any leveling work etc. shall be carried out at the plastering stage itself and not while putting 'Neeru' finish.

The surface shall be kept moist for seven days following which a coat of white wash may be applied, if specified.

3.0 PLASTER OF PARIS

Surface of walls/ceiling where specified shall be treated with plaster of paris calcium sulphate Hemihydrate materials. It shall have fineness such that residue after sieving of dry materials for 5 minutes through IS. Sieve designation 3.75 mm will not exceed 1% by weight and initial setting time shall not be less than 13 minutes. The particular brand of this special plaster and its composition must be previously approved by the Consultant/ Employer.

The paste of material made with water shall be applied by means of English trowel.

The entire surface must be smooth on completion and unevenness must be removed. Special trained and skilled artisans with previous experience of this work will have to be employed for the purpose of achieving high grade finish. Before application of plaster of paris, the surface to be treated shall be thoroughly cleaned, brushed and patching must be scraped properly, and all holes, cracks and patches shall be made good with approved materials.

4.0 METHOD OF MEASUREMENT

Measurement shall be in sq.m. as per drawing or actual whichever is less. half the area of opening shall be deducted for each face of wall plaster and jambs and soffits will not be separately paid for as the case applicable as per provisions of IS codes of measurements. Deduction for ends of dissimilar materials, if less than 0.5 sq.m. will not be made.

SECTION - E

FLOOR FINISHING

1.0 TERRAZZO (MARBLE CHIPS) FLOORING LAID IN SITU

1.1 General

The thickness of the under layer shall be measured with a permissible tolerance of +/- 3 mm. The thickness of the top layer after polishing shall be measured with a tolerance of +/- 1.5 mm.

1.2 Under Layer

Cement concrete of specified mix shall be used. The panels shall be of sizes as directed by representative of Employer/Consultant and generally not exceeding 2 sq.m. in area and 2 M in length for inside situation. In exposed situations the length of any side of the panel shall be preferably be not more than 1.25 M or as directed. Cement slurry @ 2.00 Kg. per sq.m. shall be applied before laying of under layer over the cement concrete/R.C.C. surface which will not be separately paid for.

1.3 Strip Fixing

Glass strips or aluminium strips as given in the schedule shall be fixed with their top at proper level.

1.4 Top Layer

Mortar : The mix for terrazzo topping shall consist of cement with or without pigment, marble powder. marble aggregate (marble chips) and water. The cement and marble powder shall be mixed in the proportion of 3 parts of cement to one part marble powder by weight. For every part of cement marble powder mix, the proportion of aggregate by volume shall be as follows :

Size of Aggregate			Proportions of Aggregate to binder mix
For predominantly	grade 00, 0 and 1	....	1.50 parts
For predominantly	grade 2 and 2	....	1.25 parts
For predominantly	grade 4 and 5	....	1.25 parts

Grade No.	Size of Aggregate in (mm)	Minimum thickness of top layer in (mm)
00	1 - 2	6
0	2 - 4	9
1	4 - 7	9
2	7 - 10	12

Where aggregate of size larger than 10 mm are used the minimum thickness of topping shall not be less than 1.5 times the maximum size of the chips. Where large size chips such as 20 mm or 25 mm are used they shall be used only with a flat shape and bedded on the flat face so as to keep the maximum thickness of wearing layer. Before starting the work, the Contractor shall get the sample of marble chips approved by the representative of Employer/Consultant. The cement to be used shall be ordinary grey cement, white cement, coloured cement or cement with admixture of colouring matter of approved quality in the ratio specified in the description of the item or in the ratio to get the required shade as ordered by the representative of Employer/Consultant. Colouring matter where specified, shall be mixed dry thoroughly with the cement and marble powder and then chips added and mixed as specified above. The full quantity of dry mixture of mortar required for a room shall be prepared in a lot in order to ensure a uniform colour. This mixture shall be stored in a dry place and well covered and protected from moisture. The dry mortar shall be mixed with water in the usual way as and when required. The mixed mortar shall be homogeneous and stiff and contain just sufficient water to make it workable.

The terrazzo topping shall be laid while the under layer is still plastic, but has hardened sufficiently to prevent cement between 18 to 24 hours after the under layer has been laid. A cement slurry preferably of the same colour as the topping shall be brushed on the surface immediately before laying is commenced. it shall be laid to a uniform thickness slightly more than that specified in order to get the specified finished thickness after rubbing. The surface of the top layer shall be troweled over, pressed and brought true to required level by a straight edge and steel floats in such a manner that the maximum amount of marble chips come up and are spread uniformly over the surface.

1.5 **Polishing, curing and Finishing**

Polishing shall be done by machine. About 36 hours after laying the top layer the surface shall be watered and ground evenly with machine fitted with special rapid cutting grit blocks (carborundum stone) if coarse grade (no. 60) till the marble chips are evenly exposed and the floor is smooth. After the first grinding, the surface shall be thoroughly washed to remove all grinding mud and covered with a grout of cement or/and colouring matter in same mix and proportion as the topping in order to fill any pin holes that appear. The surface shall be allowed to cure for 5 to 7 days and then ground with machine fitted with fine grit blocks (No. 120). The surface is cleaned and repaired as before and allowed to cure again for 3 to 50 days. Finally the third grinding shall be done with machine fitted with fines grade grit blocks (No. 320) to get even and smooth surface without pin holes. The finished surface should show the marble chips evenly exposed.

Where use of machine for polishing is not feasibility or possible, rubbing and polishing shall be done by hand, in the same manner as specified for machine polishing except that carborundum stone of coarse grade (No. 60) shall be used for the 1st rubbing, stone of medium grade (No. 80) for second rubbing and stone of fine grade (no. 120) for final rubbing and polishing.

After the final polishing either by machine or by hand, oxalic acid shall be dusted over the surface @ 33 gm per square meter sprinkled with water and rubbed hard with a namdah block (Pad of woolen rags). The following day, the floor shall be wiped with a moist rag and drilled with a soft cloth and finished clean.

Curing shall be done by suitable means, such as laying moist sawdust or ponding water. The finished floor shall not sound hollow when tapped with a wooden mallet.

1.6 **Precautions** :

Flooring in lavatories and bathrooms shall be laid after fixing of squatting pans and floor traps. Traps shall be plugged, while laying the floors and opened after the floors are cured and cleaned. Any damage done to W.C.'s squatting pans and floor traps during the execution of work shall be made good by the Contractor.

During cold weather, concreting shall not be done when the temperature falls below 4 degree centigrade. The concrete placed shall be protected against frost by suitable coverings. Concrete damaged by frost shall be removed and work redone. During hot weather, precautions shall be taken to see that the temperature of wet concrete does not exceed 38 degree centigrade. No concreting shall be laid within half an hour of the closing time of the day unless permitted by the representative of Employer/Consultant.

The floor shall be protected from any damage during the execution of work.

2. **TERRAZZO (MARBLE CHIPS) SKIRTING-IN-SITU** :

2.1 **Thickness**

The thickness of the bottom and top coats shall be as specified. The total thickness of skirting specified is of the total thickness of plaster as measured from the unplastered face of the masonry. Average thickness of the undercoat shall not be less than 6 mm and minimum thickness over any portion of the surface shall not be less than 4 mm. A tolerance of 1.5 mm is applicable over the finished specified top coat.

3.0 **GLAZED/UNGLAZED CERAMIC TILE FLOORING** :

3.1 **Preparation of Surface and Laying** :

Sub-grade concrete or the RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tile shall be either with cement mortar 1:3 (1 Cement : 3 coarse sand) or approved cement based ready to use mortar on cement plastered (1:3) surface as specified. The average thickness of the bedding fir cement mortar shall be 10 mm while the thickness under portion of the tiles shall not be less than 5 mm.

Mortar shall be spread, tamped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set and to enable the mason to place wooden plank across and squat on it.

Over this mortar bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 3.3 Kg. of cement per sq.m. over such an area as would accommodate about twenty tiles. Tiles shall be soaked in water washed clean and shall be fixed in this grout one after another, each tiles gently being tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern.

The surface of the flooring during laying shall be frequently checked with a straight edge about 2m long, so as to obtain a true surface with the required slope.

Where full size tiles can not fixed these shall be cut (sawn) to the required size, and their edge rubbed smooth to ensure straight and true joints.

Tiles which are fixed in the floor adjoining the wall shall enter not less than 10mm under plaster, skirting or dado.

After tiles have been laid surplus cement grout shall be cleaned off.

3.2 **Pointing and Finishing** :

The grey cement grouts in joints shall be cleaned of with wire brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigment if required to match the colour of tiles. The floor shall then be kept wet for 7 days. After curing, the surface shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden.

4.0 **CERAMIC TILES IN SKIRTING AND DADO** :

4.1 **Laying** :

Tiles shall be laid either on 12 mm thick plaster of cement mortar 1:3 (1 cement 3 coarse sand) or mix as specified shall be applied and allowed to harden. The plaster shall be roughened with wire brushes or by scratching diagonally a closed intervals. The plaster thickness shall be reduced, as directed, only for a leveling course, when ready to use approved cement based mortar is used.

The tiles should be soaked in water, washed clean, and a coat or cement slurry or ready to use cement based mortar as the case may be applied liberally at the back of tiles and set in the bedding mortar. Approved epoxy adhesives, if specified in the bill of quantities shall be used in lieu of cement slurry as per manufacturers specification. The tiles shall be tamped and corrected to proper plane and lines. The tile shall be set in the required pattern and butt jointed. The joints shall be as fine as fine as possible. Top of skirting of dado shall be truly horizontal and joints truly vertical except where otherwise indicated.

Full size tiles can not be fixed these shall be cut (sawn) to the required size and their edges rubbed smooth.

4.2 **Curing and Finishing** :

The joints shall be cleaned off the grey cement grout with wire brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigments if required to match the colour of tiles. The surface shall be washed and finished clean. The finished work shall not sound hollow when tapped with a wooden matter.

5. **KOTA/CUDAPPAH STONE FLOORING** :

5.1 **Dressing**:

Every slab shall be cut to the required size and shape and fine chisel dressed on the sides to the full depth so that a straight edges laid along the side of the stone shall be in full contact with it. The sides (edges) shall be table rubbed with coarse sand or machine rubbed before paving. All angles and edges of the tiles shall be true, square and free from chipping and the surface shall be true and plane. The thickness of each such Kota Stones shall not be less than 25 mm .

5.2 **Preparation of Surface and Laying** :

The subgrade concrete or the RCC slab on which the slabs are to be laid shall be cleaned, wetted and mopped. The bedding for the slab shall be with cement mortar 1:4 (1 cement : 4 coarse sand) or with lime mortar (1 lime putty : 1 surkhi : 1 coarse sand)

as given in the description of the item except that the edges of the slabs to be jointed shall match the shade of the slab.

5.3 **Polishing and Finishing** :

The day after the slabs are laid all joints shall be cleaned of the grey cement grout with a wire brush or trowel to a depth of 5mm and all dust and loose mortar removed and cleaned. Joints shall then be grouted with grey or white cement mixed with or without pigment to match the shade of the stone slabs. The flooring, thus laid, shall be ground evenly with machine as specified in para 3.2, except that (a) first polishing with coarse grade carborundum stone shall not be done (b) cement slurry with or without pigment shall not be applied on the surface before polishing.

6.0 **KOTA/CUDAPPAH STONE IN SKIRTING, DADO, RISERS, STEPS, ETC**. :

6.1 **Preparation of Surface** :

Shall be as specified in case of Glazed tiles in skirting and dado.

6.2 **Laying** :

The stone slab for risers of steps and skirting/dado shall be set in grey or white cement admixed with or without pigment to match the shade of the stone as specified in the description of the item, with the line of the slab at such a distance from the wall so that the average width of the gap shall be 20 mm and at no place the width shall be less than 15 mm. If necessary, the slabs shall be held i

position by temporary M.S. hooks fixed in the wall at suitable intervals. The skirting/dado or riser face shall be checked for plane and plumb and corrected. The joints shall thus be left to harden then the rear of the skirting or risers slab shall be placed with cement mortar 1:3 (1 cement : 3 coarse sand) or other mix as specified in the description of the item. The fixing hooks shall be removed after the mortar filling the gap has acquired sufficient strength.

6.3 **Curing, Polishing & Finishing** :

It shall be as specified in para 7.3 for as applicable, except that cement slurry with or without pigment shall not be applied on the surface and polishing shall be done only with hand. The face and top skirting shall be polished.

7.0 **NATURAL STONE FLOORING** :

Method of mixing, placing and compacting shall generally conform to the specifications under plain ad reinforced cement concrete described earlier. A stiff mix consistent with workability shall be used.

7.1 **Preparation of Surface** :

Before the operation for laying topping is started the surface of base concrete shall be thoroughly cleaned of all dirt, loose particles, caked mortar, droppings and laitance, if any by scrubbing with coir or steel wire brush. Where the concrete has hardened so much that roughening of surface by wire brush is not possible, the surface shall be roughened by chipping or backing at close intervals. The surface shall then be cleaned with water and kept for 12 hours and surplus water shall be removed by moping before the topping is laid.

7.2 **Laying** :

The screed strips shall be fixed over the base concrete dividing it into suitable panels. Before placing the concrete for topping, neat cement slurry shall be thoroughly brushed into the prepared surface of the base concrete just ahead of the finish. Concrete of specified proportion and thickness shall be laid in alternate panels to required level and shape and thoroughly tamped.

7.3 **Finishing the surface** :

After the concrete has been fully compacted it shall be finished by trowelling or floating with mixed cement rendering. Finishing operations shall start shortly after the compaction of concrete and the surface shall be troweled three times at intervals so as to produce uniform and hard surface. The satisfactory resistance of floor to wear depends largely upon the care with which trowelling is carried out. The time interval allowed between successive trowelling is very important. Immediately after placing cement rendering, only just sufficient trowelling shall be done to give a level surface. excessive trowelling in the earlier stages shall be avoided as this tends to bring a layer rich in cement to the surface. Some time, after the first trowelling the duration depending upon the temperature, atmospheric condition and the rate of set of cement used, the surface shall be

retroweled to close any pores in the surface and to bring to surface and to scrape off any excess water in concrete or laitance. No dry cement shall be used directly on the surface to absorb moistures or to stiffen the mix. The final trowelling shall be done well before the concrete has become too hard but at such a time that considerably pressure is required to make any impression on the surface. If directed by the representative of Employer/Consultant, approved mineral pigment shall be added to the rendering to give desired colour and shape to the flooring at no extra cost. The finished floor shall not sound hollow when tamped with a wooden mallet.

8.0 **CHEQUERED TILES** :

The tiles shall be of nominal sizes such as 20 x 20 cm, 25 x 25 cm and 30 x 30 cm or of standards sizes with equal sides. The size of tiles to be used shall be as shown in drawings or as required by the representative of Employer/Consultant. The centre to centre distance of chequers shall not be less than 2.5 cm and nor more than 5 cm.

The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be cement tiles, or terrazzo tiles as specified in the description of the item. The thickness of the upper layer, measured from the top of the chequers shall not be less than 6 mm.

The tiles shall be given the first grinding with machine before delivery to site.

8.1 The tiles shall be manufactured under hydraulic pressure of not less than 140 Kg per square centimeter and shall be given the first grinding with machine before delivery to site.

All exposed joints shall be pointed using mortars/water proof adhesives, as specified with admixture of pigment, duly approved by representative of Employer/Consultant to match the shade of marble.

Green work shall be protected from rains/adverse weather conditions by suitably covering the same. The work shall be kept constantly moist for a period of 7 days.

8.2 The proportion of cement to aggregate in the backing of the tiles shall not be leaner than 1:3 by weight. Similarly, the proportion of cement to marble chips aggregate in the wearing layer of the tiles and the proportion of pigment to be used therein shall not exceed 10 percent of weight of cement used in mix.

8.3 **Laying and Curing**

Laying and curing shall be as specified for terrazzo tiles.

9.0 **METHOD OF MEASUREMENT** :

9.1 Flooring work shall be measured net as per drawing or actual, which ever is less. Measurements for flooring shall be upto the wall (before plaster) and that for skirting shall be from above the floor finish.

9.2 Nett laid area shall be measured in square meters correct to two decimal places.

9.3 SPECIFICATION FOR VACUUM DE-WATERING FLOORING

Providing Tremix flooring of thickness 125mm thick using M-20 grade concrete (1:1.5:3) the aggregate to be used should be 20 mm nominal size. For the better quality of the floor it is advisable to use Tremix Vacuum De-watering System manufactured by Tremix, Sweden or Dynapac UK or their substitute in India. The top of the floor should be provided by non metallic floor hardener Drietop FH or equivalent and the consumption of the floor hardener should be around 3 kg per sq.mtr.

Cutting the construction joints of size 6mm wide and 10mm deep by using diamond concrete cutter and it should be provided in such a way that the area of a penal is around 144 sq.ft. (a penal of 12 ft x 12ft should be cut). The joints should be sealed by using Shalitex joint filler

a) Curing

The floor shall be kept continuously moist for at least 14 days by means of wet gunny bags, 50 mm thick layer of damp sand spread over the surface or pooling with water on the surface.

b) Rates to include

Apart from other factors mentioned elsewhere in this contract the rate quoted for 'Artificial stone flooring with hardener' shall include the following:-

i) All labour, materials and equipment, cleaning the sub-base, laying base course and top layer with hardener, polishing etc. complete.

ii) Preparing/treating the sub-base course of bearing structural slab surface to the required line, level and slopes.

iii) All labour, materials and equipment, consumables, cleaning the sub- grade, laying base course and top layer to have finished 40 mm thick flooring or specified thickness and configuration (after the high polishing) as per above specifications and all dye work for achieving the required surface finish.

iv) Curing

v) High polishing

vi) Cleaning the floor from all stains etc.

Forming curves at junctions of walls and rounding or nosing at the edges including cutting and or making holes or openings, wherever required and neatly finishing with adjoining surface finish.

vii) Work at all positions, heights, depths, line and level with all lead and lift.

9.4 Stone Slabs

Pre Polished **/** Flamed Stone Slabs shall be laid on surface after surface preparation on suitable base coat of cement mortar 1:4 (1 Cement : 4 Sand) in proper line and level of requisite shape size and specification all complete as directed by the Consultant / Employer or the Engineer in Charge .

SECTION - G

EXTERNAL AND INTERNAL PAINTING WORKS

1.0 WHITE WASHING WITH LIME

1.1 Scaffolding

Wherever scaffolding is necessary, it shall be erected on double supports ties together by horizontal pieces, over which scaffolding planks shall be fixed. No Ballies, bamboo or planks shall rest on or touch the surface which is being white washed.

For all exposed brick work or tile work, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

Note : In case of special type of brick work, scaffolding shall be got approved from representative of Employer/Consultant in advance.

Where ladders are used, pieces of old gunny bags shall be tied on their tops to avoid damage or scratching to walls.

For white washing the ceiling, proper stage scaffolding shall be erected.

1.2 Preparation of Surface

Before new work is white washed, the surface shall be thoroughly brushed free from mortar dropping and foreign matter.

In the case of old work, all loose pieces and scale shall be scrapped off an holes in plaster as well as patches of less than 50 sq.cm. area shall be filled up with mortar of the same mix, where so specifically ordered by the representative of Employer/Consultant, the entire surface of old white wash shall be thoroughly removed by scrapping and this shall be paid for separately.

1.3 Preparation of Lime Wash

The wash shall be prepared from good quality fresh stone white lime. The lime shall be thoroughly slaked on the spot, mixed and stirred with sufficient water to make a thin cream. This shall be allowed to stand for a period of 24 hours and then shall be screened through a clean coarse cloth. 40 gm of gum dissolved in hot water, shall be added to each 10 cubic decimeter of the cream. The approximate quality of water to be added in making the cream will be 5 litres of water to one kg. of lime.

If not directed otherwise, Indigo (Neel) upto 3 gm. per kg. of lime, dissolved in water, shall be added and wash stirred well. Water shall then be added at the rate of about 5 litres per kg. of lime to produce a milky solution. In case of lime wash on the surface finished with lime punning, no Indigo (Neel) should be used unless otherwise directed by the representative of Employer/Consultant.

1.4 Application

The white wash shall be applied with moonj brushes to the specified number of coats. The operation for each coat shall consist of a stroke of the brush given from the top downwards, another from the bottom upwards over the first stroke, and similarly one stroke horizontally from the right and another from the left before it dries.

Each coat shall be allowed to dry before the next one is applied. Further each coat shall be inspected and approved by the representative of Employer/Consultant before the subsequent coat is applied. No portion of the surface shall be left out initially to be patched up later on.

For new work, three or more coats shall be applied till the surface presents a smooth and uniform finish through which the plaster does not show, the finished dry surface shall not show sings of cracking and peeling nor shall it come off readily on the band when rubbed.

For old work, after the surface has been prepared as described in para 1.2 a coat of white wash shall be applied over the patches and repairs. Then a single coat or two or more coats of white wash as stipulated in the description of the item shall be applied over the entire surface. The white washed surface should present a uniform finish through which the plaster patches do not appear. The washing on ceiling should be done prior to that on walls.

1.5 **Protective Measure**

Doors, windows, floors articles of furniture etc. and such other parts of the building not to be white washed shall be protected from being splashed upon. Splashing and droppings, if any, shall be removed by the contractor at his own cost and the surface cleaned. Damages if any to furniture or fittings and fixtures shall be recoverable from the contractor.

2.0 **CEMENT PAINT** :

2.1 **Preparation of Surface**

For new work, the surface shall be thoroughly cleaned of all mortar dropping, dirt, dust, algae, grease and other foreign matter by brushing and washing. The surface shall be thoroughly wetted with clean water before the cement paint is applied.

In the case of old work, all loose pieces and scales shall be removed and the surface shall be cleaned of all dust, algae oil, etc. by brushing ad washing. Pitting in plaster shall be made good and a coat proof cement paint shall be applied over patches after wetting them thoroughly .

2.2 **Preparation of Mix**

Cement paint shall be mixed in such quantities as can be used up within an hour of its mixing as otherwise the mixture will set an thicken, affecting flow and finish.

Cement paint shall be mixed with water in two stages. The first stage comprise of 2 parts of cement paint and one part of water stirred thoroughly and allowed to stand for 5 minutes. Care shall be taken to add the cement paint gradually to the water and not vice versa. The second stage shall compromise of adding further one part of water to the mix and stirring thoroughly to obtain a liquid of workable and uniform consistency. In all cases the manufacturer's instructions shall be given preference over the above specification, in case of variation between the two exists.

The lids of cement paint drums shall b e kept tightly closed when not in use, as by exposure to atmosphere the cement paint rapidly becomes air set due to it's hygroscopic qualities.

2.3 **Application**

The solution shall be applied on the clean and wetted surface with brushes or spraying machine. The solution shall be kept well stripped during the period of application. It shall be applied on the surface which is on the shady side of the building so that the direct heat of the sun on the surface is avoided. The method of application of cement paint shall be as per manufacturer's specification. The completed surface shall be watered after the day's work.

The second coat shall be applied after the first coat has been set for at least 24 hours. Before application of the second or subsequent coasts, the surface of the previous coat shall not be wetted.

For new work, the surface shall be treated with three or more coats of water proof cement paint as found necessary to get a uniform shade,.

For old work, the treatment shall be with one or more coats as found necessary to get a uniform shade.

2.4 **Precaution**

Waterproof cement based paint shall not be applied on surface already treated with white wash, colour wash, distemper dry or oil bound, varnishes, paint, etc. It shall not be applied on gypsum, wood and metal surfaces.

The specification in respect of scaffolding, protective measure, measurements and rate shall be as described under white washing with lime.

3.0 **PAINTING** :

Approved paints, oils or varnishes shall be brought to the site of work by the contractor in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work of at least fortnight's work. The empties shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the representative of Employer/Consultant.

3.1 **Commencing work**

Painting shall not be started until the representative of Employer/Consultant has inspected the items of work to be painted, satisfied themselves about their proper quality and given their approval to commence the painting work. Painting of external surface should not be done in adverse weather condition like hail storm and dust storm.

Painting, except the priming coat, shall generally be taken in hand after practically finishing all other builders work.
The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the paint work being started.

3.2 **Preparation of Surface**

The surface shall be thoroughly cleaned and dusted. All rust, dirt, scales, smoke and grease shall be thoroughly removed before painting is started. The prepared surface shall receive the approval of the representative of Employer/Consultant after inspection, before painting id commenced.

3.3 **Application**

Before pouring into smaller containers for use, the paint shall be stirred thoroughly in the containers, when applying also, the paint shall be continuously stirred in smaller containers so that its consistency is kept uniform.

If for any reason, thinning is necessary in case of ready mixed paint, the brand of thinner recommended by the manufacturer or as instructed by the representative of Employer/Consultant shall be used.

The painting shall be laid on evenly and smoothly by means of crossing and laying off, the latter in the direction of the grain of wood. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for

the first time over and then brushing alternatively in opposite direction, two or three times and then finally, brushing tightly in a direction at right angles to the same, in this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat. Where so stipulated, the painting shall be done by spraying. Spray machine used may be (a) high pressure (small air aperture) type, or (b) a low pressure (large air gap) type, depending g on the nature and location of work to be carried out. Skilled ad experienced workmen shall bee employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.

Spraying should be done only when dry conditions prevails, Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by through ventilation. Each coat except the last coat, shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off before the next coat is laid.

No left over paint shall be put back into the stock tins. When not in use, the containers shall be kept properly is laid.

No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work.

In painting doors and windows, the putty round the glass panes must also be painted, but care must be taken to see that no paint no stains etc. are left on the glass. Top of shutters and surface in similar hidden locations shall not be left out in plaint.
In painting steel work, special care shall be taken while painting over bolts, nuts, rivets, overlaps, etc.

The additional specifications for primer and other coats of paints shall be as according to the detailed specifications under the respective headings.

3.4 **Brushes and containers** :

After work, the brushes shall be completely cleaned of paint by rinsing with linseed oil or with turpentine. A brush in which paint has dried up is ruined and shall on no account be used for painting work. The container, when not in use, shall be kept closed and free from air so that paint does not thicken and also shall be kept safe from dust. When the paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

4.0 PRIMING COAT ON WOOD, IRON OR PLASTIC SURFACE

4.1 Preparation of Surface

i) Wooden Surface

The wood work to be painted shall be dry an free from moisture.

The surface shall be thoroughly cleaned. All unevenness shall be rubbed down smooth with sand paper and shall be well ducted. Knots, if any, shall be covered with preparation of red lead made by grinding red lead in water and mixing with strong glue sized and used hot. Appropriate filler materials with same shade as paint shall be used where specified.

The surface treated for knotting shall be dry before painting is applied. After the priming coat is applied, the holes and indentations on the surface shall be stopped with glazier's putty or wood putty. The primer shall be prepared on site or shall be of approved brand and manufacturer as specified in the item. Paint shall be anti-corrosive bitumastic paint, aluminium paint or other type of paint as specified in the description of the item.

Stopping shall not be done before the priming coat is applied as the wood will absorb the oil in the stopping and the later is therefore liable to crack.

ii) Iron & Steel Surface

All rust and scales shall be removed by scrapping or by brushing with steel wire brushes. Hard skin of oxide formed on the surface or wrought iron during rolling which become loose by rusting, shall be removed.

All dust and dirt shall be thoroughly wiped away from the surface.

If the surface is wet, it shall be dried before priming coat is undertaken.

iii) Plastered Surface

The surface shall ordinarily not be painted until it has dried completely. Trial patches of primer shall be laid at intervals and where drying is satisfactory, painting shall then be taken in hand. before primer is applied, holes and undulations, shall be filled up with plaster of paris and rubbed smooth.

4.2 Application

The primer shall be applied with brushes, worked well into the surface and spread even and smooth. The painting shall be done by crossing and laying off as described in cement paint above.

5.0 PAINTING WITH READY MIXED PAINT/ SYNTHETIC ENAMEL PAINT

5.1 Painting on new surface

The surface which has not been painted earlier, or the paint has been removed by paint remover, burning, caustic soda, etc. shall be considered to be new surface.

5. Preparation of surface

i) **Wood work**

The surface shall be thoroughly cleaned and unevenness removed as specified in wooden surface. Knot, if visible, shall be covered with a preparation of red lead. Holes and indentations on the surface shall be filed in with glazier's putty or wood putty and rubbed smooth before painting is done.

The surface should be thoroughly dry before painting.

ii) **Iron and steel work**

The priming coat shall have dried up completely before painting is started. Rust and scaling shall be carefully removed by scrapping or by brushing with steel wire brushes. All dust and dirt shall be carefully and thoroughly wiped away.

iii) **Plaster surface**

The priming coat shall have dried up completely before painting is started. All dust or dirt that has settled on the priming coat shall be thoroughly wiped away before painting is started.

5.3 **Application**

The specification described in Cement Paint shall hold good as far as applicable. The number of coats to be applied will be as stipulated in the item. The painted surface shall present a uniform appearance and glossy/mat finish as described in schedule of quantities free from streaks, blisters etc.

6.0 **FRENCH SPIRIT POLISHING**

Pure shellac varying from pale orange to lemon yellow colour, free from resin or dirt shall be dissolved in methylatyed spirit at the rate of 140 gm of shellac to 1 litre of spirit. Suitable pigment shall be added to get the required shade.

6.1 **Polishing new surface**

Preparation of surface - The surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots, if visible, shall be covered with a preparation of red lead and glue sized and used hot. Holes and indentations on the surface shall be slopped with glazieries putty. The surface shall be then given a coat of wood filler made by mixing whiting (ground chalk in methylated spirit at the rate of 1.5 kg. of whiting per litre of spirit). The surface shall again be rubbed down perfectly smooth with glass paper and wiped clean.

6.2 **Application**

The number of coats of polish to be applied shall be as decided by the representative of Employer/Consultant to get the desired finish. A paid of woolen cloth covered by fine cloth shall be used to apply the polish. The pad shall be moistured with the polish and rubbed hard on the wood, in series of overlapping circles applying the mixture sparingly but uniformly over the entire area to give an even level surface. A trace of linseed oil on the face of the paid facilitates this operation. The surface shall be allowed to finish off, the pad shall be covered with a fresh piece of clean fine cotton cloth slightly damped with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall have a uniform texture.

6.3 **METHOD OF MEASUREMENT**

Measurements for painting on plastered surface shall be the same as that for plaster. For doors, windows etc. the following multiplying factors will be considered:

	Description of work	How measured	Multiplying coefficients
	Woodwork - Doors, windows, etc.		
1.	Panelled for framed braced doors, windows, etc.	Measured flat (not girthed) including chowkhat or frame edges, chocks, cleats, etc. shall be deemed to be included in the item	1.30 (For each side
2.	Flush doors, etc,	-- Do --	1.20 (- do -)
3.	Part panelled and part glazed or gauged doors, windows	-- Do --	1.00 (- do -)
4.	Fully glazed or gauzed doors, windows, etc.	-- Do --	0.80 (- do -)
5.	Fully venetioned or louvered doors, windows, etc.	-- Do --	1.80 (- do -)
6.	Trellis (or jaffri) work one way or two way	Measured float, no deduction shall be made for open spaces, supporting members shall not be measured separately)	2 (for painting all over)
	Steel work - Doors, windows, etc.		
7.	Pain sheeted steel doors or windows	Measured flat (not girthed including frame edges etc.)	1.10 (for each side)
8.	Fully glazed or gauzed steel doors and windows	-- Do --	0.50 (- do -)
9.	Partly panelled	-- Do --	0.80 (- do)
10.	Corrugated sheeted steel doors or windows	-- Do --	1.25 (- do -)
11.	Collapsible gates	Measured flat	1.50 (for painting all over)

12.	Rolling shutters of interlocked laths	Measured flat (size of opening) all over : jambs, guides, bottom rails and locking arrangements etc. shall be included in the item (Top cover shall be measured separately)	1.10 (for each side)

	Description of work	How measured	Multiplying coefficients
	General		
13.	Expanded metal, hard drawn steel wire fabric of approved quality, grill work and gratings in guard bars, balustrades, railing, partitions and MS bars in window frames etc.	Measured flat overall ; no deduction shall be made for open spaces ; supporting members shall not be measured separately.	1.00 (for all over)
14.	Corrugated iron sheeting in roof, side cladding etc.	Measured flat (not girthed)	1.1.14 (For each side)
15.	A.C. corrugated sheeting in roofs, side cladding, etc.	-- do --	1.20 (- do -)
16.	A.C. semi-corrugated sheeting in roofs, side cladding etc.	-- Do -	1.00 (- do -)
17.	Wire gauge shutters including painting of wire guage	-- Do --	1.00 (- do -)

SECTION - H

METAL DOORS / WINDOWS

1.0 STEEL DOORS / WINDOWS, ETC.

The windows shall be obtained from approved specialised manufacturers. The frames of doors, windows, ventilators etc. shall be formed by cutting section to required lengths and mitred. The corners shall be welded to form a solid framed welded joints. Sash bars of units shall be tenoned and riveted into the frames ad where they intersect the vertical tie shall be broached and the horizontal tie threaded through it, and the intersection closed by hydraulic pressure. For fixing steel hinges, slots shall be cut in the fixed frame and the hinges inserted inside and welded to the frame at the back. For fixing hinges to inside frame, the method described for fixing to outside framed may be adopted but weld shall be cleaned or holes made in the inside frame and hinge riveted. The hinge pin and washer shall be galvanised or aluminum alloy 5IS-WP of suitable thickness.

The handle shall be mounted on handle plate which shall be welded top the opening frames. The handle shall have a two points nose which will engage with suitable tapered striking plate provided on the fixed frame.

Top hung and bottom hung ventilators shall be provided with two plain hinges, with peg stays of sufficient length as specified earlier.

Centre hung ventilators shall be made with two outer frames, with mastic water-proof compound embedded between these two outer frames. Unless otherwise specified the ventilators shall be provided with spring catch which when pulled by a cord, will allow the shutter bottoms to open outside and the top half opening inside.

Steel windows and ventilators shall be fixed to brick or concrete surface as shown in drawing or with M.S. lugs of sizes 100 x 16 x 3 mm and to concrete work by means of 125 mm long counter sunk screw, or plugs or other approved fastener after drilling into concrete with a power drill as specified in the item. The lug shall be grouted in concrete (1:2:4) mix of dimension as directed.

The frames should not be fixed in position until the structural work has been completed and the free deflection has taken place. The doors, windows, etc. shall be erected in true plumb, line and level.

All steel doors, windows, ventilators shall be given a coat of anti-corrosive primer at the shop before delivery to site for erection but in no case prior to the materials have been inspected by the representative of Employer/Consultant. Final painting shall be done after obtaining approval from the representative of Employer/Consultant.

2.0 STEEL GRILL AND RAILINGS

The grills and railings for windows, verandah and balcony etc. shall be of mild steel. The design of grills/railings and shape and sizes of various components shall be according to the drawings. Wherever grills integrated with windows are specified, they shall be manufactured at window manufacturer's shop.

The edge angles and corners shall be cleaned and true to shape. The joints, if possible, shall be mechanically interlocked and neatly spot welded in such a way that the grill is rigid. Grinding of the joints to achieve a neat regular finish shall be done. The grills shall be fixed to true plumb, line and level as per drawing.

All grills, railings etc. after being fixed in position, shall be cleaned off dust, dirt, rust and loose scales before applying a coat of protective zinc chromate primer.

3.0 ROLLING SHUTTER

These shall be fixed in position as shown in drawing.

Brackets shall be fixed on the lintel or under the lintel as specified with rawl-plugs, and screw bolts, etc. The shaft along with the spring shall then be fixed on the brackets.

The lath portion (shutter) shall be laid on ground and the side guide channels shall be bound with it with ropes etc. The shutter shall then be placed in position and top fixed with pipe shaft with bolts and nuts. The side guide channels and the cover frame shall then be fixed to the walls through the plate welded to the guides. These plates and bracket shall b e fixed by means of steel screw bolts, and rawl-plugs drilled in the wall. The plates and screw bolts shall be concealed in plaster to make their location invisible. Fixing shall be done accurately in a workmen like manner that the operation of the shutter is easy and smooth.

After being fixed in position, these shall be cleaned off dust, dirt, rust or scales before applying a protective coat of zinc chromate.

4.0 COLLAPSIBLE GATE

T-iron rails shall be fixed to the floor and to the lintel at top by means of anchor bolts embedded in cement concrete of floor and lintel. The anchor bolts shall be placed approximately at 45 cm centres alternatively in the two flanges of the T-iron. The bottom runner (T-iron) shall be embedded in the floor and proper groove shall be formed along the runner for the purpose. The collapsible shutter shall be fixed at sides by fixing the end double channels with T-iron rails and also by hold-fasts bolted to the end double channel and fixed in the masonry of the side walls on the other side.

In case the collapsible shutter is not required to reach the lintel, beam or slab level, a Tea-section suitably designed may be fixed at the top, embedded in masonry and provided with necessary clamps and roller arrangement at the top.

All the adjoining work damaged in fixing of gate shall be made good to match the existing work, without any extra cost.

After being fixed in position, these shall be cleaned off dust, dirt, rust or scales before applying without any extra cost.

After being fixed in position, these shall be cleaned off dust, dirt, rust or scales before applying a protective cost of zinc chromate.

5. METHOD OF MEASUREMENT

5.1 Steel Windows

Shall be measured in Sq.m. upto two decimal places, the height and width being measured correct to 0.5 cm between out-to-out of frame.

5.2 **Rolling Shutter**

Shall be measured nett in sq.m. upto two decimal places, the width being measured overall out-to-out of guide towards channels and height taken as clear opening height, all measurements correct to o.5 cm.

5.3 **Collapsible gate**

Shall be measured in sq.m. upto two decimal places, the width being measured in fully stretched position and height taken as between out-to-out of top and bottom runner, all correct to o.5 cm.

5.4 **Grills/railing etc.**

Shall be measured nett in Kg. upto three decimal places, the sectional weights being taken as per IS Codes upto three decimal places. No extra will be entertained for welding etc.

5.5 **Allumunium Works**

The allumunium windows /doors to be prepared are from standard Sections available from Hindalco , Jindal. The sections to be powder coated as specified by the consultant / client.

METHOD OF MEASUREMENT

Shall be measured in Sq.m. upto two decimal places, the height and width being measured correct to 0.5 cm between out-to-out of frame.

SECTION - I

WATER PROOFING

1.0 DAMP PROOF COURSE (D P C)

DPC shall be of thickness as shown in drawing or in the schedule of quantities. Unless otherwise mentioned, proportion shall be 1 part cement, 2 parts of sand, 4 parts of aggregate mixed with approved waterproofing compound as per manufacturer's specification. Before laying the concrete, the top surface of the wall shall be thoroughly cleaned of all dirt and loose particles, mortar droppings and laitance, if any, scrubbing with coir or steel wire thoroughly wetted and the concrete is placed. The concrete or as shown in drawing. The top surface shall be kept rubbed or rough or double-chequered for adhesion of mortar for brick work. Proper curing shall be done before starting the brick work over DPC.

2.0 BRICK COBA WATERPROOFING

The treatment is to be got done by approved specialist firms and a guarantee of 10 years in the approve format is to be submitted alongwith a back-to-back separate guarantee by the main contractor. Moreover, in case of variations between manufacturer, the later shall prevail.

a. Terrace

The roof surface shall be thoroughly cleaned and prepared. Construction joints, if any, are raked and cleaned. Cement slurry with resinous admixture of specialist firm is spread to penetrate into the surface and to fill cracks and other porous areas.

15 mm thick cement mortar 1:4(1 cement : 4 Coarse sand) with resinous admixture of specialist firm is laid over the prepared surface.

A layer of brick bats (Coba) is laid over the mortar layer to get the required gradient for adequate drainage. (A slope of 1 in 120 is considered adequate). The joints between the brick bats shall generally be kept between 15-25 mm wide. These joints are filled with cement mortar (1:4) with resinous admixture of Specialist firm. Curing is done for two days.

The top is finished smooth with 20 mm thick cement mortar (1:4) with resinous admixture of Specialist firm and marked with 300 mm x 300 mm false square. Curing is done for two weeks.

The wall surface is fully cleaned and prepared upto the required height (A height of 300 mm above the top of slab treatment is considered adequate). Cement slurry coating with resinous admixture of Specialist firm is given.

The side wall is provided with cement plaster (1:4) with resinous admixture of Specialist firm 20 mm thick upto the height specified. A vatta (Gola) with brick bats is made in cement mortar (1:4) with resinous admixture of Specialist firm.

This is topped within 20mm thick cement plaster with resinous admixtures of Specialist firm. Curing is done for two weeks.

b. **Sunk Slab**

Any existing covering on slab is removed and surface is prepared. Construction joints, if any, are raked and cleaned. Cement slurry with resinous admixture of specialist firm is spread to penetrate into the structure. This fills cracked and other porous areas.

20 mm thick cement mortar 1:4 (1 cement : 4 Coarse sand) with resinous admixture of specialist firm is laid over the prepared surface.

A layer of brick bats (Coba) is laid over the mortar layer to get the required gradient for adequate drainage. The joints between the brick bats shall generally be kept between 15-25 mm wide. These joints are filled with cement mortar (1:4) with resinous admixture of Specialist firm. Curing is done for two days.

The top is finished smooth with 20 mm thick cement plaster (1:4) with resinous admixture of Specialist firm. Curing is done for two weeks.

Existing cover, if any, is removed and surface is prepared upto the required height (A height of 150 mm above upper floor level is considered adequate). A cement slurry coating with resinous admixture of Specialist firm is given.

The side wall is provided with cement plaster (1:4) 20 mm thick with resinous admixture of Specialist firm 20 mm thick upto the height specified. A vatta (Gola) of specified design is made in cement mortar (1:4) with resinous admixture of Specialist firm. Curing is done for two weeks.

3.0 METHOD OF MEASUREMENT

The measurement for the complete work as per specification shall be made clear between walls. No separate measurements for GOLAI or treatment to vertical surface shall be made.

SECTION - J

WOOD WORK & JOINERY

1.0 WOODWORK & JOINERY

1.1 Timber

i) Unless otherwise specified, all timber, for frames and shutters for doors, windows, ventilators, cupboards, etc. shall be free from knots, shakes, fissures, flaws, sub-cracks and other defects. The planed surface shall be smooth and free from blemishes and discolourations.

ii) All timber for carpentry and joinery in touch with masonry concrete shall be creosoted before fixing.

iii) All full fabricated timber shall be air seasoned at site of work for a period of not less than one month to allow for any shrinkage that may take place. The preparation of timber for joinery is to commence simultaneously with the beginning of the project work generally and should proceed continuously until all the wood work is prepared and fixed / stacked on or near the site as the case may be.

iv) Panelled shutter may be obtained from factories approved by Consultants / Employer provided the contractor can ensure proper quality control to the satisfaction of Consultants/Employer.

v) Panelled shutters shall be manufactured after taking correct measurements of opening so as to ensure that the dimensions of rails/styles are not reduced than that indicated in schedule/drawing.

1.2 Workmanship and Construction

a) The workmanship shall be first class and to the approval of the representative of Employer/Consultant. Scantling and board shall be accurately sawn and shall be of required width & thickness. All carpenter's work shall be wrought except where otherwise described. The workmanship and according to the drawings and shall be framed together and securely fixed in approved manner and with properly made joints. All work is to be properly tenoned shouldered, wedged, pinned, braced etc. and properly glued with approved quality glue to the satisfaction of the representative of Employer/Consultant.

b) **Screws**

Unless otherwise specified all screws to be used in woodwork and joinery shall be of cadmium plated and of approved quality. The size (diameter and length) should conform to those specified in hardware schedule.

c) **Tolerance**

1.5mm (1/16") will be allowed for each wrought face of sizes specified where described as finished i which case they shall hold to the full dimension.

d) **Protection**

All edges of timber frames etc. shall be protected from being damaged during construction by providing rough timber casing securely fixed and other adequate protective measure.

e) If it is decided by the representative of Employer/Consultant to provide antitermite treatment, the buildings contractor shall co-ordinate his work suitable as directed by the representative of Employer/Consultant.

f) Door/Window frames shall have cut rebate. Planted rebates shall not be permitted unless shown in drawings.

g) Wooden cover, moulds of sizes shown in drawings shall be provided all round painted or finished as in doors. This will be paid as a separate item as described in Schedule of Quantities.

1.3 **Holdfasts** :

Three holdfasts shall be fixed to each post of the door frame. The MS holdfasts shall be of the size 37 cm x 40 mm x 3 mm or as mentioned in the Schedule of Quantities and shall be fixed to the frames by means of screws and not nails. The other end of the holdfasts shall be fixed into jambs with 1:2:4 P.C.C. of dimensions as directed. Ends of holdfasts will be fish tailed.

Whenever the frames are abutting to concrete surface approved metal expansion as directed shall be provided for frame, hangers, rough grounds etc.

The rates quoted for wood work and joinery shall exclude the cost for all types of holdfasts or Rawl Plugs or other approved fasteners. Horns frames shall be out and shall not be used as holdfasts.

The items of holdfasts, metal fasteners etc. shall be paid as a separate item as described in Schedule of Quantities. The rate for holdfasts shall include for cement grouting and fixing to frame work with screws etc. he rate for metal fasteners shall include for nuts etc. as required.

2.0 **Door / Window Frame**

Specified timber sawn in the directions of grain and truly straight and square shall be used. The scantlings shall be planed smooth and accurate to the full dimensions, rebates, roundings & moulding as shown in the drawing before as shown in the drawing before assessment & strong. The joints shall be glued, framed, put together and pinned with timber of not less than 10 mm dia vertical members of frames shall be embedded in the finished floor. Painting shall not be done unless the frame in position is finally approved by the Consultants / Employer.

2.1 **Wooden Flush Shutters** : (Solid Core Type) :

Wooden flush shutters shall be of solid core type and obtained from approved manufacturers as listed. Shutter shall be hot pressed and phenon-formaldehyde synthetic resin shall also be provided with external lipping fixed to shutter with synthetic adhesives & head-less pins.

2.2 **Panelled Shutters** :

Where specified in the Schedule of Quantities Shutter shall be manufactured from Kiln Seasoned and chemically treated commercial hardwood of approved quality. thickness and sizes of styles rails and panels etc. shall be as specified in the Schedule of Quantities and/or drawings. Panel shall be in a single width pieces. Shutters shall be manufactured conforming to the relevant IS Specification and an approved sample shall be kept in the site office of the representative of Employer/Consultant.

2.3 **Teak Wood Glazed Shutters**

The general specifications for glazed shutter shall be similar to that for panelled shutters described. Styles and rails in the glazed shutters shall be rebated 55/8" x 1/2" (16 mm x 12 mm) to receive the glass unless otherwise specified.

Sash bars shall be of full thickness of the shutter and of width as shown in the drawings. These shall be moulded and rebated mitre on side to receive the glass as per drawing unless otherwise specified glass panels shall be fixed by means of moulded teak beads and suitable G.I. Screws. Finished thickness of the shutter shall be as mentioned in the Schedule of Quantities. The rate shall be for the completed work fitted and fixed in position. an approved sample should be kept in the office of the representative of Employer/Consultant at the site for reference. The glass shall conform to specification as described under head glazing. The thickness of glass shall be mentioned in the Schedule of Quantities.

3.0 **Method of Measurement**

Doors shutters shall be measured in square meter upto two decimal places. The height and width shall be clear height and width of shutter.

Frames shall be measured along the centre line, no extra being allowed for embedment in floors.

SECTION - K

PRE-CONSTRUCTION ANTI-TERMITE TREATMENT

1.0 **General**

The work should be executed through a specialised firm approved by the representative of Employer/Consultant. Approval of such firm shall be obtained from the representative of Employer/Consultant before commencement of work.

2.0 Soil treatment shall conform to the following :

2.1 **Chemicals** :

The treatment of the area shall be carried out by applying of chlorphyriphos chemical 20% EC at 1% or Endosulfan (30% EC) with 0.25% concentration. The chemicals shall be obtained from approved manufacturer.

2.2 **Records** :

A daily record shall be maintained by the contractor indicating the amount of work done and quantity of chemical consumed for the work. This record book shall be property of the representative of Employer/Consultant.

2.3 **Tests** :

The contractor should perform test at his own cost of the chemical to be used in the work and the result of the test should be submitted to the representative of Employer/Consultant.

2.4 **Method of Application** :

The following paragraph specify the manner and sequence of operations, which must be followed. The rates of applications of chemical as indicated in the following paras for various operations should be followed. This specifications represent the minimum rates of application of each operation and the contractor shall actually apply chemical at rates that be may consider necessary for effectiveness during the 10 years guarantee period. In other words onus of responsibility of applying adequate amounts of chemicals as required to sustain the 10 years guarantee shall be that of the contractor, but in no case shall actual rates of applications be less than those specified in the Technical Specifications.

2.4.1 **Treatment of junction of wall and the floor** :

Special care shall be taken to establish continuity of the chemical barrier on inner well surface from ground level. To achieve this a small channel of 30 m x 30 mm x 30 mm shall be made at the junction of wall and columns with the floor (before laying the sub-grade) and rod holes made in the channel upto ground level 150 mm apart and the iron rod moved backward and forward to break up the earth and chemical emulsion poured along the channel at the rate of 7.5 litres per square metre of the vertical wall or column surface so as to soak the soil right to the bottom. The soil should be tamped back into place after operation.

2.4.2 **Treatment of top surface of Plinth Filling** :

The top surface of the consolidated earth within plinth walls shall be treated with chemical emulsion at the rate of 5 litres per square metre of the surface before the sub-grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through holes upto 50 to 70 mm deep at 150 mm centres both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

2.4.3 **Treatment of soil surrounding Pipes, Wastes and Conduits** :

When pipes, wastes and conduits enter the solid inside the area of the foundations, soils surrounding the point of entry shall be loosened around each of such pipe, waste or conduit for a distance of 150 mm and to a depth of 75 mm before treatment is commenced. When they enter the soil external to the foundations, they shall be similarly treated for a distance of over 300 mm unless they stand clear of the walls of the building by about 75 mm.

2.4.4 **Treatment of soil along External Perimeter of Building** :

After the building is completed the earth along the external perimeter of the building should be rodded at intervals of 150 mm and to a depth of 300 mm. The rod should be moved backward and forward parallel to the wall to back up the earth and chemical emulsion poured along the wall at the rate of 7.5 litres per square metre of vertical surfaces. After the treatment, the earth should be tamped back into place. Should the earth outside the building be graded on completion of the building, this treatment should be carried out on completion of such grading.

In the event of filling being more than 300 mm, the external perimeter treatment shall be extended to the full depth of filling upto the ground level so as to ensure continuity of the chemical barrier.

2.5 Treatment shall not be made the soil or fill is excessively wet or immediately after heavy rains to avoid surface flow of toxicant from application site. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact with treated soil.

2.6 **Guarantee** :

10 (Ten) years guarantee should be submitted on non-judicial stamp paper as per the proforma attached. The guarantee shall be signed by the main contractor and the specialised who have executed the work. In the unlikely even of any treatment becoming necessary subsequently during the guarantee period. required inspection and treatment shall be carried out free of cost.

1 ROAD WORKS

1.01 Granular Sub-base

(All as per MOST Specifications Clause No. 401)

1.02 . Scope

This work shall consist of laying and compacting well-graded material on prepared sub-grade in accordance with the requirements of this specifications. The material shall be laid in one or more layers as sub-base of lower sub-base and upper sub-base (termed as sub-base hereinafter) as necessary according to lines, grades and cross sections shown on the drawings or as directed by the Engineer.

1.03 Materials

The material to be used for the work shall be natural sand, moorum, gravel, crushed stone, crushed slag, crushed concrete, brick ,metal, laterite, kankar, etc. or combinations thereof depending upon the grading required. Materials like crushed slag, crushed concrete, brick metal and kankar may be allowed only with the specific approval of the Engineer. The material shall be free from organic or other deleterious constituents and conform to one of the three gradings given in Table -1.(Table 400-1 of MOST Specifications)

While the gradings in Table-1 .(Table 400-1 of MOST Specifications) are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75mm, 53mm and 26.5mm, the corresponding gradings for the coarse-graded materials for each fo the three maximum particle sizes are given at Table-2 (Table 400-2 of MOST Specifications).The grading to be adopted for a project shall be as specified in the Contract.

1.04 Physical Requirement :

The material shall have a 10 percent fines value of 50 kN or more (for sample in soaked condition) when tested in compliance with BS:812 (Part-III). The water absorption value of the coarse aggregate shall be determined as per IS:2386 (Part-3); if this value is greater than 2 percent, the soundness test shall be carried out on the material delivered to site as per IS:383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium uniform air voids content of 5 percent.

TABLE –1 (Table 400-1 of MOST Specifications)
GRADING FOR CLOSE-GRADED GRANULAR SUB-BASE MATEIRALS

IS Sieve Designation	Percent by weight passing the Sieve		
	Grading-1	Grading-2	Grading-3
m.	100	--	--
m.	80-100	100	--
mm	55-90	70-100	100
m.	35-65	50-80	65-95
m.	25-55	40-65	50-80
m.	20-40	30-50	40-65
m.	10-25	15-25	20-35
m.	3-10	3-10	3-10
alue (Minimum)	30	25	20

TABLE 400-2 (Table 400-2 of MOST Specifications)
GRADING FOR COARSE GRADED GRANULAR SUB-BASE MATEIRALS

IS Sieve Designation	Percent by weight passing the Sieve		
	Grading-1	Grading-2	Grading-3
m.	100	--	--
m.	--	100	--
mm	55-75	50-80	100
m.	--	--	--
m.	10-30	15-35	25-45
m.	--	--	--
m.	--	--	--
m.	<10	<10	<10
alue (Minimum)	30	25	20

Note :

The material passing 425 micron (0.425mm) sieve for all the three gradings when tested according to IS : 2720 (Part V) shall have liquid limit and plasticity index of not more than 25 per cent and 6 percent respectively.

1.05 Strength of Sub-base

It shall be ensured prior to actual execution that the material to be used in the sbu-base satisfies the requirements of CBR and other physical requirements when compacted and finished.

When directed by the Engineer, this shall be verified by performing CBR tests in the laboratory as required on specimens remoulded at field dry density and moisture content and any other tests for the “quality” of materials, as may be necessary.

1.06 Construction Operations

1.061 Preparation of Sub-grade :

Immediately prior to the laying of sub-base, the sub-grade already finished as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes 80-100 kN smooth wheeled roller.

1.062 Spread and Compacting :

The sub-base material of grading specified in the Contract shall be spread on the prepared sub-grade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and maintain the required slope and grade during the operation or other means as approved by the Engineer.

When the sub-base material consists of combination of materials mentioned in Clause 1.8.1.2, mixing shall be done mechanically by the mix-in-place method.

Moisture content of the loose material shall be checked in accordance with IS : 2720 (Part-2) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that at the time of compaction it is from 1 percent above to 2 percent below the optimum moisture content corresponding to IS:2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means if so directed by the Engineer until the layer is uniformly wet.

Immediately thereafter, rolling shall be started. If the thickness of the compacted layer does not exceed 100mm, a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 225mm. the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight with plain drum or pad foot-drum or heavy pneumatic tyred roller of minimum 200 to 300 kN weight having a minimum tyre pressure of 0.7 MN/sq.m. or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall and super elevation and shall commence at the edges and progress towards the centre for portions having crossfall on both sides.

Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and crossfall (camber) shall be checked and any high spots or depressions which become apparent corrected by

removing or adding fresh material. The speed of the roller shall not exceed 5 km. per hour.

Rolling shall be continued till the density achieved is at least 100 per cent of the maximum dry density for the material determined as per IS:2720 (Part 8I). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

1.063 Measurements for Payment

Granular sub-base shall be measured as finished work in Square Meters.

The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

Rates

a) The Contract unit rate for granular sub-base shall be payment in full for carrying out the required operations including full compensation for :

b) Making arrangements for traffic to Clause 112 except for initial treatment to verge shoulders and construction of diversions;

c) Furnishing all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts;

d) All labour, tools, equipment and incidentals to complete the work to the specifications; and

e) Carrying out the work in part widths of road where directed.

f) Carrying out the required tests for quality control

Brick Bats Laying

Brick bats either collected from site or bought in inside from outside shall first be approved by the Engineer In Charge and then shall be laid in two layers to achieve a compacted thickness of each of 100mm for total thickness of 200mm and the interstices filled with moorum or stone dust and rolled by 10 T- 12 Power roller to achieve the desired compaction .

Herring Bone Pattern Brick On Edge Soling :

Soling to be laid on Hard Subbase in proper lines and levels with picked jhama bricks and Rolled properly with roller .All care must be taken to known the sharp

projecting Brick surface caused due to irregulaities . The Gaps between the bricks be necessarily filled up with sand and then the top 30-35 mm be grouted with cement mortar and broom finished . No claim should be made for leveling the uneven surface of road .

Jhama Khowa Laying ;

The Base such prepared shall be covered with 150 thick Jhama Khowa and the interstices filled with stone dust/moorum and dry rolled followed by wet Rolling to achieve the desired compaction .

Notes :

Making and Finishing of Side Berm to protect the edge during construction and rolling to be considered purely incidental and no extra payments shall be claimed for that.

TECHNICAL

SPECIFICATION FOR

ELECTRICAL WORK

SCOPE OF WORK

The scope of work here consist of supply, installation, connection, testing and commissioning of the Electrical installations starting from point of power supply inside the meter room of project site as per specifications, relevant Indian standards, Code of practices.

The contractor shall carry out and complete the contracted job in every respect in line with the current rules and regulations of the local Electricity Authority, the Indian Standards and with the directions of consultant & owners up to their full satisfaction. The Contractor shall provide all necessary labourers for installation of all materials, appliances, equipment, for complete provision and testing purpose of the whole electrical installation as specified and shown in the drawings. This also includes provisions of any material, appliances, equipment not specifically mentioned herein or noted on the drawing as being furnished or installed but which are necessary and customary to make complete installation with all outlets for power, light, telephone conduits, all other conduits and other electrical systems shown in the schedule or described herein, properly connected and in working order.

The work shall also include all incidental jobs connected with electrical installation such as excavation for trenches and back filing and surfacing, cutting/drilling holes through walls/floors and grouting for fixing of fixtures, equipment etc. Chiseling in the wall or principal structure is not permitted.Apart from the scope described above, different types of jobs may come up which has to be undertaken by the contractor as per mutually bipartite agreement between Contractor & Client.

SYSTEM DESCRIPTION

SOURCE OF POWER

Power will be supplied by Power Supply Authority WBSEDCL at LT. . Power inside the premises will be supplied by the authority up to the point of operation at meter room.

L.T POWER DISTRIBUTION SCHEME

L.T power distribution room has been ear marked at ground floor . One Main L.T panel / distribution board will be installed in this room. Power from this panel will be fed to different Power Distribution Boards, in different floors, utilities etc.

From the different floor distribution board, power will be provided to all rooms offices and to the common areas/zones.

EARTHING SYSTEM

A suitable system of earthing (for Panel,System & DG sets) and body earthing will be installed. Earth flat/earthing wire to run along the all the floors, in all floor rooms.

Dedicated earth pit also will be provided for DG neutral.

STAND BY POWER

Certain percetage back up of power will be provided by DG Set for which decision may be taken. These DG sets will be installed at a suitable with suitable place with acoustic enclosure for damping the sound pollution. In case of failure of Mains power, the DG set may be started manually/automatically through Auto Mains failure system (AMF). DG Set will feed to the main distribution panel.

1. INTERNAL ELECTRICAL WIRING & INSTALLATIONS

- **General:**

  Technical specification in this section cover the internal wiring installation comprising of:

- oint wiring including circuit wiring for light, lighting and power socket outlets etc. in concealed /surface conduit.
- iring for telephone/TV outlets.
- onduiting telephone/TV systems.
- ub main wiring in concealed/surface conduits.

- **Standards and Codes:**

  Following Indian Standard Specification and Codes of Practice, along with Rules, Regulations, Directives and Standards shall apply.

Rigid steel conduits for electrical wiring .	IS	9537: 1981
Flexible steel conduits for electrical Wiring	IS	3480: 1966
Switch socket outlets	IS	4615: 1968
Switches for domestic and similar Purposes	IS	3854: 1966
Boxes for the enclosure of electrical Accessories	IS	5133: 1969
PVC insulated wires 660 volts grade	IS	694: 1977
Code of practice for personal hazard Fire safety of buildings	IS	1644: 1960
Code of practice for personal hazard fire Safety of buildings	IS	1646: 1982
Code of practice for electrical wiring Installations	IS	732: 1989

- **Conduiting**

1.3.1 Conduits:

These shall be PVC rigid 32/25/20 mm as per the need and as per spec and make.

- **Conduit Connections:**

Connections between conduits to be made properly with suitable jointing material.
Boxes shall be fixed by suitable approved method . Connection between PVC conduits, if required, shall be through junction box and never directly.

- **Bends:**

As far as possible, the conduit system shall be so laid out that it shall obviate use of tees, elbows and sharp bends.

- **Fan Hook Boxes:**

Ceiling boxes for fan hooks shall be made out of sheet steel not less than 14 SWG and hexagonal in shape with one ‘U’ shaped 15mm dia rod inside secured tightly with the top reinforcement of the roof. 3 mm thick perspex/hylem sheet cover of matching colour shall be provided.

- **Switch and Outlet Boxes:**

16 SWG mild steel boxes suitable to house modular type switches of required ratings, unless otherwise stated, and fan regulators as required shall be provided. These will be so designed that accessories are mounted on a grid plate with tapped holes for brass machine screws leaving ample space at the back and on the sides for accommodating conductors and check nuts at conduit entries. The grid plates and M.S. boxes shall be fitted with a brass earth terminal. MS boxes shall be completely embedded leaving edges flush with finished wall surface. Moulded front covers made from high impact resistant, flame retardant and ultra violet stabilised engineering plastics shall be fixed by means of counter sunk chromium plated brass machine screws. No timber shall be used for any support.

- **Draw Boxes:**

17 SWG mild steel/PVC draw boxes of ample dimensions shall be provided at convenient locations to facilitate drawing of long runs of conductors. These shall be mounted flush with wall /ceiling/surface as required and shall have screwed covers of 3 mm thick perspex/hylam sheet.

- **Inspection Boxes**

Inspection boxes of 16 SWG mild steel /PVC and having smooth external and internal finish shall be provided to permit inspection and maintenance. These shall be mounted flush with wall /ceiling surface as required and shall have screwed cover of 3mm thick perspex/hylem sheet.

1.3.10 **Cross Section**

The conduits shall be of ample sectional area to facilitate simultaneous drawing of wires. In no case shall the total cross section of wires measured overall be more than half the area of the conduit. Maximum number of wires permissible in various sizes of conduits shall be as per IS.

1.3.11 **Laying of conduits:**

Concealed conduits shall be laid before casting in the upper portion of slabs or otherwise in surface, as may be instructed in accordance with approved drawings, so as to embedded the entire run of conduits and ceiling outlet boxes with a cover of minimum 12 mm.. Surface conduits shall be secured to the finished building surfaces by suitable cast aluminium spacer saddles of approved make and finish with heavy duty screwed clamps at every 600 mm.

For concealed wiring vertical drops shall be embeded in columns or walls unless otherwise stated. Wherever necessary, chases shall be cut by the contractor with the written orders of the owners / architects to sufficient depth to allow full thickness of plaster over conduits. The width of the chases shall be such as to accommodate the required number of conduits. The chases shall be filled with cement, coarse sand mortar (1:3) and property cured by watering. If a chase is cut in an already furnished surface, the contractor shall fill the chase and finish it to match the existing finish. Conduits shall be fixed inside the chases with the help of U clamps/nails at 300mm centre to centre.

Contractors shall not cut any iron bars to fix the conduits.

When the conduit is to be embedded in a concrete member, it shall be adequately tied to be the reinforcement to prevent displacement during casting. Conduits in chase or laid in the slab shall be supported at maximum of 1 m centers.

Suitable flexible joint fittings shall be provided at all the points where conduits cross any expansion joint in the building.

1.3.12 **Painting of conduits and Boxes:**

All draw/switch/junction/fan-hook boxes shall be painted with red oxide/galvanized/ cadmium plated in three manufactured from. All ungalvanized / unplated boxes shall be again painted with red oxide paint as required before fixing. Boxes fixed on surface shall, in addition, be painted with finishing paint of approved colour and finish.

Before laying, conduits shall be painted at such places where painted has been damaged due to vice or wrench grip or any other reason.

1.3.13 **Protection of conduits:**

To safeguard against filling up with mortar/plaster etc. all the outlet and switch boxes shall be provided with temporary covers and plugs, which shall be replaced by sheet/plate covers as required. All screwed and socketed joints shall be made fully water tight with white lead paste.

1.3.14 **Cleaning of conduit Runs:**

The entire conduit system including outlets and boxes shall be thoroughly cleaned after completion of erection and before drawing in of cables.

1.3.15 **Earthing :**

Continuous earth wire shall be provided for all points, outlets and submains. Earthing terminals shall be provided inside all switch boxes, outlet boxes and draw boxes etc.

- **Wires :**

Wires shall be PVC insulated, FRLS, stranded copper conductors, unless otherwise stated, of 1100 volt grade. All wires shall bear manufacturer's label and shall be brought to site in new and original packages. Manufacturer's certificate, certifying that wires brought to site are of their manufacture shall be furnished as required.

- **Bunching of wires :**

Wires carrying current shall be so bunched in conduits that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit.

- **Drawing of wires :**

The drawings of wires shall be executed with due regard to the following precautions: -

- o wire shall be drawn into any conduit, until all work of any nature, that may causes injury to wire is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Screwed brass bushes shall be provided at conduit edges.

- efore the wires are drawn into the conduits, conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction by forcing compressed air through the conduits and necessary.

- hile drawing insulated wires into the conduits, care shall be taken to avoid scratches and

kinds, which cause breakage of conductors.

- There shall be no sharp bends.

Termination / Jointing of Wires :

- ub-circuit wiring shall be carried out in looping system. Joints shall be made only at distribution board terminals, switches/buzzers and at ceiling roses/ connectors /lamp holders terminals for lights/fans/socket outlets. No joints shall be made inside conduits or junction/draw/inspection boxes.

- iring conductors shall be continuous from outlet to outlet. Joints where unavoidable, due to any specified reasons shall be made by approved connectors. Specific prior permission from architect / owners in writing shall be obtained before making such joint.

- nsulation shall be shaved off for a length of 15 mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or wiring.

- trands of wires shall not be cut for connecting terminals. All strands of wire shall be soldered at the end before connection.

- VC insulated aluminium conductor wire (wherever used) ends before connection shall be properly soldered (at least 15 mm length) with suitable soldering material.

- onductors having nominal cross sectional area exceeding 4 sq. mm. Shall always be provided with crimping sockets.

- t all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used.

- rass nuts and bolts shall be used for all connections.

- he pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less.

- witches controlling lights, fans, socket outlets etc. shall be connected to the phase wire of circuits only.

- nly certified wiremen shall be employed to do wiring / jointing work.

- **Load Balancing:**

Balancing of circuits in three-phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

- **Colour Code of Conductors:**

Colour code shall be maintained for the entire wiring installation – red, yellow, blue for three phases, black for neutral and green for earth.

1.5 Switches and Fixtures:

1.5.1 Switches:

All 6 and 16 amps switches shall be of the modular flush mounting type unless otherwise stated 240 Volt AC of good quality and standard. The switch moving and fixed contacts shall be of silver nickel and silver graphite alloy and contact tips coated with silver. Housing of switches shall be made from high impact resistant, flame retarding and ultra violet stabilized engineering plastic material.

Switches controlling the light, fan or sockets shall be connected on to the phase wire of the circuit.

- **Fan Regulators:**

Fan regulators shall be fixed inside the switch boxes on grid plates with tapped holes and brass machine screws unless otherwise stated, leaving ample space at the back and sides for accommodating wires.

- **Flush/cover Plates:**

Switches, receptacles and telephone system outlets in wall shall be provided with moulded cover plates, unless otherwise stated, of approved colour, shape and size made from high impact resistant, flame retarding and ultra violet stabilized engineering plastic material, and secured to the box with counter sunk /round head chromium plated brass screws. Where two or more switches are installed together, they shall be provided with one common switch cover plate as described above with notches to accommodate all switches either in one, two or three rows.

-

Socket Outlets:

6/16 amps socket outlets shall be of modular flush/surface mounting type, unless otherwise stated, and shall be switched, three-pin type and fitted with automatic linear safety shutters to ensure safety from prying fingers. Unswitched 6/16 amp socket outlets where called for shall also be of three pin type. Socket outlets shall be made from high impact resistant, flame retarding and ultra violet stabilized engineering plastic material.

Switches and sockets shall be located in the same plate. Plates for 6 amp switched / unswitched plugs and telephone outlets shall be of the same size and shape.

Switches controlling socket outlets shall be on the phase wires of circuits. An earth wire shall be provided along the wires feeding socket outlets for electrical appliances. The earth wire shall be connected to the earthing terminal of the socket shall be connected to the earth terminal provided inside the box.

- **Lighting Fixtures, Fans and Exhaust Fans :**

Light fixtures and fittings shall be assembled and installed complete as required and ready for service, in accordance with details, drawings, and manufacturer's instructions and to the satisfaction of the architects/owners.

Pendant fixtures specified with overall lengths are subject to change and shall be checked with site conditions and installed as required.
All suspended fixtures shall be mounted rigid and fixed in position in accordance with drawings, instructions and as approved by architect/owners.

Fixtures shall be suspended true to alignment, plumb, level and capable of resisting all lateral and vertical forces.

All suspended light fixtures, fans etc. shall be provided with concealed suspension arrangement in the concrete slab /roof members/false ceiling . Making provisions for such arrangements at the appropriate stage of construction is deemed to be included in contractors' scope.

Exhaust fans shall be fixed at locations shown on the drawings. They shall be wired to a plug socket at a convenient location near the fan in flexible conduits.

All switch and outlet boxes, fan regulators shall be bonded to earth with PVC insulated stranded copper wire as specified.

Wires shall be connected to all fixtures through connector blocks.

- **Point Wiring:**

- **Measurement and Payment of Wiring:**

Wiring for lights, fans, socket outlets, telephone outlets etc. carried out as per tender specifications shall be measured and paid on point basis only unless otherwise specifically stipulated. The point-wiring basis shall assume average wiring length and average conduiting length per point. The average wiring length forming the basis of point wiring payment shall take the electrical layouts of the entire project into consideration. Tenderers are advised to seek clarifications, if they so desire, on this aspect before submitting their tenders. No claim for extra payment on account of electrical layouts in parts of the project requiring large average wiring and conduiting length per point whether specifically shown in tender drawings or not shall be entertained after the award of contract.

- **General**

Point wiring shall be carried out as per following

- In concealed /surface conduit system unless otherwise stated.
- Only looping system of wiring shall be adopted throughout.
- All accessories shall be flush types unless otherwise stated.
- ight points, fan points and 6 amp socket outlet points may be wired on a common circuit. Such circuit shall not normally have more than a total of ten light, fan or socket outlets or a load of 800 watts, whichever is less unless otherwise stated.
- ower circuits shall normally have maximum one 16 amps socket outlets unless otherwise stated. Separate circuit shall be run for each geyser, kitchen equipment, window air conditioners and similar appliances.
- oint wiring rates shall include painting of conduits and other accessories as required and wherever necessary.
- oint wiring rates shall include cleaning of dust, splashes of colour wash or paint from all fixtures, fans, fittings etc. at the time of taking over of the installation.
- **Light Point:**

Point wiring for light points shall commence at the distribution board terminals and shall terminate at the ceiling rose/connector in ceiling box/lamp holder via the control switch. Rates quoted shall be deemed to be inclusive of the cost of entire materials and Labour required for completion of point wiring thus defined including: a) conduiting system complete with all accessories, junction/draw/inspection boxes, screwed brass bushes, check nut etc. complete as required, b) Wiring with stranded copper (unless otherwise stated)

PVC insulated 1100 volt grade wires for point wiring including circuit wiring (wiring from distribution board terminals to the first switch in the circuit) and cover plate of specified type including fixing screws, earth terminal etc. Complete as required d) Loop earthing with PVC insulated stranded copper wires complete as required.

- **Ceiling Fan Points:**

  Point wiring for ceiling fan points shall be same as for light points and shall, in addition, include recessed fan hook, ceiling outlet box and provision in the switch box for mounting the fan regulator which shall be earthen with PVC insulated stranded copper wire as required. In case owners supply the ceiling fans and regulators, the rate shall be inclusive of blank off in the switch box.

- **Exhaust Fan Point :**

  Point wiring for ceiling fan points shall be same as for light points and shall in addition include socket outlet near the exhaust fan and control switch with regular at a convenient location complete as required.

- **Call Bell Point :**

  Point wiring for call bell points shall be same as for light point and shall in addition include a bell push in lieu of control switch.

- **3 Pin 6 Amps Socket Outlet Point (Lighting)**

  Point wiring for lighting convenience socket outlet points shall be same as for light points and shall, in addition, include 3 pin 6 amps socket outlet and 6 amps control switch of specified type mounted in a MS box with cover as required, and third pin earthed with PVC insulated stranded copper wire as required.

- **3 Pin 16 Amps Outlet Point (Lighting) :**

  Point wiring for power convenience socket outlet points shall be same as for light point and shall also include a 3 pin 16 amps socket and 16 amps control switch of specified type mounted in a MS box with cover as required and third pin earthed with PVC insulated stranded copper wire as required.

- **Geyser Point:**

  Point wiring for Geyser points shall be same as for 3 pin 16 amps outlet point and shall, in addition, include socket outlet near the geyser and control switch in a separate convenient location complete as required.

- **pecial Purpose Outlets:**

  Wiring for special purpose outlets, not covered by convenience socket outlets as defined and shall be itemized and paid for as stipulated in schedule of quantities.

- **ircuit Wiring:**

  Minimum size of PVC insulated copper conductor wires for all circuit wiring for light, exhaust fan, ceiling fan and lighting convenience outlet points shall be 2.5 sq mm unless otherwise specified.

  Circuit wiring shall not be separately measured and paid for. Point wiring rates shall include the cost of providing circuit wiring as required.

- **Sub-Main Wiring:**

  Sub-main wiring shall comprise of stranded copper conductor PVC insulated 1100-volt grade wires in MS/PV conduits including loop earthing, terminations etc. complete as required.

  Sizes of conduits, number/type/size of wires and loop earthing shall be as stipulated in the schedule of quantities and /or drawings.

  Wires shall be drawn in the concealed or surface conduits as required, without being damaged. For this purpose, draw boxes shall be located at convenient locations.

  Every sub-main shall run in an independent conduit with an independent earth wire of PVC insulated stranded copper wire as specified running along the entire run of conduit. For single phase, one earth wire shall run and for three phase two earth wires shall run.

  Necessary provision of wire lengths entering and emerging from the conduit shall be made for connections.

  Measurement shall be taken of the actual conduit run containing the wires from one point to the other.

2.0 L.T.Cables

2.1 General

L.T. Cables shall be supplied, inspected, laid tested and commissioned in accordance with drawings, specifications, relevant Indian Standards specifications and cables manufacturer’s instruction. The cable shall be delivered at site in original drums with manufacturer’s name clearly written on

the drums. The recommendations of the cable manufacturer with regard to jointing and sealing shall be strictly followed.

2.2 TECHNICAL REQUIREMENTS

- he cable shall be suitable for laying on racks, in ducts, trenches, conduits and under ground buried installation with chances of flooding by water.

- ables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions as specified elsewhere in this specification.

- he cable cores shall be laid up with fillers between the cores whenever necessary. It shall not stick to insulation and inner sheath. All the cables, other than single core unarmoured cables, shall have distinct extruded PVC inner sheath of black color as per IS : 5831.

- uter sheath shall be of PVC & black in color. In addition to meeting all the requirements of Indian standards referred to, outer sheath of all the cables shall have the following FRLS properties:-

    - xygen index of min.29 (as per ASTMD 2863).
    - cid gas emission of max.20% (as per IEC-754-I).
    - moke density rating shall not be more than 60% during Smoke Density Test as per ASTMD- 2843.

    g) Cores of the cable shall be identified by colouring of insulation. Following color scheme shall be adopted:

    1 core - Red, Black, Yellow, Blue

    2 core - Red & Black

    3 core - Red, Yellow & Black

    4 core - Red, Yellow, Blue and Black

    h) In addition to manufacture's identification on cables as per IS, following marking shall also be provided over outer sheath:

    - able size and voltage grad – To be embossed
    - orld 'FRLS' at every 5 meter – To be embossed

- equential marking of length of the cable in meters at every one – meter – To be embossed / printed.

The embossing shall be progressive, automatic, in line and marking shall be legible and indelible.

i) All cables shall meet the fire resistance requirement of IEEE – 383 with cable.

- nstallation made in accordance with clause “Flammability test” and as per category – B of IEC 332 Part – 3

- llowable tolerance on the overall diameter of the cables shall be + / -2 mm maximum over the declared value on the technical data sheets.

- n plant repairs to the cables shall not be accepted. Pimples, fish eye, blowholes etc. are not acceptable.

2.3 CONSTRUCTION

L.T.Cables shall be XLPE insulated and PVC sheathed aluminium conductor armoured cables conforming to IS : 7098 (Part I) – 1988. Cables shall be of 1100 volt and with ISI certification mark. Conductor of power cables shall be made of electrical purity aluminium conforming to IS 8130 – 1984. Aluminium conductor of cables up to 16 sq.mm shall be of solid circular cross section and the size above 16 sq.mm shall be circular or sector shaped. The conductor shall be insulated with high quality XLPE base compound with maximum operating conductor temperature of 90 degree C. Insulation and outer sheathing compound shall conform to IS 5831 – 1984. Armouring shall be provided over the inner sheath. Armouring shall conform to IS : 3975. Armouring shall be of galvanized round steel wires or galvanized flat steel wires (strip). For single core cables non magnetic armouring shall be provided over the insulation outer sheath shall be extruded over the armouring. Maximum permissible bending radius for cables upto 1.1 KV shall be 12 D. (D is outer diameter of cable).

2.4 INSTALLATION OF CABLES

Cables shall be laid directly in ground, pipes, masonry ducts, on cable tray, surface of wall / ceiling etc. as indicated on drawing and / or as per the direction of Engineer – in – Charge.

2.5 INSPECTION

All cables shall be inspected at site and checked for any damage during transit.

2.6 JOINTS IN CABLES

The Contractor shall take care to see that the cables received at site are apportioned to various locations in such a manner as to ensure maximum utilization and avoiding of cable joints. This apportioning shall be got approved from Engineer – in – Charge before the cables are cut to lengths.

2.7 LAYING CABLES IN GROUND

Cables shall be laid by skilled experienced workmen using adequate rollers to minimize stretching of the cables. The cable drums shall be placed on jacks before unwinding the cable. With great care it shall be unrolled on over wooden rollers placed in trenches at intervals not exceeding 2 metres. Cables shall be laid at depth of 0.75 metres below ground level. A cushion of sand total of 250 mm shall be provided both above and below the cable, joint boxes and other accessories. Cable shall not be laid in the same trench or along side a water main.

The cable shall be laid in excavated trench over 80 mm layer of sand cushion. The relative position of the cables, laid in the trench shall preserved. At all changes in direction in horizontal and vertical planes, the cables shall be bent smooth with a radious of bent not less than 12 times the diameter of cables. Minimum 3 metre long loop shall be provided at both end of cable.

Distinguishing marks may be made on the cable ends for identifications of phases. Insulation, tapes of appropriate voltage and in red, yellow and blue colours shall be wrapped just below the sockets for phase identifications.

2.8 PROTECTION OF CABLES.

The cables shall be protected by bricks laid on the top layer of the sand for the full length of underground cable. Where more than one cables is laid in the same trench, the bricks shall cover all the cables and shall project a minimum of approximately 80 mm on either side of the cables. Cable under road crossing and any other places subject to heavy traffic, shall be protected by running them through Humes Pipes of suitable size.

2.9 EXCAVATION & BACK FILL

All excavation and back fill required for the installation of the cables shall be carried out by the Contractor in accordance with the drawings and requirements laid down elsewhere. Trenches shall be dug true to line and grades. Back fill of trenches shall be filled in layer not exceeding 150mm. Each layer shall be properly rammed and consolidated before laying the next layer.
The contractor shall restore all surface, sidewalks, curbs, wall or the works cut by excavation to their original condition to the satisfaction of the Engineer- in-charge.

2.10 LAYING OF CABLES ON SURFACE OF WALL/ CEILING

Cables shall be fixed on surface of wall or ceiling slab by suitable MS clamps/Saddles. Care shall be taken to avoid crossing of cables.

2.11 CABLES HANGERS OR RACKS

The Contractor shall provide and install all iron hangers racks or racks with die cast cleats with all fixings, rag bolts or girder clamps or other specialist fixing as required.

Where hangers or racks are to be fixed to wall sides, ceiling and other concrete structures, the Contractor shall be responsible for cutting away, fixing and grouting in rag bolts and making goods.

The hangers or racks shall be designed to leave at least 25mm clearance between the cables and the face to which it is fixed. Multiple hangers shall have two or more fixing holes. All cables shall be saddled at not more than 150 mm centers. These shall be designed to keep provision of some spare capacity for future development.

2.12 CABLE TAG

Cable tags shall be made out of 2 mm thick aluminium sheets, each tag 1-1/2 inch in dia with one hole of 2.5 mm dia, 6mm below the periphery. Cable designations are to be punched with letter / number punches and the tag are to be tied inside the panels beyond the glanding as well as below the glands at cable entries. Trays tags are to be tied at all bends. On straight lengths, tags shall be provided at every 5 metres.

2.13 TESTING OF CABLES

a). GENERAL

i). All cables to be supplied shall be of type-tested quality. **The contractor shall submit for owner's approval the reports of all the type tests as listed in this specification and carried out within last five years from the date of bid opening.**

ii). In case the contractor is not able to submit report of the type test(s) conducted within last five years from the date of bid opening, or in case the type test report (s) are not found to be meeting the specification requirements, the contractors shall conducted all such tests under this contract **free of cost** to the owner and submit the reports for approval.

iii). All acceptance and routine tests as specified in Reference Quality Plan and relevant standards shall be carried out **free of cost.** Charges for these shall be deemed to be included in the cable price.

Prior to installation burying of cables, following tests shall be carried out. Installation test between phases, phase & neutral, phase & earth for each length of cable.

- before laying.
-

After laying.

- After jointing.

On completion of cable laying work, the following tests shall be conducted in the presence of Engineer in Charge.

Insulation Resistance Test (Sectional and overall).
Continuity Resistance Test.
Earth Test

All tests shall be carried out in accordance with relevant Indian Standard Code of practice and Indian Electricity Rules. The Contractor shall provide necessary instruments, equipments and labour for conducting the above tests & shall bear all expenses of conducting such tests.

3.0 MEDIUM VOLTAGE DISTRIBUTION BOARDS / DBs

3.1 Standards and Codes:

The following Indian Standard Specification and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and /or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current standards shall be applicable irrespective of those listed below.

Minimum Air Circuit breakers for AC circuits	IS 13947 : 1993
Degrees of Protection provided by enclosures for low voltage switch gear	IS 2147 : 1962
Code of Practice for selection, installation and maintenance of switchgear & control gear	IS 10118 : 1982

3.2 Miniature Circuit Breakers:

- The MCB’s shall be of the completely moulded design suitable for operation at 240 /415 Volts 50 Hz system.

- Have inverse time delayed thermal overload and Instantaneous magnetic short

circuit protection. The MCB time current characteristic shall coordinate with H.R.C. fuse/PVC cable characteristic.

3.3 Distribution Boards :

- Final distribution board shall be flush mounting, double door, totally enclosed, dust and vermin proof and shall comprise of miniature circuit breakers, earth leakage circuit breakers, neutral link etc. as detailed in the schedule of quantities.

- The distribution equipment forming a part of the distribution boards shall comply to the relevant standards and codes of the Bureau of Indian Standards and as per detailed specifications in this tender document.

- The board shall be fabricated from 14 gauge CRCA sheet steel shall have hinged lockable spring-loaded cover. All cutouts and covers shall be provided with synthetic rubber gaskets. The entire construction shall give a IP 54 degree protection.

- he busbar shall be of electrical grade copper/aluminium having a maximum current density of 1.2 /1 ampere per sq mm and PVC insulated (heat shrinkle) through out the length.

- ll the internal connections shall be with either solid copper insulated or copper conductor PVC insulated wires of adequate rating.

- ll the internal connections shall be concealed by providing a hinged protective panel to avoid accidental contact with live points.

- ll outgoing equipment shall be connected direct to the busbar on the live side. The equipment shall be mounted on a framework for easy removable and maintenance.

- he sheet steelwork shall undergo a rigorous rust proofing process and finally powder coated paint finish.

- ll the circuit shall have an independent neutral insulated wire, one part circuit, and shall be numbered and marked as required by the owners.

- amples of the complete board each to be got approved by the architects/ Owners before commencement of supply and erection.

- Outgoing terminals of all the MCBs shall be wired up to the terminal block of the

distribution boards.

- Provision of Cable / Conduit entry to the DB shall be from bottom as well as from top.

3.4 Sheet Steel Treatment And Painting

- heet steel material is used in the construction of this units should have undergone a rigorous rust proofing process comprising of alkaline of degreasing, descaling in dilute sulfuric acid and a recognized phosphate process. The steel works shall then receive two coats of oxide filler primer before final painting. Castings shall be scrupulously cleaned and fitted before receiving a similar oxide primer coats.

- ll sheet steel shall after metal treatment be given powder coated finish paint with two coats of approved shade to IS 5 on the outside and white on the inside.

3.5 Name Plates and Labels :

- uitable engraved white on black nameplates and identification labels of metal for Switch Boards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

4.0 L.T. PANELS

4.1 GENERAL

Main L.T. Panel shall be indoor type, metal clad, floor mounted, free standing, totally enclosed, extensible type, air insulated, cubicle type and having multitire arrangement, fabricated with CRC sheet for use on 415 Volts, 3 phase, 50 cycles system with a fault level withstand capacity of 25KA RMS symmetrical.

STANDARDS

The equipment shall be designed to conform to the requirements of the latest revisions including amendments of the following codes and standards.

- IS : 8623 – Factory Built Assemblies of switchgear and control gear.
- S : 4237 – General requirements for switchgear and control gear for voltages not exceeding 1000 volts.
- S : 2147 – Degree of protection provided by enclosures for low voltage switchgear and control gear.
- S : 375 – Marking and arrangement of busbars.
- S : 6005 Code of practice for phosphating of iron & steel.
-

S : 5 – 1994 Colours for ready mix paints and enamels.

- S : 5578 – 1984 Guide for marking of insulated conductor.

Individual equipment housed in the Main L.T. Panels shall conform to the following IS Specification.

- ir circuit breakers / moulded case circuit breaker IS : 13947 (Part – II) & IEC 947 (2).
- use switch and switch fuse units – IS : 13947 (Part – 3) & IEC 947 (3).
- RC fuse links – IS : 13703
- urrent Transformers – IS : 2750
- oltage Transformers – IS : 3156
- ndicating Instruments – IS : 1248
- ntegrating Instruments – IS : 722
- ontrol Switches & Push Buttons – IS : 6875
- uxiliary Contactors – IS : 13947 (Part – 4 / Sec. – I) & IEC 947 (4/1)
- elays – IS : 3231

4.3 **CONSTRUCTION**

4.3.1 **MAIN L.T. PANELS SHALL BE** :

- f metal enclosed, indoor, floor mounted, free standing compartmentalized construction, extensible type.
- ade up of the requisite vertical sections, which when coupled together shall form continuous dead front switchboards.
- rovide dust and damp protection, the degree of protection being not less than IP 52 to IS : 2147.
- e readily extensible on both sides by the addition of vertical sections after removal of the end covers.

Main L.T. Panel shall be constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses, as the effects of humidity, which are

likely to be encountered in normal service.

Each vertical section shall comprise of :

- front framed structure of cold rolled / folded sheet steel channel section, of minimum 2 mm. thickness, rigidly bolted together. This structure shall house the components contributing to the major weight of the equipment, such as circuit breaker cassettes, fuse switch units, main horizontal busbars, vertical risers and other front mounted accessories. Stiffeners shall be provided wherever necessary.

  The structure shall be mounted on a rigid base frame of cold rolled sheet steel of minimum 2 mm. thickness and 100 mm. height or 100 mm. X 50 mm. X 50 mm. MS channel. The design shall ensure that the weight of the components is adequately supported without deformation or loss of alignment during transit or during operation.
- A rear cable chamber housing the cable end connections, and power / control cable terminations. The design shall ensure generous availability of space for ease of installation and maintenance of cabling, and adequate safety for working in one vertical section without coming into accidental contact with live parts in an adjacent section.
- Front and rear doors fitted with neoprene gaskets with fasteners designed to ensure proper compression of the gaskets. When covers are provided in place or doors, generous overlap shall be assured between sheet steel surfaces with closely spaced fasteners to preclude the entry of dust.
- he panel shall be divided into distinct vertical sections each comprising of :
- ompletely enclosed bus bar compartment for running horizontal and vertical busbars. Minimum width of busbar horizontal compartment shall be 400 mm. Busbar vertical compartment shall be of 300 mm.
- ompletely enclosed switchgear compartment one for each circuit for housing Air Circuit Breaker MCCB / SFU etc.
- compartment alley for power and control cables of atleast 250 mm. width covering entire height.
- All doors shall be industrial type locking facility.
- land plate shall be 3 mm. thick.

The height of the Main L.T. panels should not be more than 2400 mm. The total depth of the panel should be adequate to cater to proper cabling space. Operating handle not higher than 1800 mm.

Doors and covers shall be of minimum 2 mm. thick sheet steel. The front of each compartment shall be provided with the hinged single leaf door with locking facilities. Sheet steel shrouds and partitions shall be of minimum 2 mm. thickness. All sheet panels shall be smoothly finished, leveled and free from flaws. The corners should be rounded.

The apparatus and circuits in the power control centres shall be so arranged as to facilitate their operation and maintenance and at the same time to ensure the necessary degree of safety.

Apparatus forming part of the Main L.T. Panel shall have the following minimum clearances

between phases – 32 mm.
- between phases and neutral – 26 mm.

between phases and earth – 26 mm.
- between neutral and earth – 26 mm.

When, for any reason, the above clearances are not available, suitable insulation shall be provided. Clearances shall be maintained during normal service conditions.

Creepage distances shall comply to those specified in relevant standards.

All insulating material used in the construction of the equipment shall be of non-hygroscopic material, duly treated to withstand the effects of the high humidity, high temperature tropical ambient service conditions.

Functional units such as circuit breakers and fuse switches shall be arranged in multi-tier formation, except that not more than two air circuit breakers shall be housed in a single vertical section. Cable entry for various feeders shall be from the rear for Main L.T. Panels. Panel shall be suitable for termination of cables for incoming breakers & outgoing breaker feeders. Cable entry shall be from bottom.

The panel shall be provided with three phase buses and a neutral busbar of high conductivity aluminium alloy sections of adequate size throughout the length of switchgear panel and shall be adequately supported and braced. Maximum temperature rise of busbars and busbar connections while carrying rated current shall not exceed 40º C. over and ambient of 45º C. Metallic/ insulated barriers shall be provided within vertical sections and between adjacent sections to ensure prevention of accidental contact with :

-
ain busbar and vertical risers during operation, inspection or maintenance of functional units and front mounted accessories.

-
able termination of one functional unit, when working on those of adjacent unit / units.

All doors / covers providing access to live power equipment / circuits shall be provided with tool operated fasteners to prevent unauthorized access.

Provision shall also be made for permanently earthing the frames and other metal parts of the switchgear by two independent connections.

A galvanized steel earth bus shall be provided at the bottom of the panel throughout the length. The size of GI bus shall be equal to half the cross sectional area of phase bus.

All feeders should be provided with engraved identification plates with feeder no. and feeder designation. All inscription plates are of black anodized aluminium with white engraved lettering on black background. All the equipments installed inside the panel should have suitable sticker / labels to identify the equipment.

4.4 **METAL TREATMENT & FINISH**

All steel work used in the construction of the Main L.T. Panel cubicle panels should have undergone a rigorous metal treatment process as follows :-

- ffective cleaning by hot alkaline degreasing solution followed by cold water rinsing to remove traces of alkaline solution.

- ickling in dilute sulphuric acid to remove oxide scales & rust formation, if any, followed by cold water rinsing to remove traces of acidic solution.

- recognized phosphating process to facilitate durable coating of the paint on the metal surface and also to prevent the spread of rusting in the event of the paint film being mechanically damaged. This again, shall be followed by hot water rinsing to remove traces of phosphate solution.

- assivating in de-oxalite solution to retain and augment the effects of phosphating.

- rying with compressed air in a dust free atmosphere.

- owder Coating paint shall be peeble grey or of Siemens Gray colour.(RAL – 7032)

- **BUSBARS**

The busbars shall be air insulated and made of high conductivity, high strength aluminium alloy complying with the requirement of grade E-91E of IS – 5082 or electrolytic grade copper as specified in BOQ.

The busbars shall be suitably braced with non combustible, track resistant, non-hygroscopic and high strength type SMC / DMC supports to provide a through fault withstand capacity of 50KA RMS symmetrical for one second and peak short circuit withstand capacity of 105 KA. The neutral as well as the earth bar should be capable of withstanding the above level. Ridges shall be provided on the SMC supports to prevent tracking between adjacent busbars. Large clearances and creepage distances shall be provided on the busbar system to minimize possibilities of fault.

The Main L.T. Panel shall be designed that the cables are not directly terminated on the terminals of breaker / switch fuse / fuse switch etc. but on cable termination links. The main busbars shall have continuous current rating throughout the length of L.T. Panel. The cross section of neutral busbars shall be same as that of phase busbar for busbars of capacity upto 200 Amp; for higher capacity the neutral busbar shall not be less that half (50%) the cross section of that the phase busbars. The busbar system shall consists of main horizontal busbar and auxiliary vertical busbars run in busbar alley / chamber on either side in which the circuit could be arranged / connected with front access. Aluminium busbar joints should be thoroughly cleaned at joint locations and a suitable contact grease should be applied just before making joint.

Connections from the main busbars to functional circuit shall be arranged and supported to withstand without any damage or deformation the thermal and dynamic stresses due to short circuit currents. Busbars to be colour coded as per IS : 375 and insulated with heat shrinkable PVC sleeves.

4.5.1 **WIRING**

For power and control wiring PVC insulated flexible copper wire as per IS : specifications should be used. Crimping type silver plated copper thimbles should be used for proper contact and termination. Control wiring should be done with 1.5 sq. mm., CT wiring with 2.5 sq. mm., and power wiring with suitable size of flexible colour coded wire. Wire bunches should be placed neatly and accurately with the help of nylon self locking type ties.

4.5.2 **EARTHING**

Vendor should provide galvanised steel earth bus at the bottom of each panel which should run throughout the length of the board. The same should be bolted to the framework of each panel and breaker earthing contact point, from horizontal busbar, a vertical earth bus should be provided in each vertical section. The cross section area of the earth bus should be suitable to bear short circuit current. The horizontal earth bus should be extended at both side of the panel.

All the non current carrying metallic parts should be effectively bonded to earth bus and conductivity of the whole switchgear enclosure, framework, doors, and trolley should be maintained even after painting. All metallic cases of relays, instruments, and other panel mounted equipments should be connected to earth bus by green colour flexible copper wire of size not less than 2.5 sq. mm. The earthing of CTs should be through shorting link type terminal blocks.

• MOULDED CASE CIRCUIT BREAKERS

4.7.1 **GENERAL**

Moulded Case Circuit Breaker shall be incorporated in the Main L.T. Panel wherever specified. MCCBs shall conform to IS : 13947 (Part – II) IEC – 947 (2) in all respects. MCCBs shall be suitable either for single phase AC 230 volts or there phase 415 volts.

• FRAME SIZES

The MCCB's shall be of the standard frame of the manufacturer sizes subject to meeting the fault level as specified else where.

- **CONSTRUCTIONS**

The MCCB's cover and case shall be made of high strength heat treatment and flame retardant thermo-setting insulating material. Operating handle shall be quick make / quick break, trip-free type. The operating handle shall have suitable "ON", "OFF" and "tripped" indicators. Three phase MCCB's shall have common operating handle for simultaneous operation and tripping of all the three phases. MCCB shall be provided with rotary handle outside the compartment door. Rotary mechanism should be with door interlock (with defeat feature) and padlock facility. MCCB shall be load / line reversible type. MCCB shall be site adjustable type with overload setting of 80% to 100% MCCB should have inbuilt mechanical anti reclosing feature. MCCBs shall have shrouded terminals. It must give the shrouding after termination with spreader terminals.

Suitable extinguishing device shall be provided for each contact. Tripping unit shall be of thermal magnetic or static release type provided in each pole and connected by a common trip bar such that tripping of any pole operates all three poles to open simultaneously. MCCB shall be current limiting type. All protection releases should be shrouded to avoid unauthorized tampering. MCCBs shall be CE marked.

Contacts trips shall be made of suitable air resistant, silver alloy for long electrical life. Terminals shall be of liberal design with adequate clearance.

- **RUPTURING CAPACITY**

The moulded Case Circuit Breaker shall have a minimum service breaking capacity (Ics) of not less than 35KA RMS or as specified in relevant SLD at 415 volts for Main L.T. Panels. MCCB provided in Feeder Pillars shall have a minimum service breaking capacity (Ics) of not less than 25 KA RMS at 415 volts.

SPECIFICATIONS

Sl. No.	Function	Value
1.	No. of poles	As mentioned in BOQ
2.	Rated Current	As mentioned in BOQ
3.	Over current protection setting	80% - 100%
4.	Rated Insulation Voltage Ui	>650 Volt
5.	Ultimate breaking Capacity	25KA / 50KA as shown in SLD
6.	Service breaking capacity	100%
7.	Utilisation Category	A

- **TESTING**

•

opy of Original type test certificate of the MCCB as per relevant Indian Standards (IS) shall be furnished.

- re-commissioning tests on the Main L.T. Panels incorporating the MCCB shall be done as per standard.

- **MEASURING INSTRUMENTS, METERING & PROTECTION**

- **GENERAL**

Direct reading electrical instruments shall be in conformity with IS : 1248. The accuracy of direct reading shall be 1.0 for voltmeter and 1.5 for ammeters. Other type of instruments shall have accuracy of 1.5. The errors due to variations in temperature shall be limited to a minimum. The meter shall be suitable for continuous operation between 10º C. to ± 50º C. All meters shall be f flush mounting type of 96 mm. sq. The meter shall be enclosed in dust tight housing. The housing shall be of steel or phenolic mould. The design and manufacture of the meters shall ensure the prevention of fogging of instruments glass. Instruments meters shall be sealed in such a way that access to the measuring element and to the accessories within the case shall not be possible without removal of the seal. The meters shall be provided with white dials and black scale markings.

The pointer shall be black in colour and shall have zero position adjustment device which could be operated from outside. The direction of defection shall be from left to right.

Suitable selector switches shall be provided for all ammeters and voltmeters intended to be used on three phase supply.

The specifications herein after laid down shall also cover all the meters, instrument and protective devices required for the electrical work. The ratings type and quantity of meters, instruments and protective devices shall be as per the schedule of quantities.

- **AMMETERS**

Ammeters shall be moving iron or moving coil type. The moving part assembly shall be with jewel bearing. The jewel bearing shall be mounted on a spring to prevent damage to pivot due to vibrations and shocks, the ammeters shall be manufactured and calibrated as per the latest edition of IS : 1248. Ammeters shall be instrument transformer operated, and shall be suitable for 5A secondary of instrument transformer. The scales shall be calibrated to indicate primary current, unless otherwise specified. The ammeters shall be capable of carrying sustained overloads during fault conditions without damage or loss of accuracy.

- **VOLTMETERS**

Voltmeter shall be of moving iron or moving coil type. The range for 415 volts, 3 phase voltmeters shall be 0 to 500 volts. Suitable selector switch shall be provided for each voltmeter to read voltage between any two lines of the system. The voltmeter shall be provided with protection fuse of suitable capacity.

- **CURRENT TRANSFORMERS**

Current transformers shall be cast resin in conformity with IS : 2705 (Part – I , II & III) in all respects. All current transformers used for low voltage applications shall be rated for 1kv. Current transformers shall have rated primary current, rated burden and class of accuracy as required. However, the rated secondary current shall be 5A unless otherwise specified. The acceptable minimum class of various applications shall be as given below:

Measuring : Class 1

Protection : Class 5P 10 or As Specified in SLD / BOQ

Current transformers shall be capable of withstanding without damage, magnetic and thermal stresses due to short circuit fault of 50KA on medium voltage system. Terminals of the current transformers shall be marked permanently for easy identification of poles. Separate CT shall be provided for measuring instruments and protection relays. Each CT shall be provided with rating plate.

Current transformers shall be mounted such that they are easily accessible for inspection, maintenance and replacement. The wiring for CT's shall be copper conductor, PVC insulated wires with proper termination lugs and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner.

- **MISCELLANEOUS**

Control switches shall be of the heavy duty rotary type with escutcheon plates clearly marked to show the operating position. They shall be semi-flush mounting with only the front plate and operating handle projecting. Indicating lamps shall be of the LED type shall be easily replaced from the front.

Push buttons shall be of the momentary contact, push to actuate type fitted with self reset contacts & provided with integral escutcheon plates marked with its functions.

- **CABLE TERMINATIONS**

Cable termination compartment and arrangement for power cables shall be suitable for stranded aluminium conductors, armoured, PVC insulated and sheathed. 1100 V grade cables. The temperature rise over ambient of 45º C. at busbars / terminals for external cable connections shall be limited to 20º C. For power wiring colour coded wires shall be preferred.

All necessary cable terminating accessories such as Gland plates, supporting clamps and brackets, power cable lugs, glands, hardware, cable termination kits etc. shall be provided by the contractor.

The gland plate shall be removable type and shall cover the entire cable alley. Bidder shall ensure that sufficient space is provided for all cable glands. Gland plates for power cables only shall be factory drilled according to the cable gland sizes and number. For all single core cable, gland plates shall be of non-magnetic material.

Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable gland and terminals such that cables can be easily and safely terminated.

Barriers or shrouds shall be provided to permit safe working at the terminals of one circuit without accidentally touching that of another live circuit.

Cable risers shall be adequately supported to withstand the effects of rated short circuit currents without damage and without causing secondary faults.

- **LABELS**

Labels shall be anodized aluminium with white engraving on black background shall be provided for each incoming and outgoing feeder of L.T Panels.

- **TEST AT MANUFACTURERS WORK**

All routine tests specified in IS : 8623-1977 shall be carried out and test certificates produced to the Department.

- **TEST AND COMMISSIONING**

Commissioning checks and tests shall be included all wiring checks and checking up of connections, Primary / Secondary injection test for the relays adjustment / setting shall be done before commissioning in addition to routine meggar test. Checks and tests shall include the following :

- peration checks and lubrication of all moving parts.
- nterlocking function check.
- **nsulation test :** When measured with 500V meggar, the insulation resistance between phases and with respect to earth shall not be less than 100 mega ohms.
- rip tests & protection gear test.
- atio, polarity and magnetizing characteristics of Current transformers.
- atio, polarity test of Voltage transformers.
- esting of protection relays as per manufacturer’s catalogue.
-

esting of metering instruments by secondary injection.

-

ny other test mentioned elsewhere in this document.

All tools, tackles, instruments and equipments, labour and testing engineer required for conducting the test is to be arrange by contractor at no extra cost.

7. EARTHING

7.1.1 GENERAL

All the non –current metal parts of external / internal electrical installation shall be earthed properly. Transformer, H.T switchgear, Main L.T. Panel, Feeder Pillar and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. Earthing work shall conform to CPWD General Specifications for Electrical Works (Part I – Internal) – 1994 and Indian Standard specification IS : 3043 – 1987 and relevant Indian Electricity Rules 1956 amended upto date and in the regulations of the local Electricity Supply Authority.

7.1.2 BODY EARTHING OF EQUIPMENT / OTHER PANELS, LIGHT POLE ETC.

All non-current carrying metal parts of the Electrical equipment shall be connected to earth system at two points, each of 100% rating. Metallic supports, fencing etc. shall also be connected to earth system. Body earthing of Substation equipment like Transformer, H.T Panels, Main L.T Panels, Sub Main Units, and Capacitor Panels etc. shall be through a common grid formed in the substation building. A main earth ring shall be formed round the station interconnecting all electrodes. Each equipment shall be connected with two independent earth conductors. Earthing Grid shall be directly connected by minimum two independent earth electrodes. Earthing electrode shall be 600 x 600 x 6 mm thick GI plate or of. Earth conductor laid in ground shall be protected for mechanical injury & corrosion by providing GI pipe. Earthing grid shall be of 50 mm x 6 mm & connection to individual equipment shall be with 50mm X 6mm or 25mm x 6mm or as stated / shown in drawing. Earth bar shall be of 50mm x 6mm GI strip.

7.1.3 NEUTRAL EARTHING OF EQUIPMENT

Neutral terminals of Transformers and Diesel Generating set shall be earthed independently. Each neutral terminal shall be earthed with two independent earth electrodes. Earth electrode shall be 600 x 600 x 3mm thick copper plate.

7.1.4 PLATE EARTH ELECTRODE

Earthing shall be provided with copper / G.I plate electrode as mentioned in BOQ of following :

i. Copper Plate Electrode : 600mm x 600mm x 3mm thick

ii G.I. plate Electrode : 600mm x 600mm x 6mm thick

The electrode shall be buried in ground with its faces vertical and not less than 3 meters below ground level. 25mm dia. medium class GI pipe shall be provided and attached to the electrode. A funnel with mesh shall be provided on the top of this pipe for watering and earth electrode. The watering funnel attachment shall be housed in masonary enclosure of not less than 300 x 300 x 300mm deep. A cast iron MS frame with cover having locking arrangement shall be provided at top of chamber. Earth electrode may not affect the column footing or foundation of the building. In such cases electrode may be further away from the building.

7.1.5 ARTIFICIAL TREATMENT OF SOIL

If the earth resistance is too high and the multiple electrode earthing does not give low resistance to earth, then the soil resistivity immediately surrounding the earth electrodes shall be reduced by addition of sodium chloride, calcium chloride, sodium carbonates copper sulphate, salt and soft coke or charcoal in suitable proportions.

7.1.6 RESISTANCE TO EARTH

The overall resistance of earthing system shall be not exceed one ohm.

EARTHING OF L.T. SYSTEM

7.2.1 General

All the non-current metal parts of electrical installation shall be earthed properly. All metal Pole, Cable loop-in boxes, Road / Street Lighting Feeder Pillars, Cables and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient conductors to an efficient earthing system. Earthing work shall conform to CPWD General Specifications for Electrical Works (Part – I – Internal) – 1994 and Indian Standard Specification IS: 3043-1987 and relevant Indian Electricity Rules 1956 amended upto date and in the regulations of local Electricity Supply Authority.

7.2.2 Earth Conductor

Pole, Cable loop in box and all other part made of metal shall be bonded together with 8 SWG GI wire. Every fifth pole shall be earthed with pipe earth electrode. Earth continuity conductor shall be terminated at earth bolt provided on each pole with suitable cable lug. GI pipe shall be provided for mechanical protection of GI wire four pole to earth pit.

7.2.3 Pipe Earth Electrode

GI pipe shall be medium class 50mm dia and 3.0 metre in length. Galvanizing of the pipe shall conform to relevant Indian Standards, GI pipe electrode shall be cut tapered at bottom and provided with holes of 12mm dia drilled not less than 7.5 cm from each other upto 2 metre of length from bottom. The electrode shall be buried in the ground vertical with its top not less than 20cm below ground level as per detail enclosed. Earth electrode shall not be situated less than 2

metres from the building. The location of the earth electrode will be such that the soil has reasonable chance of remaining moist as far as possible. Masonry chamber of size 300x300x300 mm shall be provided with water funnel arrangement. A cast iron or MS frame & cover having locking arrangement at the top has to be arranged.

7.2.4 **Artificial Treatment of Soil**

If the earth resistance is to high and the multiple electrode earthing does not give adequate low resistance to earth, then the soil resistivity immediately surrounding the earth electrode shall be reduced by addition of sodium chloride, calcium chloride, sodium carbonates copper sulphate, salt and soft coke or charcoal in suitable proportions.

7.2.5 **Resistance to Earth**

The overall resistance of earthing system shall not exceed one ohm.

MAKE OF MATERIALS: P-1

ITEM	APPROVED MAKE
i)Panel fabrication	Any reputed panel builder
Ia) Contactors	L&T/SCHNEIDER/SIEMENS/ABB/GE/CS
1c) MCCB	L&T/SCHNEIDER/SIEMENS/ABB/GE/CS
1d) HRC FUSES	L&T/GE/SIEMENS/C&S/COOPER BUSMAN
iv)TPN/SPN/DP SFU with HRC fuse/Isolators	L&T/SIEMENS/SCHNEIDER/HAVELLS/HPL/ GE
v)Rewireable type IC switch fuse unit	HAVELLS/HPL/L&T/GE/STANDARD
vi)Heavy duty ON load change over switch	HAVELLS/HPL/L&T/ABB/GE/CS
vii)MCB & MCB DB	LEGRAND/L&T/SIEMENS/GE/ABB/HAGER
viii)ELCB/RCCB/RCBO	LEGRAND/L&T/SIEMENS/GE/ABB/HAGER
ix)1.1KV grade armoured PVC/XLPE cable	POLYCAB/NICCO/HAVELLS/FGI/CCI/KEI
x)PVC insulated flexible/stranded copper conductor (FRLS) for wiring	FINOLEX/POLYCAB/HAVELLSRR KABLE/KEI
xi)Non rigid PVC conduit	DALDA/VULCAN
xii)Rigid PVC conduit	PRECISION/KALINGA/AKG/BEC/PRESSIFT
xiv)Decorative electrical switch board cover with top lamination for concealed wiring	HYLAM BRAND
xv)6 amp/16 amp piano type modular switch/socket, call bell,regulator,dimmer etc.	LEGRAND/CRABTREE/MK/CLIPSAL/ROMA/NORTH WEST(WIPRO)/ABB
xvi) AC socket and starter	ELECTRON/CRAB TREE/NORTH WEST
xvii)Buzzer with indicator	ROMA/ANCHOR/BAJAJ/ANY REPUTED MAKE

xviii) Indicating instruments/meters	AUTOMATIC ELECTRIC/IMP/L&T/HPL/GE
xix) Rotary type selector switch	KAYCEE/L&T/SIEMENS/SALZER/C &S
xxi)Light fittings	PHILIPS/WIPRO/GE/BAJAJ/ARTLIGHT/REPUTED BRAND
xxii)Exhaust Fan	CALCUTTA/POLAR/KHAITAN/USHA/EPC
xxiii)Ceiling fan	CGL/ORIENT/POLAR/KHAITAN/USHA
xxiv) Wall bracket fan	CGL/ORIENT/POLAR/KHAITAN/USHA
xxvb) AC	HITACHI/ SAMSUNG/ BLUE STAR/VOLTAS/CARRIER/GENERAL
xxvc)Road Lighting fittings	PHILIPS/WIPRO/GE/BAJAJ/HAVELLS

P-2

ITEM	**APPROVED MAKE**
xxvii)CT/PT	KAPPA/GUPTA ENGG./PRECISION
xxviii) Electronic digital meter	CONZERVE/SECURE/AE/ABB
xxviii a) Ammeter/Volt meter	AE/IMP/MECO
xxix)LT jointing kit	RAYCHEM/REPL
xxx) Cable gland	DOWELLS/COMET/JAINSONS/COSMOS/REPUTED MAKE
xxxii) BI metallic cable lugs/sockets	DOWELLS/3 D/JAINSON/COMET/COSMOS/EQ.
xxxiii)Industrial Socket	MDS/BCH/C&S/LEGRAND/L&T/REPUTED MAKE
xxxvi)Battery charger	CALDYNE/CHHABBI ELECTRICALS/ANY REPUTED MAKE
xxxvii)SMF battery	EXIDE/AMRA RAJA/ANY REPUTED MAKE
xxxvii b)Terminal block	ELMEX/CONNECTWELL/WAGO
xxxviii)FR PVC Conduit and accessories	PRECISION/AKG/POLYCAB/KINJAL
xxx)PVC flexible FRLS copper wire and Tel. cable	POLYCAB/FINOLEX/HAVELLS/RR/KEI
xxxi)Pipe earth electrode	GALVANISED TATA/JINDAL/BANSAL PIPE.

SYNOPSIS OF THE TENDER

TYPE OF WORK	**:**	**CONSTRUCTION OF PARTLY TWO STORIED AND PARTLY SINGLE STORIED BUILDING AND OTHER ALLIED WORKS**
TIME OF COMPLETION	**:**	**4 MONTHS FROM FROM RECEIVING THE LETTER OF INTENT OR WORK ORDER WHICH EVER IS EARLIER.**
LIQUIDATED DAMAGE	**:**	**NOT LESS THAN Rs10,000/-PER WEEK TO A MAXM OF 5 % OF CONTRACT VALUE**
TO BE SUPPLIED BY CONTRACTOR		**ALL MATERIALS , LABOURS, TOOLS AND PLANTS,SHUTTERING SCAFFOLDING,AND OTHER CONSUMABLES OTHER THAN ABOVE.**
WATER AND ELECTRICITY :		**PLEASE REFER SPECIAL CONDITIONS OF CONTRACT.**
TOOLS AND PLANTS	**:**	**ALL TOOLS AND PLANTS REQUIRED FOR / CONCRETING / EXCAVATION / DISMANTLING /FLOORING /PUMPS /LIGHTS / AND ANY TOOLS AND PLANTS LIKELY TO BE USED FOR THE SAID ACTIVITY HAS TO BE SUPPLIED BY THE CONTRACTOR**
RATES	**:**	**SHOULD BE INCLUSIVE OF ALL APPLICABLE TAXES. GST TO BE INDICATED SEPERATELY**
MEASUREMENT	**:**	**AS PER ACTUAL WORK EXECUTED .**
SETTING OUT	**:**	**IN THE SCOPE OF THE CONTRACTOR .**
EARNEST MONEY	**:**	**Rs 30,000/- (ADJUSTABLE WITH SECURITY DEPOSIT FOR SUCCESSFUL TENDERER)**
RETENTION MONEY	**;**	**10 % OF EACH RA BILL . 50 % CAN BE RELEASED AFTER VIRTUAL COMPLETION AGAINST BANK GURANTEE AND REMAINING AGAINST DEFECT LIABILITY PERIOD OF 12 MONTHS FROM COMPLETION .**
MATERIAL TESTI NG	**:**	**DESIGN MIX REPORT TO BE OBTAINED FROM ANY REPUTED COLLEGE OR TEST HOUSE AT THE COST OF THE CONTRACTOR. THE ACTIVITY NEEDS TO BE CARRIED ON BY CONTRACTOR AND APPROVED BY THE CONSULTANT IF REQUIRED**
MANDATORY QUALITY TEST	**;**	**CUBE TESTING , SLUMP TEST TO BE DONE AT SITE . OTHER TEST AS REUIRED AT NO EXTRA COST OF CLIENT .**
MATERIAL HANDLING :		**CONTRACTOR NEEDS TO UNLOAD CEMENT AND STEEL AT SITE AND STORE THE MATERIAL PROPER MANNER AND KEEP THE SAME UNDER THEIR SAFE CUSTODY . SECURITY PERSONEL SHOULD BE DEPUTED AT CONTRACTOR'S SCOPE. THE OWNER SHALL NOT BE HELD RESPONSIBLE FOR ANY LOSS OR DAMAGE TO THE MATERIAL ONCE DELIVERED TO SITE**

LABOUR CAMP / TOILET /SITE OFFICE / CEMENT GODOWN : **SPACE WILL BE PROVIDED BY CLIENT BUT THE TEMPORARY STRUCTURES HAS TO BE CONSTRUCTED BY THE CONTRACTOR.**

CLEARING OF SITE : **TO BE TRANSPORTED AND CLEARED OF SITE BY THE CONTRACTOR AT NO EXTRA COST OF THE CLIENT TO SPECIFIED LOCATION WITHIN A DISTANCE OF 3 KM FROM THE SITE .**

DISCIPLINE AT SITE : **THE CONTRACTOR HAS TO ENSURE THAT THE LABOURS WORKING UNDER HIM SHALL ABIDE BY THE RULES AND REGULATIONS OF "DRCSC" AND IN NO WAY SHALL BE ALLOWED TO VIOLATE THE SAME .**

MOBILISATION ADVANCE : **MOBILISATION ADVANCE WILL BE GIVEN TO A MAXIMUM OF 10% OF THE CONTRACT VALUE ON SUBMISSION OF BANK GUARANTEE ON REQUEST BY THE CONTRACTOR WHICH SHALL BE ADVANCE SO PAID SHALL BE RECOVERED @ 10 % FROM EACH RA BILLS, AND SHALL BE RECOVERED FULLY WHEN 75% OF THE CONTRACT VALUE IS ACHIEVED.**

BOQ

Detail Documents

ABSTRACT SHEET

SL	ITEM NAME	AMOUNT	
A	MAIN BUILDING		
1	CIVIL AND ARCHITECTURAL WORKS		
1.1.1	EARTH WORK & SITE DEVELOPMENT	-	
1.1.2	PLAIN AND REINFORCED CEMENT CONCRETE WORK	-	
1.1.3	MASONRY WORKS AND PLASTERING	-	
1.1.4	WATER PROOFING WORKS	-	
1.1.5	FLOORING, TILING, DADO	-	
1.1.6	FINISHING WORKS	-	
1.1.7	JOINERY ,ALUMINIUM, METAL WORKS FOR DOOR & WINDOWS	-	
1.1.8	STRUCTURAL STEEL WORK	-	
1.1.9	MISCELLANEOUS	-	
	SUB TOTAL		-
B.	BUILDING SERVICES (PLUMBING)		
2	INTERNAL AND EXTERNAL WATER SUPPLY AND SEWERAGE	-	
	SUB TOTAL		-
C	BUILDING SERVICES(ELECTRICAL)		
3	INTERNAL AND EXTERNAL ELECTRIIFICATION	-	
	SUB TOTAL		-
D	INFRASTRUCTURE WORKS		
4	(BOUNDARY WALLL/SEPTIC TANK/EXTERNAL DEVELOPMENT)		
4.1	BOUNDARY WALL	-	
4.2	SEPTIC TANK	-	
4.3	EXTERNAL DEVELOPMENT	-	
	SUB TOTAL		-
SUB TOTAL		-	-
	ADD : GST %	-	-
	TOTAL	-	-

B.O.Q.

1	**PROJECT NAME - DRCSC , BANKURA ,CHHATNA**				
A	**TITLE :-** BUILDING WORKS				
	SUB TITLE :- TWO STORIED BUILDING				
1	**CIVIL AND ARCHITECTURAL WORKS**				
Sl. No	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE**	**AMOUNT**
1.1.1	**EARTH WORK & SITE DEVELOPMENT**				
1	Earth work in excavation including backfilling over areas, stacking the excavated material at site as directed including all leads and lifts incldentals including shoring strutting, dressing of excavated surface etc complete. Excavation shall be payable for vertical cut up to the outer edge of lean concrete only, for depths indicated in the drawings.Cost of extra excavation required for supporting side shuttering of foundations and retaining walls and that required for making side slopes for stability of excavation shall be deemed to be included in the rate quoted.(Solid Measurements Only). All kind of soils for all leads, upto any depth				-
a)	UP TO 1.50M	Cum	181.55		-
b)	AFTER 1.50M	Cum	0.00		-
2	Filling with selected earth brought form outside the site including transportation for all leads, and up to any height, cost of soil, royalty, loading unloading, carriage to dumping spot and all incidentals complete (Net consolidated area fill volume will be computed from the initial and final levels. Volumes in Slope, embankments etc. will be computed applying suitable formula.)	Cum	55.00		-
3	Filling with selected available earth from inside including transportation all leads and up to any height of soil loading unloading carriage to dumping spot and all incidentals complete (Net consolidated area fill volume will be computed form the initial and final levels. Volumes in Slope, embankments etc. will be computed applying suitable formula.)	Cum	27.50		-
4	Supplying & diluting chloropyrophous Emulsifiable concentrate of 20% concentration confirming to IS ; 6439 -1978 to form water emulsion of 0.5 % concentration for preconstructional anti termite treatment by uniformly spraying and injecting the diluted water Emulsion in specified quantities under and all around the column pits,water trenches, top surface of plinth filling, junctions of walls and floor, along the external perimeter of the building expansion joints, over the top surface of the excavated earth on which apron is to be laid,surroundings of pipes and conduits etc. to create a continuous chemical barriercomplete as per standard CPWD specifications.	Sq.m	248.85		-
5	Providing and laying Brick Flat Soling Below Foundations, floor and filling up the gaps with sand after proper compaction of the earth and making the surface good as directed by The Engineer In charge.	Sq.m	351.86		-
				TOTAL =	**-**

1.1.2	**PLAIN AND REINFORCED CEMENT CONCRETE WORK**				
1	Providing and laying plain cement concrete of specified grade as bed concrete under foundation column footing and other locations as called for etc. laid, consolidated and cured etc. complete and including side forms as required as per specification and drawing including the cost of centering and shuttering.				
a)	1:4: 8 (1 cement :4 coarse sand : 8 graded stone agg. 20 mm nominal size)	Cum	0.00		-
b)	1:5:10 (1 cement : 5 coarse sand: 10 graded stone agg . 20 mm nominal size)	Cum	0.00		-
c)	1:2:4 (1 cement : 2coarse sand : 4 graded stone aggregate 20 mm nominal size(FOR FLOORING)with underlying 200 gsm LDP sheet	Cum	18.66		-
d)	1: 3 : 6 (1cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) with underlying 200 gsm LDP sheet	Cum	17.23		-
2	Providing and laying damp proof course 50 mm thick with cement concrete 1:2:4 (1cement : 2 coarse sand : 4 graded stone aggreate 20 mm nominal size) including mixing of water proofing compound as directed by the Architect.	Sq.m	13.73		-
3	Providing, laying & casting cast - in - place structural controlled cement concrete grade M20 using 20 mm down coarse aggregates excluding cost of centering, shuttering and steel reinforcement but including cost of making shear keys and provision of construction / contraction / control joints in various locations, laid consolidated and cured. Item to include all structural items like base raft, ramp, column, wall, footings, equipment foundations, fins, mullions, beams, lintels, pergola, chajja, facia, parapet railing, slab trenches,etc also include the concrete requiring waterproofing like water tanks, retaining walll base raft etc.	.			
a)	Footing / Liftpit / grade slab ,grade beams / wall foundations Pile cap Basement slab etc	Cum	38.64		-
4	M20 Grade for Columns, Walls and other vertical surfaces for all levels including all scaffolding, hoisting etc all complete as per direction of the Engineer In charge / Architect	Cum	19.85		-

5	M20 Grade of Concrete for Beams, Slabs, Chajjas ,lintels,bands for all levels fins etc and other horizontal surfaces including all scaffolding, hoisting etc all complete as per direction of the Engineer In charge / Architect	Cum	89.25		-
6	Providing and laying of approved Marine plywood or 3 mm thick steeel plate shuttering and centring for structural concrete work (plain and reinforced) in locations called for including strutting, propping, bracing, bolting, wedging, casing, striking, removal etc. complete. Props shall consist of well designed steel pipes adequately braced using X and K bracings (wooden ballies as props shall not be permitted).The item to include centering and shuttering at all heights and levels. Allow for forming grooves drips throats, chamfers, cut outs, openings etc, where called for and for dressing with approved shuttering oil to precent adhesion, unexposed concrete surfaces subsequently left untreated (in the condition obtained on removal of form work) It shall not constitute exposed concrete work and shall be measured under this item only. For Walls, columns, Plinth Beam, Tie Beams, Grade Beams, Footings, Slabs and beams stair case landings balconies, pergola, circular column and other RCC Structures as applicable all complete.				
(i)	**Footing**	Sqm	70.95		-
(ii)	**Columns /Walls and all verical surface for all levels**	Sq.m	279.99		-
(iii)	**Beams and suspended Slabs and horizontal surface at all levels**	Sq.m	852.32		-
7	Laying of Thermomechanically Treated reinforcement (TMT) in all reinforced concrete work, including cutting, removal of loose rust by wire brush and coating with cement slurry, bending, laying in position to the shape and profile required at all levels and heights as per drawing and design and / or as directed, binding with 18 guage annealed steel wire and cost of binding wire etc complete or welding wherever necessary as directed by the Engineer in chage	MT	16.08		-
				TOTAL	**-**

1.1.3	**MASONRY WORKS AND PLASTERING**				
1	Brick work of thickness 200 mm and above using selected quality burnt clay bricks (Crushing strength not less than 75kg/sqcm) in super structure and substructure at all levels in cement mortar 1:5 (1 cement : 5 coarse sand) mix, joints finished flush raked to 6 mm depth including jointing with concrete where required and as per specification and drawing or as directed by the Engineer -in-Charge with all scaffolding for all levels as mentioned below.	Cum	70.04		-
2	Half brick masonry using selected quality burnt clay bricks (Crushing strength not less than 75kg/sqcm) in super structure laid in cement mortar 1:4 (1 cement : 4 coarse sand) mix, joints finished, flushed raked to 6 mm depth including HB Netting at every third course for all levels as directed by the Engineer -In- Charge including, curing, with all scaffolding and as per specification and drawing all complete as directed by the Engineer-In-Charge for all levels	Sqm	417.57		-
3	10-12 mm thick plaster to masonry & RCC walls columns ,masonary etc. in cement mortar 1: 4 (1Cement : 4 fine and coarse sand in equal proportion) applied, finished smooth and cured including comer / edge beads of approved material etc, complete.	Sq.m	998.41		-
4	8-10 mm thick plaster to soffits of the beam, slab, and other Rcc surfaces etc. in cement mortar 1: 4 (1Cement : 4 fine and coarse sand in equal proportion) applied, finished smooth and cured including comer / edge beads of approved material etc, complete.	Sq.m	364.08		-
5	12-15 mm thick plaster to masonry & RCC walls columns ,masonary etc. in cement mortar 1: 4 (1Cement : 4 fine and coarse sand in equal proportion) applied, finished smooth and cured including comer / edge beads of approved material etc, complete.	Sqm	600.42		-
6	Extra over for Neat Finish (N.B.: Cement shall be provide by the Client)	Sq.m	27.55		-
				TOTAL	**-**
1.1.4	**WATER PROOFING WORKS**				
d)	Providing and laying 40- 25 mm average thick screed concrete in the ratio 1 : 2 : 4 cement : sand :aggregate over treated surface as a mechanical protection and providing slope for runoff .	Sqm	206.85		-
				TOTAL	**-**
1.1.5	**FLOORING, TILING, DADO**				
1	Indian Patent Stone (IPS) flooring of grade (1:2:4) using river sand 40 mm thick average finished to smooth surface including mixing with red oxide and marking lines/ squares and adding plasticisers approved by the Site In-charge etc. complete as directed.	Sqm	505.38		-
					-
2	Providing & laying in floors and skirting matt finish ceramic tiles of 8mm thickness of size 300 x 300 , 450x450 without warpage, of approved make and colour laid on 30 mm thick cement mortar 1:4 (1 cement : 4 coarse sand) including grouting the joints with white cement and matching pigment etc. complete. (Make Kajaria, Johnson Or Equivalent)	Sqm	80.06		-

3	Providing and fixing Black Stone counter for kitchen Pantry slab over a base coat of 20 mm cement mortar in 1:4 in proper line and slope all complete .	Sqm	3.15		-
4	Coloured glazed tiles 8 mm thick of size 200 x 300 mm and dado on 10 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) and jointed with white cement slurry.	Sqm	96.26		-
				TOTAL	**-**
1.1.6	**FINISHING WORKS**				
1	Putty punning to walls, ceiling, beams, door, windows jambs etc. all complete including preparation of base with all labour & materials in all floors.	Sq.m	38.86		-
2	Applying two coatsdistemper of approved quality on wall, columns, beams, ceiling etc. including preparation of surface as per direction and sand papering Rate should also required to achieve the desired finish. Work should be executed as per engineer in charge.	Sq.m	QRO		-
3	White/ lime washing including cleaning and smoothening surface thoroughly. (TWO COAT)	Sq.m	808.70		-
4	Applying two coats Synthetic Enamel Paint of approved quality on wall, columns, beams, ceiling etc. including preparation of surface as per direction and sand papering Rate should also required to achieve the desired finish. Work should be executed as per engineer in charge.	sqm	37.01		-
5	Providing & applying external grade cement paint painting with cement base paint (Make snowcem or equivalent) of approved shade & manufacture, two or more coats to give and even shade to the exterior surface cleaning and smoothing the surface with sand paper etc. complete at all levels as directed including scaffolding for all floors .	Sqm	600.42		-
				TOTAL	**-**
1.1.7	**JOINERY ,ALUMINIUM, METAL WORKS FOR DOOR & WINDOWS**				
1	Providing and fixing wood-work in frame of doors, windows, clerestory windows and other similar works including all frame works. First Class Malayasian Sal	Cum	0.75		-
					-
2	Providing and fixing of wooden 25 mm solid core flush doors with necessary fittings of approved manufacturers including painting as per design approved by the Architect / Engineer In charge	Sq.m	58.54		-
					-
3	Supplying, fitting & fixing approved quality Metal Door with ms hollow bar,square section, sheets, metal frame of approved manufacturer as per design approved by the Architect / Engineer In charge with all necessary fittings & Painting etc. Weight of door 25kg/sqm	SQ.M	6.62		-
4	Supplying, fitting and fixing windows and ventilators with or without integrated grills conforming to IS 1038-1975 and manufactured from rolled steel sections conforming to IS 7452-1974 with non friction projecting type, box type hinges, glazing clips, lugs locking bracket, handle plate etc, including hoisting in position, straightening if required, fixing lugs in cement concrete (1:2:4) with stone chips 20 mm down cutting holes and mending good damages to match with existing surface complete in all respect excluding glazing.				
a)	Openable steel windows with integrated grills & 5mm toughened glass (Weight of window with 4mm float glass - 20 kg/sqm) as per IS sizes with horizontal glazing bars.	Sqm	46.12		-
				TOTAL	**-**

1.1.8	**STRUCTURAL STEEL WORK**				
1	Providing and fixing 0.47 TCT colored coated sheets on purlins including fixing with self tapping screws with lapping minimum 100 mm and to make the surface water tight	SQM	130.63		-
2	Providing and fixing of M.S truss including erection made of RHS/SHS angles, pipes, channels etc. and fixing in position with mechanical devices as required including all welding, bolting and finishing with two coats of enamel paint over a coat of primer.	KG	1103.66		-
3	Metallic gutter around the roof . The cost includes all accessories required for complete installation of gutter such as supplying, fixing and others as per drawing and schedules.	RMT	38.85		-
4	Providing, fabricating and fixing in position accurately M.S. Inserts in RCC work before pouring of concrete including necessary templates, supports to be withdrawn later.				
	Structural inserts consisting of plates, rods, other structural sections.	KG	60.48		-
5	Providing, Supplying and fixing M.S. Grills, Fencing made of hollow M.S. square / Round sections,plates, angles etc and welded properly to columns with all accessories manufacture as per design with two coats of enamel over a coat of primer all complete as directed by the architect.	KGS	315.00		-
				TOTAL	-

1.1.9	**MISCELLANEOUS**				
1	Cutting holes in concrete required for services (if not provided earlier during casting) Thickness not exceeding 25cm including grouting the same in cement concrete M30 after positioning of service lines, bolts.				
a)	Holes upto and including 0.01 Sqm in Area.	No.	QRO	-	-
b)	holes exceeding 0.01m2 but not exceeding 0.05m2 in area	No.	QRO	-	-
					-
					-
2	Finishing the grooves of Electrical Conduits and making the surface good all complete as per direction of the Engineer In Charge / Architect	Rm	QRO	-	-
					-
				TOTAL	-
	TOTAL FOR ARCHITECTURAL AND STRUCTURAL WORKS =				**-**
B	**BUILDING SERVICES (PLUMBING)**				
2	**INTERNAL AND EXTERNAL WATER SUPPLY AND SEWERAGE**				
Sl. NO.	**DESCRIPTION**	**UNIT**	**QTY**	**UNIT RATE (Rs.)**	**TOTAL (Rs.)**
	WATER DISTRIBUTION AND SEWERAGE AND FIXTURES				
2.1.1	Supplying, fitting and fixing CPVC pipes of following sizes with all necessary approved CPVC, fittings such as bend, tee, elbow reducer, nipple, plug, long screw fitting, H.W. clamps etc. complete at all levels including below G.L. as directed and specified including concealing by chiseled or breaking brick wall/CC/ RCC and making good to the damages				
	a)25mm	Rmt	33.00		**-**
	b) 32mm	Rmt	18.00		**-**
	C) 50mm	Rmt	45.00		**-**
	D) 15mm	Rmt	10.00		**-**
	E) 40mm	Rmt	20.00		**-**
2.1.2	Supplying, fitting and fixing Supreme/Prince brand or other similar ISI brand PVC high pressure pipes of following sizes with all necessary approved PVC fittings such as bend, tee, elbow reducer, nipple, plug, long screw fitting, clamps etc. complete at all levels including below G.L. as directed and specified.				
a)	150mm Dia	Rm	25.00		**-**
					-
b)	100 mm Dia	Rm	10.00		**-**
					-
c)	75mm Dia (RAIN WATER & WASTE LINE)	Rm	50.00		**-**
					-
d)	50 mm Dia	Rm	15.00		**-**
					-

2.1.3	Providing, fitting and fixing white pedastal type WC (European type WC pan 400mm high) of Parryware/Hindware/Cere make with seat and lid, CP brass hinges and rubber buffers, 10 litre low level PVC flushing cistern of matching colour with all fittings and fixtures complete including cutting and making good the walls and floors.	Nos	5.00		-
					-
2.1.4	Same as above but for Indian WC with pedestal including flushing tank all complete	Nos	QRO		-
					-
2.4.1.1	Same as above but for Orissa Pan without flushing tank	Nos	QRO		-
2.1.5	Providing, fitting and fixing white china wash basin of size 630mm x 450mm of Parryware/ Hindware/Cera make with CI/MS brackets, 32mm CP brass waste coupling of standard pattern, etc. complete and making good the walls and slabs wherever required. (pipes will be measured separately)	Nos	5.00		-
					-
2.1.6	Kitchen Sink : Providing, fitting and fixing stainless steel AISI 304 (18/8) kitchen sink with drain board (610 x 535 x 230) of Nirali make as per IS : 13983 with CI brackets & 40mm stainless steel plug including painting of fittings & brackets, cutting & making good the walls and slabs wherever required.	Nos	1.00		-
					-
2.1.7	Supplying, fitting and fixing brass Stop cock (MEDIUM) of Santard make of approved size as mentioned below and as directed and specified (GI & CP pipes will be measured and paid separately)				-
	a) Jaquar/Sona of 15mm dia				-
					-
	i. Stop cock male/female end (long thread)	Nos	0.00		-
					-
	ii. Angular stop cock long thread	Nos	10.00		-
					-
	iii)Concealed stop cock extra heavy body with adjustable wall flange	Nos	10.00		-
					-
2.1.8	Supplying, fitting and fixing CP bib cock 15mm dia approved brand as directed and specified (GI & CP pipes will be measured and paid separately)				-
	i. Jaquor or Equivalent				-
					-
	a) Bib Cock short body	Nos	5.00		-
					-
2.1.8.1	Same as above but for pvc type bib cock	Nos	QRO		-
					-
2.1.9	Supplying, fitting and fixing CP pillar cock of 15mm dia of approved brand as directed and specified.				-
	a. Jaquar or Equivalent	Nos	5.00		-
					-
	Sink Cock :				-

2.1.10	Supplying, fitting and fixing chrome pated sink cock of approved brand as directed and specified (GI & CP pipes will be measured and paid separately)				-
	i) Jaquor or Equivalent				-
					-
2.1.11	Sink cock with 'U' shape swinging casted spout	Nos	1.00		-
					-
					-
2.1.12	Supplying, fitting and fixing Ordinary C.P. waste grating				-
A	75MM	Nos	0.00		-
B	100MM	Nos	2.00		-
					-
2.1.13	Supplying, fitting and fixing overhead adjustable chrome plated spray shower 15mm dia of Sona make with wall flange as directed and specified.				-
	a) Make Jaquar or Equivalent shower with arm	Nos	5.00		-
					-
2.1.14	Same as above but for ordibnary make with porcelian top	nos	4.00		-
					-
2.1.15	Supplying, fitting and fixing CP soap tray of reputed brand and make complete as directed and specified.	Nos	10.00		-
					-
2.1.16	Supply and fixing of C.S gate Valve, material specification of the body, body connector and gate is ASTM A 351 Gr. CF8M , stem made out of AISI 316 and seat material is PTFE. Rate shall include necessary jointing materials like threaded nipples Teflon tape etc., and complete.				-
	a) 40mm dia (Screwed ends)	Each	4.00		-
	b) 50mm dia (Screwed ends)	Each	1.00		-

2.1.17	Providing,fixing,testing and commissioning of lever operated bronze ball valve of approved make and provided with stainless steel ball (AISI 304) and spindle (AISI 410), glass filled Teflon seating and gland packing etc., complete. The valve shall be fixed after the union. The quoted rate shall include the cost of the union, nipples etc., complete.(At toilet entry in side the shaft)				-
	c) 40mm dia (Screwed ends)	Each	3.00		-
					-
2.1.18	Providing & construction of Valve chamber of size 450x450x750mm depth with 230mm thick TM brick in CM 1:6 , The chamber is constructed over 100mm thick PCC 1:4:8 internal and external plastering in CM 1:4, supply and fixing of Mediam duty CI frame & cover of size 600x600mm. The quoted rate shall include for necessary excavation in all sort of soil, back filling, consolidation and disposing surplus materials as directed within a site etc., complete.as per drawing	Each	3.00		-
2.1.19	Water pump				-
	Supply, erection, testing and commissioning of Transfer system comprising of 1 Stand by pump vertical , self priming,multistage type, fitted with standard motor impeller and other vital parts of the pump , high quality control panel comprising of change over dry run protection, DOL starter, suction and discharge manifolds, isolation valves,NRV, pressure gauges and pressure switches, inclusive of wiring from panel to pump etc., complete.This entire system should have Compatibility to integrate with BMS system.				-
	Capacity : 2 cum/Hr @ 60m head each	1Set	QRO		-
	Suction Side				-
	65mm dia strainer				-
	65mm dia- butterfly valve				-
	Delivery Side				-
	50 mm dia- ball valves				-
	50 mm dia-Non-return Valves				-
	C.I. Foot valve Ball type, Flanged end, nuts, bolts and gaskets etc.				-
					-
					-
2.1.20	Supply and installation of 2000 litters capacity SINTEX make water tank in the vicinity of the sump .	NOS	2.00		-
2.1.21	Providing & construction of inspection chamber for sewerage with 230mm best quality approved table moulded bricks in CM 1:4 over a bed of 100mm thick PCC 1:4:8 walls plastered inside smooth in CM 1:3 and outside in CM 1:6, necessary excavation in all sorts of soil, back filling, consolidation and disposing the surplus material within site or as directed, benching and channelling in PCC 1:2:4 as per drawing , WITH 75MM PRE CAST slab, medium duty . etc., complete (Depth of chamber not exceeding 0.9m).				-
a).	Size of chamber - 600x600mm	Each	6.00		-
					-
2.1.22	Supplying and laying of 150 dia GSW pipes properly jointed with cement mortar and jute including excavation upto required levels on a bed of 100 mm PCC with Pcc encasing of minimum 100 mm on all sides in proper slope and level and connection at pits and all complete as per direction of the Engineer In Charge (Rate to exclude the cost of excavation laying and jointing of pipes , PCC encasing and all works required to complete the activity)	RM	25.00		-
					-

	Grand Total Of internal & Extrenal plumbing in Rs.				-

Sl. NO.	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL (Rs.)
C	**BUILDING SERVICES(ELECTRICAL)**				
3	**INTERNAL AND EXTERNAL ELECTRIIFICATION**				
3.1	SECTION - 1				
	DISTRIBUTION BOARDS :				
	Supply, installation, testing and commissioning of distribution				
	boards in sheet steel enclosure internally wired having neutral and				
	earth busbar . It may be mounted on MS frame on wall or				
	recessed mounted including cutting wall and mending good all the				
	damages. Each DB comprises of the following:				
	A) L&PDB AT GROUND FLOOR	Nos.	1		-
	I/C : 40A FP MCCB(25 KA) -1 no				
	with 32A DP RCCB (30 mA)-3 nos. - in sub feeder				-
	O/G :				-
	16A SP MCB -12 nos				-
	25A SP MCB -12 nos				-
	and				-
	32A FP MCCB(25KA) -2 nos				-
	coupled with				-
	40A FP MCO-1 no and with the following:				-
	Incoming :				-
	32A FP MCCB(25KA) -1 no and in outgoing:				-
	25A FP MCCB(25KA) -3 nos				-
	32A DP RCCB (30 mA)-3 nos.				-
	25A SP MCB -12 nos				-
	32A FP MCB -2 nos				-
					-
	B) L&PDB AT FIRST FLOOR	Nos.	1		-
	I/C : 32A FP MCB -1 no				-
	with 25A DP RCCB (30mA)-3 nos. - in sub feeder				-
	O/G :				-
	16A SP MCB -9 nos				-
	25A SP MCB -9 nos				-
					-
					-
3.2	SECTION - 2				-
	INTERNAL WIRING FOR POWER / LIGHT POINTS				-
	All internal wiring **above/under false ceilling shall be done by Rigid PVC Conduit along the true ceilling / wall surface etc.**				-

	Wiring for lighting, fan, exhaust fan, power socket etc. shall have to be done by rigid PVC conduit whenever concealed, along the wall / RCC roof slab. Necessary PVC JB / Circular Box / Inspection bend shall be installed for the benifit of maintenance and operation.				-
	CIRCUIT MAINS AND SUB MAINS WIRING				-
	Circuit mains shall be drawn through Rigid PVC conduit from L&PDB to the SW. Board / JBs of the room or between Switch Boards/between power sockets by loop in , loop out method.				-
3.2.1	Supply, Laying & Fixing of following sizes of Rigid PVC Conduit along the surface of the true ceilling / wall including fixing of circular / sqare JB, Inspection JB / bends, clamp, socket, fish wires, etc.				-
	i) 20mm dia.	Mtr	140		-
	ii) 25mm dia.	Mtr	100		-
	iii) 32mm dia.	R.O			-
					-
3.2.2	Supply & Laying of following sizes of rigid PVC conduit in recessed manner with chase cutting, mending good of the surface / wall including fixing of circular / square JB, Inspection JB, clamp, socket, fish wires, etc. (For connection between switch board inside Room / dropping from ceilling to switch board on the wall)				-
	i) 20mm dia. PVC conduit	Mtr	250		-
	ii) 25mm dia. PVC conduit	Mtr	150		-
	iii) 32mm dia PVC conduit.	Mtr	50		-
					-
3.2.3	Supply & .Laying of PVC Flexible Conduit (For final length of conn, if any)				-
i)	20 mm dia PVC Flexible Conduit	RO			-
ii)	25 mm dia PVC Flexible Conduit	RO			-
iii)	32 mm dia PVC Flexible Conduit	R.O			-
					-
3.2.4	Supply & Drawing of following sizes of PVC insulated FRLS stranded cu conductor wires , 1100V grade in existing PVC Conduit / or laying / wiring upto power plug point (light/fan,6A, 6/16A, or AC point)				-
					-
i)	3 x 1.5 mm. Sq. Cu. Wire (DB to SB /SB to SB//LTG / Fan / 6A skt)	Mtr	975		-
ii)	3 X 2.5 mm. Sq. Cu.Wire for small powers - (for Geyser / 6/16 A skt/AC/ ETC.)	Mtr	350		-
iii)	4 x 6.0 mm sq. Cu. + 2 x 2.5 mm sq. Cu (for Chiller supply)	Mtr	50		-
					-
3.2.5	POINT WIRING WITH NORMAL POWER				-

	Point Wiring shall be started from the respective modular switch of the switch Board upto the First point of light / Fan / Plug Point. 20/25 mm. Dia. rigid PVC Conduit shall be used in recessed manner along the wall / slab including mending good the cutting. Cost of Modular switch, switch board , shall be included in this price of point wiring with cost of conduit, wires and accsesories . (Pls refer enclosed Drg for inside room.)				-
	PRIMARY LIGHT POINT				-
a)	**Primary** Light points - by 3 X 1.5 mm. sq. Cu. Wire.(Upto 6 mtr)	Nos.	25		-
	SECONDARY LIGHT POINTS				-
b)	**Secondary** light points by 3 x 1.5 m² Cu wire(Upto 3 Mtr)	Nos.	50		-
	OTHER POINTS				-
c)	Ceilling Fan points **(1 way type)** by 3 X 1.5 mm. sq. Cu. Wire with 300W electronicstepped Fan regulator.	Nos.	24		-
d)	Exh. Fan points with 6A socket point near Fan 6A switch at Toilet	Nos.	6		-
e)	Call bell point	Nos.	QRO		
					-
3.2.6	POWER POINTS / INDOOR UNIT AC POINTS:				-
					-
	Different types of power points shall be done as per the following items. Cost of Modular Board, Switch and Socket only has to be considered for these items here. Wiring & Conduiting part shall be paid seperately **as per item no.C1, C2 & C4 by measurement.**				-
a)	1 - 6A switch controlled 1 no 6A - 2/3 pin socket point in a separate 3M board.	Nos.	30		-
b)	Indoor A/C unit point consists of 1-16A switch in a modular Board with 16A socket .	Nos.	2		-
c)	1-16A switch controlled 1 no 6/16A 3/5 pin socket point in a 4M Board	Nos.	28		-
NOTE:	Wiring for power socket point 6A or 6/16A and A/C Machine point shall be paid as per the Meter run of conduit & wiring .				-
					-
3.2.7	Supplying and fixing of Junction Box (GI) with nenessary terminals and connectors for receiving and distribution of power for each guest room.				-
a)	JB- (125 H x 100 W x65D), 16 / 18 SWG GI sheet, with white acrylic shhet cover with screw having 6 nos of shrouded terminals (size suitable for 6 mm sq wires) for power distribution part inside guest room	RO			-
b)	JB- (125 H x 100 W x65D), 16 / 18 SWG GI sheet, with white acrylic shhet cover with screw having 8 nos of shrouded terminals (size suitable for 6 mm sq wires) for lighting and small power distribution part inside guest room	RO			-
					-
3.2.8	Supply & fixing of ceiling rose (of approved colour)	No	22		-
					-
3.3	CABLE LAYING / TERMINATION				-
a)	Supply,Laying, dressing, testing & commisssioning of the following sizes of 1.1 KV grade XLPE / PVC, armoured cable of AL / copper conductor, with GI strip armour to be laid on wall / ceiling / along prepared trench / Pre laid cable tray / GI conduit / through hume pipe with proper clamp, identification tag etc.				-
i)	4C - 10 sq. mm Al. XLPE / PVC.	Mtr	15		-
					-
b)	End termination for 1.1 KV grade cables with single compression type cable gland and heavy duty Aluminium or tinned copper bimetallic cable sockets. Rate shall be inclusive of all sundry materials like adhesive , tapes etc including plugging unused holes of the DBs etc.				-
i)	4C - 10 sq. mm Al. XLPE / PVC.	No	2		-

					-
3.4	EARTHING SYSTEM				-
3.4.1	Supply & Installation of Earth pit as per IS : 3043 with One 3 mtrs long GI Pipe of class - B, 50 mm dia. having flunnel with wire mesh at top shall be placed inside the pit. A 40 x 6 GI Flat shall be cllamped below the top flunnel for further connectivity . Alternate layer of salt & charcoal to be spreaded inside the pit.Earth pit shall be completed with necessary civil work like brick chamber, PCC work, & finally covered with Medium duty cast iron hinged cover of size 400 x 400 mm. sq . For details of construction please refer enclosed diagrams.(FOR BODY/SYSTEM)	No.	2		-
					-
3.4.2	Supply & Laying & interconnection by welding /nut bolting of the following size of GI/ Flat as well as GI/Cu wires, copper Cable along the excavated or prepared trench / along the wall / cable tray by suitable insulated saddling. (Labour Cost of Excavation & refilling , PCC/RCC cutting and making good, brick wall cutting & making good should be considered in this item. Welding part should be covered by bituminous paint. After installation of GI Flat shall be painted by Green enamel Paint.				-
i)	25 x 6 mm sq. GI Flat from pit to earth st.	Mtr	30		-
ii)	8 SWG GI wire for earthing of various DBs	Mtr	40		-
					-
3.4.3	Supply & Installation of Earth Station with 400 mm length GI Flat of 25 x 6 size having 6/8 Nos. 8 mm. hole, mounted on porcelain insulator support on wall for System Earthing, Lift earthing etc. in each floor Electrical Room, Terrace etc	Nos.	1		-
					-
3.4.4	Supply & Installation of 'TEST LINK' for earthing system for each of the earth pit (as per enclosed drawing) using porcelain insulator fixed in wall and 25 X 3 mm. GI Flat.	Nos.	2		-
	R.O : Rate Only				-
					-
					-
3.5	LIGHTNING PROTECTION WITH CONVENTIONAL SYSTEM				-
					-
3.5.1	Supply & Installation of Earth pit as per IS : 3043 with One 3 mtrs long GI Pipe of class - B, 50 mm dia. having flunnel with wire mesh at top shall be placed inside the pit. A 25 x 3 GI Flat shall be cllamped below the top flunnel for further connectivity . Alternate layer of salt & charcoal to be spreaded inside the pit.Earth pit shall be completed with necessary civil work like brick chamber, PCC work, & finally covered with Medium duty cast iron hinged cover of size 400 x 400 mm. sq .	No	2		-
					-
3.5.2	Supply and Installation of AIR TERMINAL UNIT (Lightning Finial) costructed of 40 mm dia , 1 mtr long GI pipe with 3 / 5 nos of lightning prong fitted on a 150 mm dia base plate	No	1		-
					-
3.5.3	Supply & Laying & interconnection by welding /nut bolting of the following size of GI Flat along the parapet / along the wall by suitable insulated saddling. . Welding part should be covered by bituminous paint.				-
i)	25 x 6 mm sq. GI Flat For horizontal run along the parapet of the roof terrace.	Mtr	60		-
ii)	25x 6 mm sq. GI Flat for vertical run along the wall from roof level to Earth Pit at ground floor level etc.	Mtr	35		-
					-
3.5.4	Supply & Installation of 'TEST LINK' for earthing system for each of the earth pit (as per enclosed drawing) using porcelain insulator fixed in wall with 25X 6 mm. GI. Flat of 300 mm length.	No	2		-
	R.O : Rate Only				-
					-
3.6	LIGHTING FIXTURES				-
					-
3.6.1	Fixing of wall mounted bulkhead luminare complete with all accessories with toughen glass cover suitable with 9W LED lamp at ground floor and Terrace	Nos	9		-
					-

3.6.2	Installation of surface/wall mounted luminaire (Tube light fittings) 1200 mm long (4 Feet) with 1 x 18 Watt LED lamp complete with drivers /acessories, MS Conduit type down Rod with ball , socket, connecting wires etc., if necessary	Nos	62		-
					-
3.7	MISCELLANEOUS ITEMS				-
					-
3.7.1	Supply & Installation of 200/ 225 mm dia heavy duty PVC body rectangular shaped exhaust fan with Louver etc. for toilet Make , Havells' , EPC,/Power vent/ Calcutta (ISI Brand)	No.	6		-
					-
3.7.2	Supply & Installation of 1200 mm sweep , 3 bladed, ceiling Fan. (Make - Polar/Orient/CGL/Khaitan) with 1 Mtr Down Rod	No.	24		-
					-
3.7.3	Supply & Installation ,T&C of FP MCB/ISOLATOR of following rating in an enclosure for POWER supply to each flat and at lift room				-
i)	25A	No.	2		-
					-
3.8	Supply & Installation ,T&C of FP MAIN SWITCH of following rating in an enclosure with angle iron frame for incoming POWER supply from WBSEDCL at meter room , adjacent to panel at gr.floor.	No.	1		-
					-
3.9	EXTERNAL LIGHTING				-
	Fixing of Integral Flood llight luminaire with die cast Aluminium having (IP65) with 125 W LED lampand driver on MS / GI structure support and loop in - loop out box to be fixed at ground level with wiring etc complete.	Nos	6		-
					-
3.10	INCOMING MAIN SUPPLY				-
	Approximate charge of supply authority for supply upto meter room main switch may consists of the follwing activity on their part:	LS (1JOB)	1		-
	i) cable laying/ overhead wire laying from source point				-
	ii) Termination activity at meter room.				-
	iii) DOE Approval , if required				-
	iv) Commissioning job.				-
					-
				SUB TOTAL	-
D	**INFRASTRUCTURE WORKS**				
4	(BOUNDARY WALLL/SEPTIC TANK/EXTERNAL DEVELOPMENT)				
4.1	TITLE :- BOUNDARY WALL				
	BOUNDARY WALL UPTO FGL				
4.1.1	Earth work in excavation including backfilling over areas, stacking the excavated material at site as directed including all leads and lifts incldentals including shoring strutting, dressing of excavated surface etc complete. Excavation shall be payable for vertical cut up to the outer edge of lean concrete only, for depths indicated in the drawings.Cost of extra excavation required for supporting side shuttering of foundations and retaining walls and that required for making side slopes for stability of excavation shall be deemed to be included in the rate quoted.(Solid Measurements Only). All kind of soils for all leads, upto any depth				-
a)	UP TO 1.5 M	Cum	60.201435		-
b)	BELOW 1.5 M	Cum	0		-
					-
4.1.2	Providing and laying Brick Flat Soling Below Foundations, floor and filling up the gaps with sand after proper compaction of the earth and making the surface good as directed by The Engineer In charge.	Sq.m	0		-
					-
4.1.3	Providing and laying plain cement concrete of specified grade as bed concrete under foundation column footing and other locations as called for etc. laid, consolidated and cured etc. complete and including side forms as required as per specification and drawing including the cost of centering and shuttering.				-
	1: 3 : 6 (1cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) with underlying 200 gsm LDP sheet	Cum	8.40903		-
					-

4.1.4	Providing and laying of approved Marine plywood or 3 mm thick steeel plate shuttering and centring for structural concrete work (plain and reinforced) in locations called for including strutting, propping, bracing, bolting, wedging, casing, striking, removal etc. complete. Props shall consist of well designed steel pipes adequately braced using X and K bracings (wooden ballies as props shall not be permitted).The item to include centering and shuttering at all heights and levels. Allow for forming grooves drips throats, chamfers, cut outs, openings etc, where called for and for dressing with approved shuttering oil to precent adhesion, unexposed concrete surfaces subsequently left untreated (in the condition obtained on removal of form work) It shall not constitute exposed concrete work and shall be measured under this item only. For Walls, columns, Plinth Beam, Tie Beams, Grade Beams, Footings, Slabs and beams stair case landings balconies, pergola, circular column and other RCC Structures as applicable all complete.				-
(i)	Footing	Sqm	17.82		-
					-
(ii)	Columns /Walls/Beams/Slabs and all vertical & Horizontal surface for all levels	Sq.m	61.35		-
					-
4.1.5	M20 Grade for foundation, Columns, Walls, Beam, Slab and other vertical & horizontal surfaces for all levels including all scaffolding, hoisting etc all complete as per direction of the Engineer In charge / Architect	Cum	9.613505		-
					-
4.1.6	Brick work of thickness 200 mm and above using selected quality burnt clay bricks (Crushing strength not less than 75kg/sqcm) in super structure and substructure at all levels in cement mortar 1:5 (1 cement : 5 coarse sand) mix, joints finished flush raked to 6 mm depth including jointing with concrete where required and as per specification and drawing or as directed by the Engineer -in-Charge with all scaffolding for all levels as mentioned below.	Cum	2		-
					-
4.1.7	Half brick masonry using selected quality burnt clay bricks (Crushing strength not less than 75kg/sqcm) in super structure laid in cement mortar 1:4 (1 cement : 4 coarse sand) mix, joints finished, flushed raked to 6 mm depth including HB Netting at every third course for all levels as directed by the Engineer -In- Charge including, curing, with all scaffolding and as per specification and drawing all complete as directed by the Engineer-In-Charge for all levels	Sqm	54.45		-
					-
4.1.8	12-15 mm thick plaster to masonry & RCC walls columns ,masonary etc. in cement mortar 1: 4 (1Cement : 4 fine and coarse sand in equal proportion) applied, finished smooth and cured including comer / edge beads of approved material etc, complete.	Sqm	130.851		-
					-
4.1.9	Laying of Thermomechanically Treated reinforcement (TMT) in all reinforced concrete work, including cutting, removal of loose rust by wire brush and coating with cement slurry, bending, laying in position to the shape and profile required at all levels and heights as per drawing and design and / or as directed, binding with 18 guage annealed steel wire and cost of binding wire etc complete or welding wherever necessary as directed by the Engineer in chage	MT	0.87		-
					-
4.1.10	Providing and fixing in position 100 mm thick M20 Precast slab with edge angles on all sides with lifting arrangement on chambers , drains and other open area including all other arrangements to make the surface good for operations with or without perforations all complete as per the direction of The Engineer IN Charge. (Reinforcement shall be paid seperately)	sqm	0		-
					-
4.1.11	Providing and fixing MS angles of 50 x 50 x 5mm grouted in columns as per direction all complete (Rate to include grouting and supply of M.S. Angles including painting)	Kgs	QRO		
					-
4.1.12	Providing and fixing 12 G barbed wire 4 rows in MS angles of 50 x 50 x 5mm grouted in columns as per direction all complete (Rate to include fixing and stretching of barbed wire only)	Rm	QRO		
					-

4.1.13	Providing, Supplying and fixing M.S. Gates with two leaf made of hollow M.S. Tubes and welded properly to gate pillar with all accessories (hinges, hashbolt, lock etc. and two coats of enamel over a coat of primer all complete as directed by the architect (Size 3.5m x 1.8) Weight of gate @24 Kg/ Sqm	Nos	1.00		-
					-
4.1.14	Supply of fixing of rcc pre-cast post with reinforcement in position (150x150mm) of length exposed 1.5m above ground level and 600mm below ground level in proper line with having arragement for fixing of chain link fencing & grouted with pcc below ground . (Extra pcc & excavation should be paid extra)	nos	25.00		-
					-
4.1.15	Supplying, fitting, fixing, Chain link fencing of approved quality with R.C.C posts wooden posts or iron posts by means of galvanised "C" clips to grid of horizontal strands of galvanised high tensile spring steel wire of 12 S.W.G which have to be tensioned and fixed to the vertical posts by means of galvanised special clips, bolts and nuts etc.				-
	(I) 50 mm. x 50 mm. x 8 g. OF HT 1.5M ABOVE FGL	sqm	90.00		-
					-
4.1.16	Providing & applying external grade cement paint painting with cement base paint (Make snowcem or equivalent) of approved shade & manufacture, two or more coats to give and even shade to the exterior surface cleaning and smoothing the surface with sand paper etc. complete at all levels as directed including scaffolding for all floors .	SQM	130.85		-
		SUB TOTAL			-

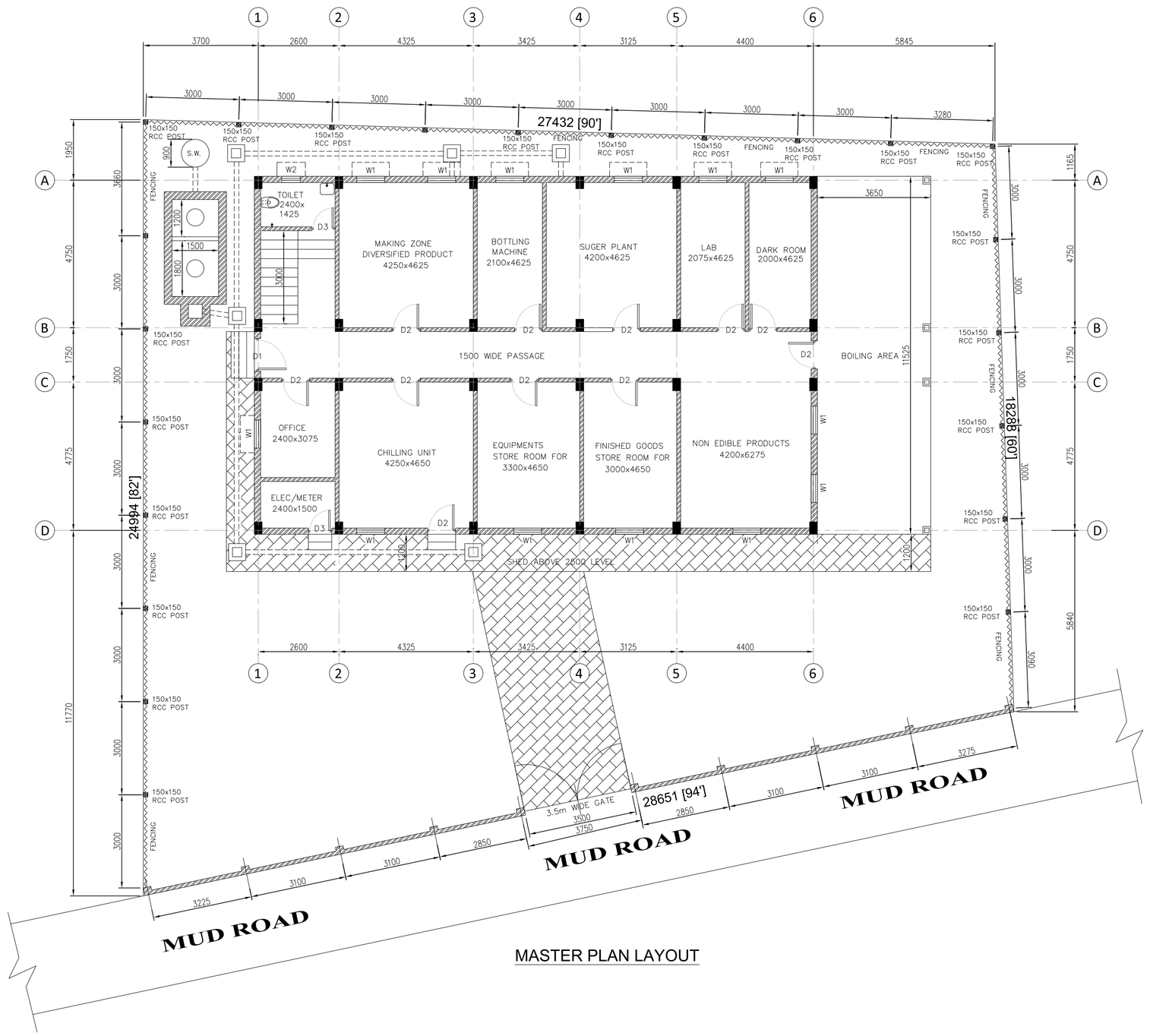
4.2	SEPTIC TANK				
Sl. No	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
4.2.1	Earth work in excavation including backfilling over areas, stacking the excavated material at site as directed including all leads and lifts incldentals including shoring strutting, dressing of excavated surface etc complete. Excavation shall be payable for vertical cut up to the outer edge of lean concrete only, for depths indicated in the drawings.Cost of extra excavation required for supporting side shuttering of foundations and retaining walls and that required for making side slopes for stability of excavation shall be deemed to be included in the rate quoted.(Solid Measurements Only). All kind of soils for all leads, upto any depth				
i)	upto 1.5 M	Cum	33.48		-
ii)	BELOW 1.5 M	Cum	12.28		-
					-
					-
4.2.2	Providing and laying plain cement concrete of specified grade as bed concrete under foundation , pile cap, column footing and other locations as called for etc. laid, consolidated and cured etc. complete and including side forms as required as per specification and drawing including the cost of centering and shuttering.				-
b)	1: 3 : 6 (1cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) with underlying 200 gsm LDP sheet	Cum	1.67		-
					-
4.2.3	Providing, laying & casting cast - in - place structural controlled cement concrete grade M20 using 20 mm down coarse aggregates excluding cost of centering, shuttering and steel reinforcement but including cost of making shear keys and provision of construction / contraction / control joints in various locations, laid consolidated and cured. Item to include all structural items like base raft, ramp, column, wall, footings, equipment foundations, fins, mullions, beams, lintels, pergola, chajja, facia, parapet railing, slab trenches,etc also include the concrete requiring waterproofing like water tanks, retaining walll base raft etc.	.			-
a)	Footing / Liftpit / grade slab ,grade beams / wall foundations Pile cap raft slab etc	Cum	3.32		-
					-
4.2.4	M20 Grade of Concrete for Tie beams and Plinth Beams ,slabs, staircase, walls, columns, bands etc and other horizontal surfaces including all scaffolding, hoisting etc all complete as per direction of the Engineer In charge / Architect	Cum	2.46		-

4.2.5	Providing and laying of approved Marine plywood or 3 mm thick steeel plate shuttering and centring for structural concrete work (raft, walls, columns, slabs, beams) in locations called for including strutting, propping, bracing, bolting, wedging, casing, striking, removal etc. complete. Props shall consist of well designed steel pipes adequately braced using X and K bracings (wooden ballies as props shall not be permitted).The item to include centering and shuttering at all heights and levels. Allow for forming grooves drips throats, chamfers, cut outs, openings etc, where called for and for dressing with approved shuttering oil to precent adhesion, unexposed concrete surfaces subsequently left untreated (in the condition obtained on removal of form work) It shall not constitute exposed concrete work and shall be measured under this item only. For Walls, columns, Plinth Beam, Tie Beams, Grade Beams, Footings, Slabs and beams stair case landings balconies, pergola, circular column and other RCC Structures as applicable all complete.				-
					-
(i)	Raft	Sqm	3.32		-
ii)	Walls/ columns/ slabs/beams	Sqm	17.38		-
					-
4.2.6	Laying of Thermomechanically Treated reinforcement (TMT) in all reinforced concrete work, including cutting, removal of loose rust by wire brush and coating with cement slurry, bending, laying in position to the shape and profile required at all levels and heights as per drawing and design and / or as directed, binding with 18 guage annealed steel wire and cost of binding wire etc complete or welding wherever necessary as directed by the Engineer in chage	MT	0.60		-
					-
4.2.7	Brick work of thickness 250 mm and above using selected quality burnt clay bricks (Crushing strength not less than 75kg/sqcm) in super structure in cement mortar 1:5 (1 cement : 5 coarse sand) mix, joints finished flush raked to 6 mm depth including jointing with concrete where required and as per specification and drawing or as directed by the Engineer -in-Charge with all scaffolding for levels as mentioned below for all levels	Cum	4.98		-
					-
4.2.8	10-12 mm thick plaster to masonry & RCC walls columns ,masonary etc. in cement mortar 1:4 (1Cement : 4 fine and coarse sand in equal proportion) applied, finished smooth and cured including comer / edge beads of approved material etc, complete.	Sqm	21.12		-
					-
4.2.9	12-15 mm thick plaster to masonry & RCC walls columns ,masonary etc. in cement mortar 1:4 (1Cement : 4 fine and coarse sand in equal proportion) applied, finished smooth and cured including comer / edge beads of approved material etc, complete.	Sqm	33.60		-
					-
4.2.9.1	Extra For Neat Finish	Sqm	21.12		-
					-
4.2.10	providing & fixing 150mm dia & 1.80m height pvc pipe with vent cowel.	NOS	2.00		-
					-
4.2.11	providing & fixing 150mm dia stone ware tee to the brick wall including cutting of the holes as required ,fixing the tee & repairing the surface as per direction of engineer-in-charge.	NOS	2.00		-
					-
4.2.12	FOR SOAK PIT				-
	Providing & installation of soak pit 3.0 m dia including excavation upto depth of 2.5m including 230mm linear wall , filling with brick bats, 100mm RCC slab , 560mm dia manhole cover, including inlet & outlet pipe, brick ballast, sand etc. All complete as per direction of Engineer-in- charge.	NOS	1.00		-
				SUB TOTAL	-

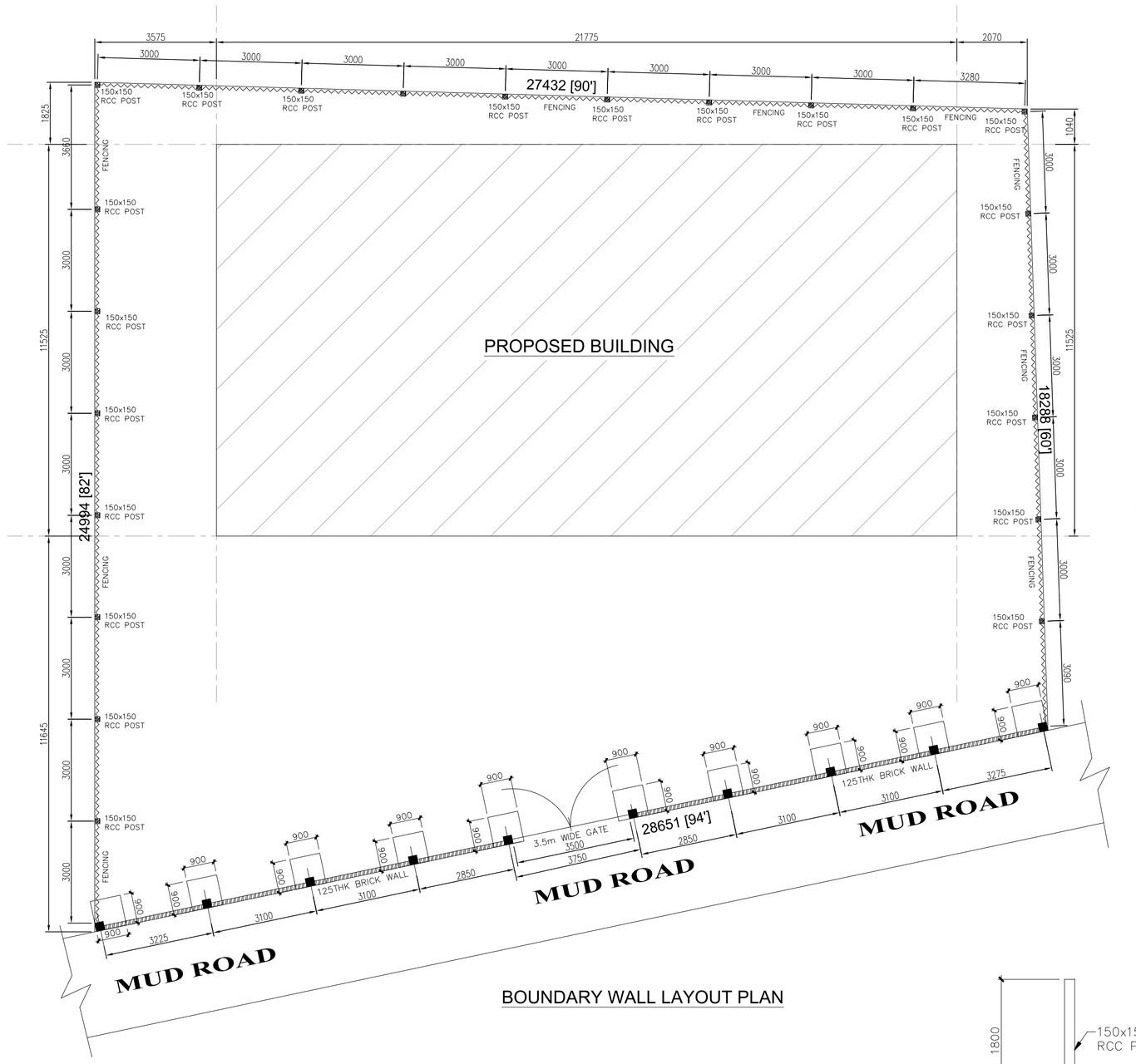
4.3	EXTERNAL DEVELOPMENT				
Sl. No	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	PATHWAY WORKS				
4.3..1	Providing and filling in plinth with earth brought from outside including ramming and watering consolidatig and dressing complete as per desired levels in layers not exceeding 300 mm as per direction of the Engineer In Charge	Cum	12.20		-
					-
4.3..2	SITE DEVELOPMENT AND EARTH FILLING				
4.3.3	Cleaning and dressing the site by using mechanical means or manually including cleaning of shrubs , herbs and uprooting the trees etc from roots and carrying away the debris irrespective of distance and levelling the surface all complete as per the direction of the Engineer In Charge . (Item to be operated after approval from the client just before handover)	Sqm	600.60		-
				SUB TOTAL:	-
					-
	TOTAL FOR INFRASTRUCTURE WORKS =				-

Architecture, Civil and Electrical

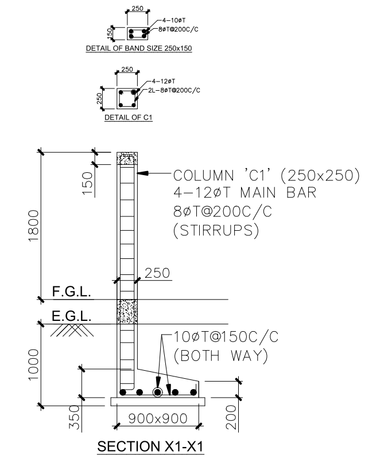
Design Details

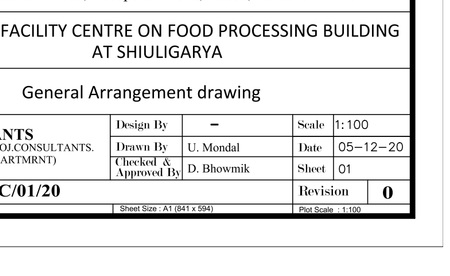


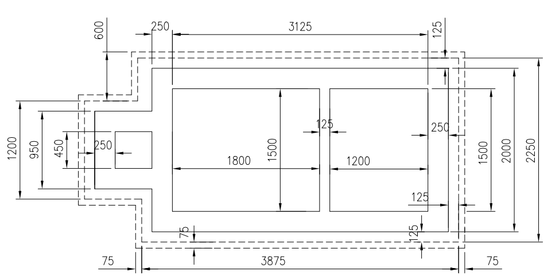
MASTER PLAN LAYOUT



BOUNDARY WALL LAYOUT PLAN







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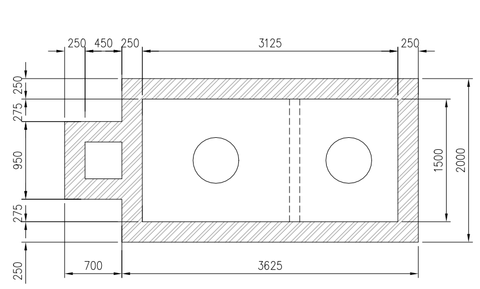

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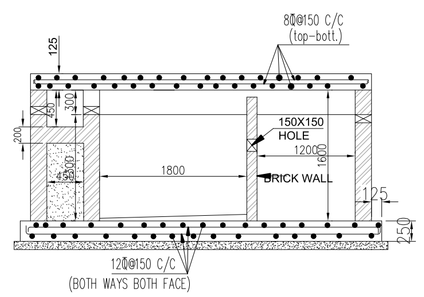

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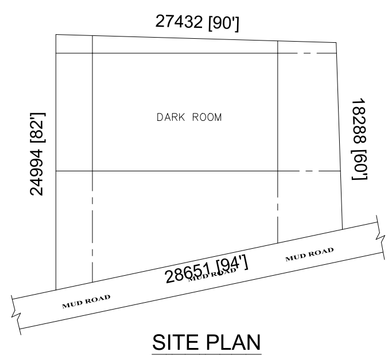


SITE PLAN

AREA STATEMENT

AREA OF LAND :- 15 DECIMAL = 607.02 SQM.
PERMISSIBLE GROUND COVERAGE = 394.56 SQM. (65%)
PROPOSED GROUND COVERAGE = 250.95 SQM. (41.34%)
PROPOSED GROUND FLOOR (RCC BUILDING AREA) = 208.89 SQM.
PROPOSED GROUND FLOOR (SHED AREA) = 42.06 SQM.
PROPOSED FIRST AREA (RCC BUILDING AREA) = 122.16 SQM.
PROPOSED TOTAL FLOOR AREA = 373.11 SQM.

DRAWING NOTES :

1. ALL DIMENSIONS ARE IN MM
2. DEPTH OF EXCAVATION OF UNDER GROUND SUMP SHOULD BE ABOVE THAT OF FOUNDATION.
3. DO NOT SCALE THE DRAWING . FOLLOW WITH DIMENSION.
4. ALL EXTERNAL WALLS ARE 200mm THK. & INTERNAL WALLS ARE 125 mm THK.
5. LEAN CONCRETE (1:3:6) NOMINAL MIX 75 THK. SHALL BE PROVIDED UNDER FOUNDATION.
6. EXTERNAL PLASTER 19mm THK. IN CEMENT MOTER GRADE (1:6)
7. INTERNAL PLASTER 12mm THK. IN CEMENT MOTER GRADE (1:5)
8. ALL CEILING PLASTER 6mm THK. IN CEMENT MOTER GRADE (1:4)
9. 37mm I.P.S. FLOOR FINISH OVER 100mm THK. P.C.C. WORK OVER 75mm THK. BRICK FLAT SOLING.
10. DEPTH OF EXCAVATION OF UNDER GROUND SUMP/RESERVOIR SHOULD BE ABOVE THE. DEPTH OF FOUNDATION OF THE ADJACENT BUILDING / STRUCTURE.

DRAWING RELEASE FOR TENDER

REV.	DATE	DESCRIPTION	BY	CHK	APD.

REVISION

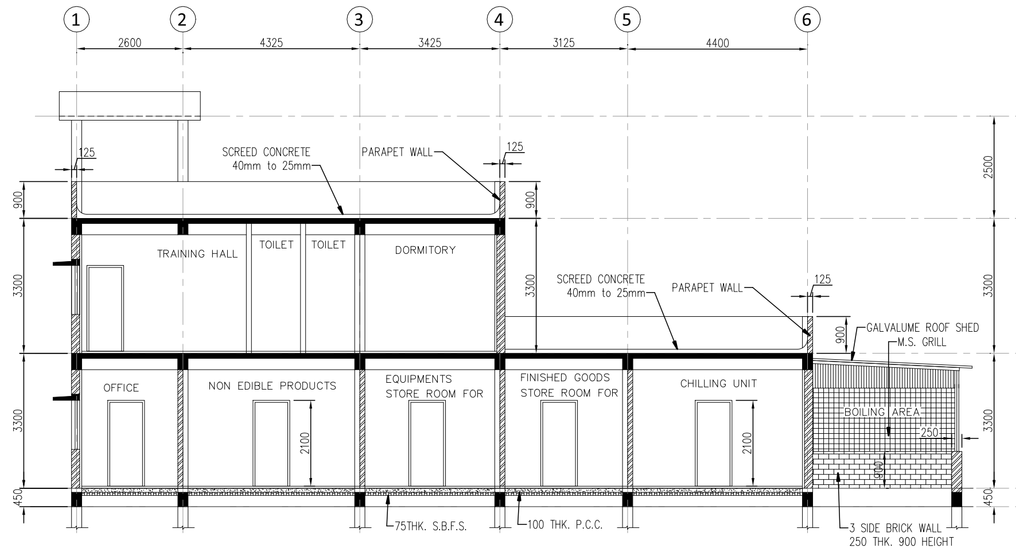
PROPOSED TWO STORIED BUILDING AT MOUZA - SHIULIGORYA, L.R. KHATIAN NO. - 75, L.R. DAG NO.- 148, P.O. - CHHATNA, P.S. - CHHATNA, BANKURA WEST BENGAL, INDIA, PIN - 700132

Clint :	Development Research Communication And Service Center 58A, Dharmatala Road, Bosepukur Road, Kasba, Kolkata - 700 042
Project Title :	COMMON FACILITY CENTRE ON FOOD PROCESSING BUILDING AT SHIULIGARYA
Drawing Title :	General Arrangement drawing

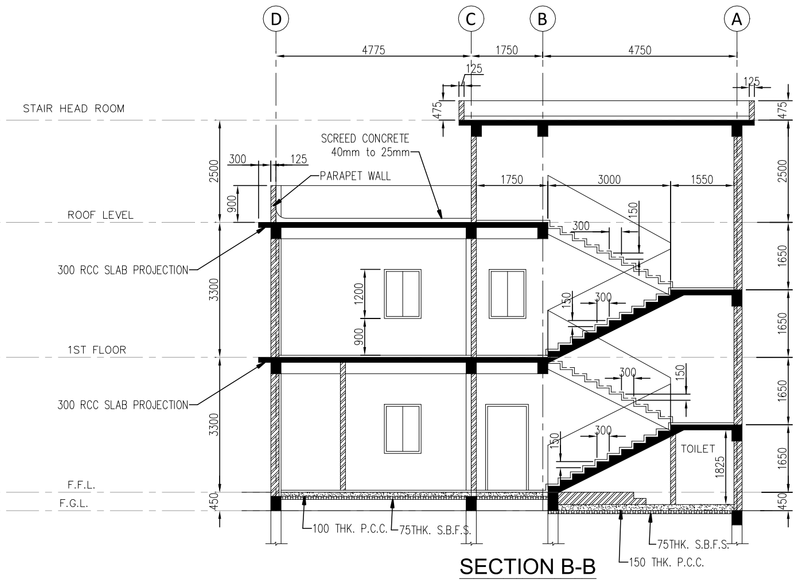
ARCHITECT & CONSULTANTS:
R.S. CONSULTANTS
ARCHITECT:-ENGINEER:-VALUERS:PROJ.CONSULTANTS.
98, SUBODH PARK, (PADMA APARTMRNT)
KOLKATA-700070

Design By	–	Scale	1: 100
Drawn By	U. Mondal	Date	05–12–20
Checked & Approved By	D. Bhowmik	Sheet	01
Drawing No.	RS/BNK/ARC/01/20	Revision	0
Cad File : RS/BNK/ARC/01/20	Sheet Size : A1 (841 x 594)	Plot Scale : 1:100	

FRONT ELEVATION



SECTION A-A

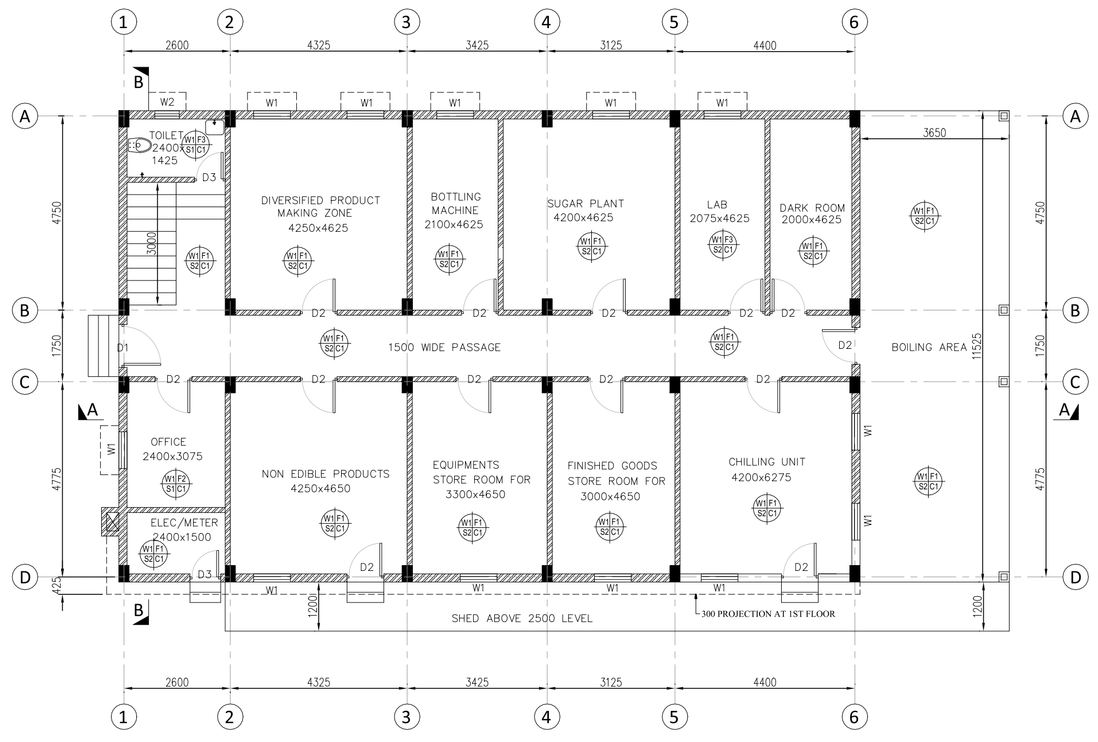


SECTION B-B

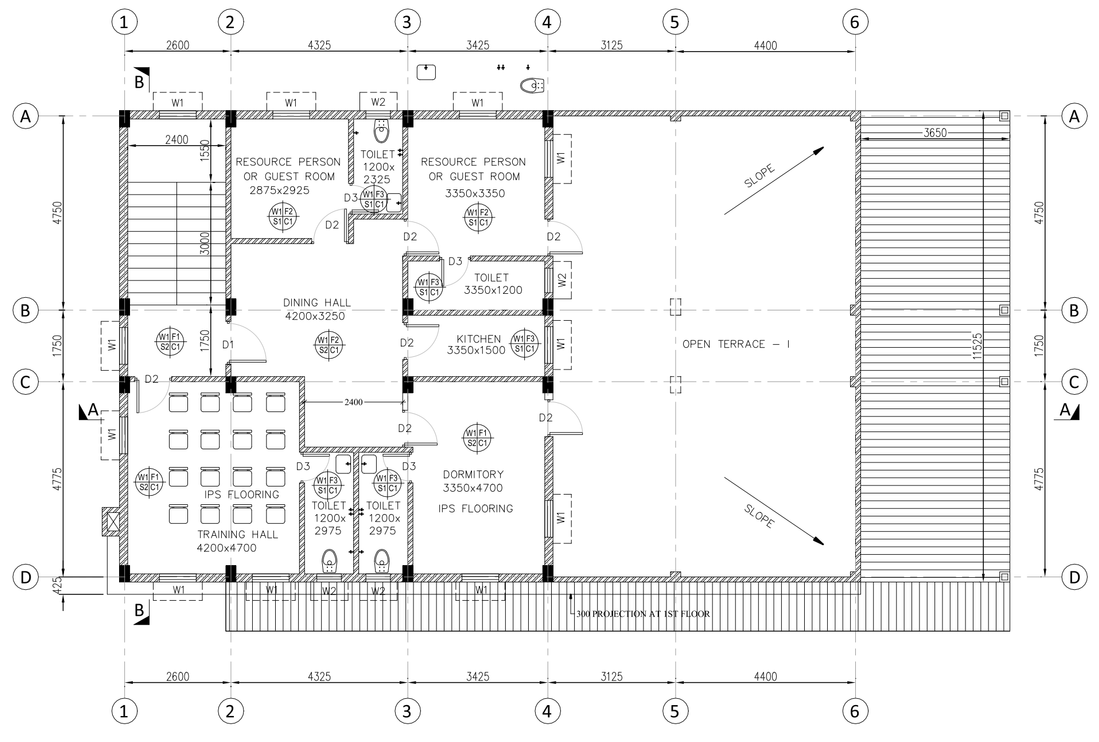
SCHEDULE OF DOOR		
MRK.	SIZE	TYPE
D1	1050x2100	FLUSH DOOR
D2	900x2100	FLUSH DOOR
D3	750x2100	FLUSH DOOR

SCHEDULE OF WINDOW		
MRK.	SIZE	TYPE
W1	900x1200	M.S. WITH GRILL
W2	600x600	M.S. WITH GRILL

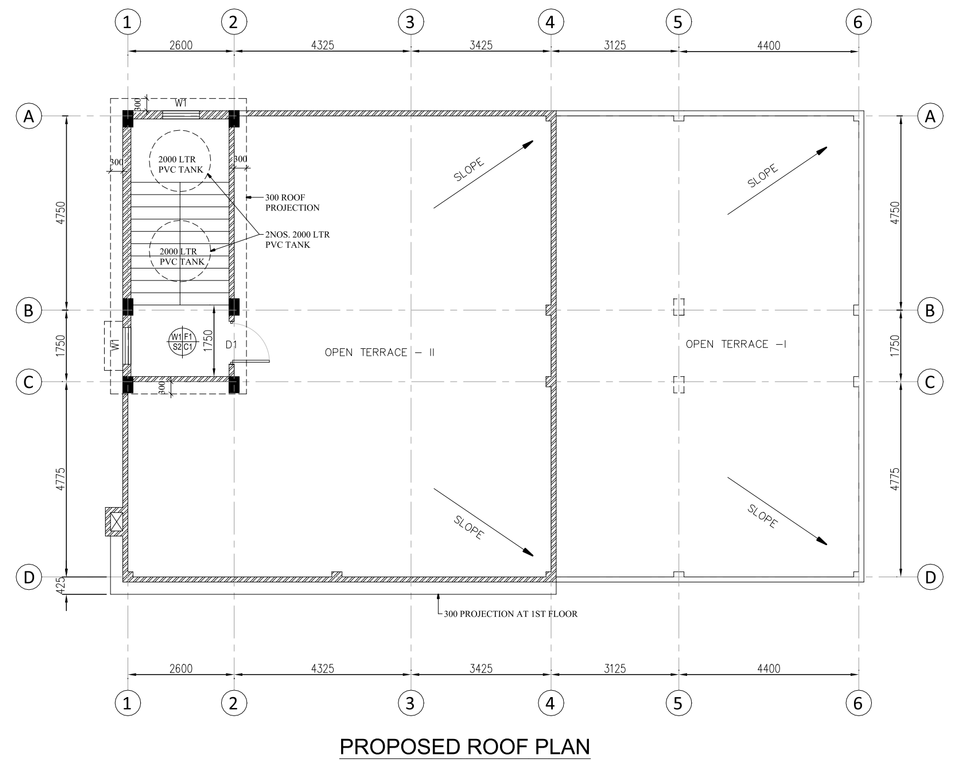
FINISHES		
FLOORING	F1	IPS FLOOORING
	F2	CERAMIC TILES 450x450
	F3	CERAMIC TILES 300x300
WALL	W1	LIME WASH
	W2	200x300 GLAZED TILES UPTO 2100 & LIMEWASH ABOVE
	W3	200x300 GLAZED TILES (600 FROM KITCHEN SLAB) AND LIME WASH



PROPOSED GROUND FLOOR PLAN



PROPOSED FIRST FLOOR PLAN



PROPOSED ROOF PLAN

DRAWING NOTES :

1. ALL DIMENSIONS ARE IN MM
2. DEPTH OF EXCAVATION OF UNDER GROUND SUMP SHOULD BE ABOVE THAT OF FOUNDATION.
3. DO NOT SCALE THE DRAWING . FOLLOW WITH DIMENSION.
4. ALL EXTERNAL WALLS ARE 200mm THK. & INTERNAL WALLS ARE 125 mm THK.
5. LEAN CONCRETE (1:3:6) NOMINAL MIX 75 THK. SHALL BE PROVIDED UNDER FOUNDATION.
6. EXTERNAL PLASTER 19mm THK. IN CEMENT MOTER GRADE (1:6)
7. INTERNAL PLASTER 12mm THK. IN CEMENT MOTER GRADE (1:5)
8. ALL CEILING PLASTER 6mm THK. IN CEMENT MOTER GRADE (1:4)
9. 37mm I.P.S. FLOOR FINISH OVER 100mm THK. P.C.C. WORK OVER 75mm THK. BRICK FLAT SOLING.
10. DEPTH OF EXCAVATION OF UNDER GROUND SUMP/RESERVOIR SHOULD BE ABOVE THE DEPTH OF FOUNDATION OF THE ADJACENT BUILDING / STRUCTURE.

DRAWING RELEASE FOR TENDER

REV.	DATE	DESCRIPTION	BY	CHK	APD.
		REVISION			

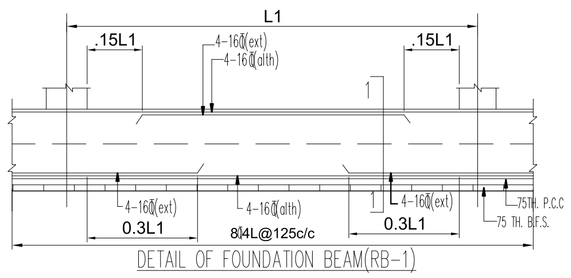
PROPOSED TWO STORIED BUILDING AT MOUZA - SHIULIGORYA, L.R. KHATIAN NO. - 75, L.R. DAG NO.- 148, P.O. - CHHATNA, P.S. - CHHATNA, BANKURA WEST BENGAL, INDIA, PIN - 700132

Clint :	Development Research Communication And Service Center 58A, Dharmatala Road, Bosepukur Road, Kasba, Kolkata - 700 042
Project Title :	COMMON FACILITY CENTRE ON FOOD PROCESSING BUILDING AT SHIULIGARYA
Drawing Title :	General Arrangement drawing

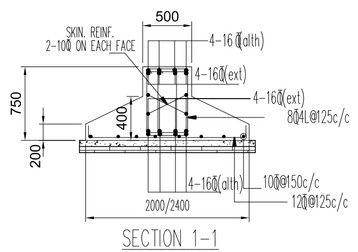
ARCHITECT & CONSULTANTS:
R.S. CONSULTANTS
ARCHITECT:-ENGINEER:-VALUERS:PROJ.CONSULTANTS.
98, SUBODH PARK, (PADMA APARTMRNT)
KOLKATA-700070

Design By	–	Scale	1: 100
Drawn By	U. Mondal	Date	05–12–20
Checked & Approved By	D. Bhowmik	Sheet	01
Drawing No.	RS/BNK/ARC/02/20	Revision	0

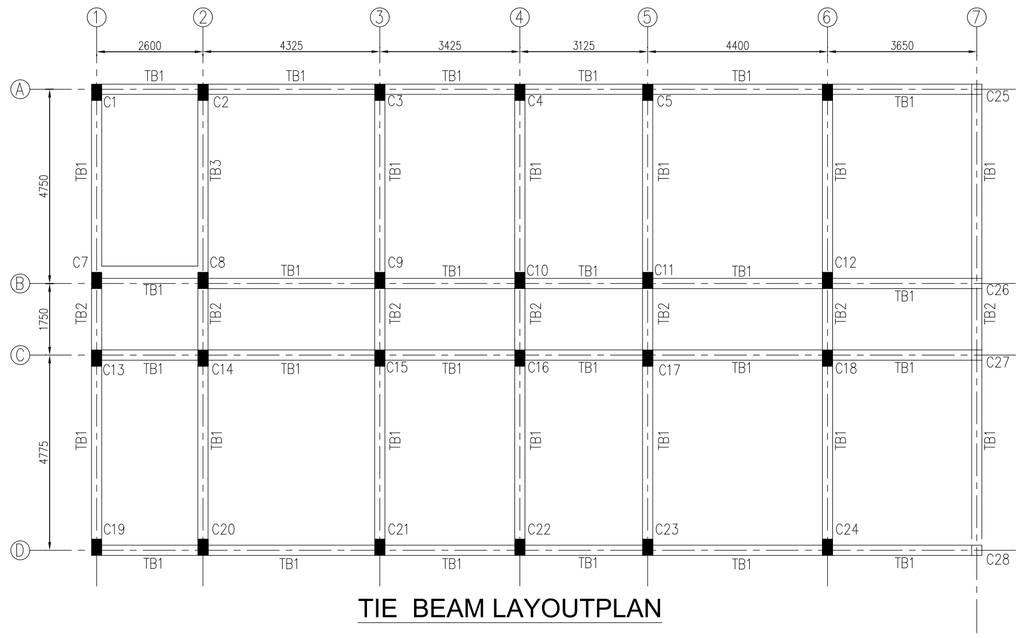
Cad File - RS/BNK/ARC/02/20 | Sheet Size - A1 (841 x 594) | Plot Scale - 1:100



DETAIL OF FOUNDATION BEAM(RB-1)
500X750

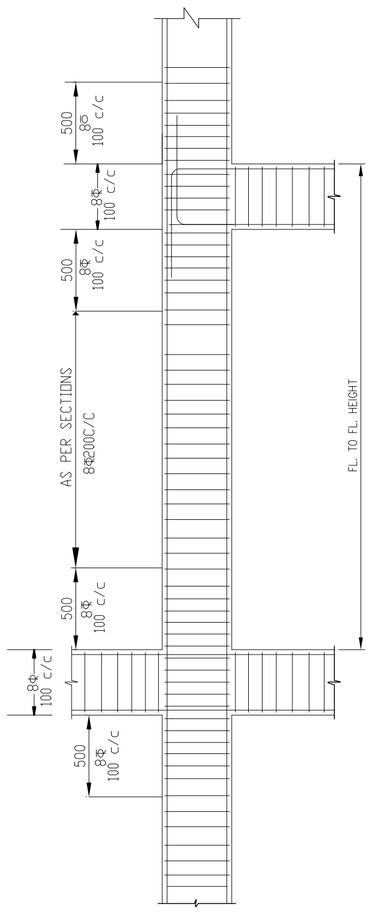


SECTION 1-1



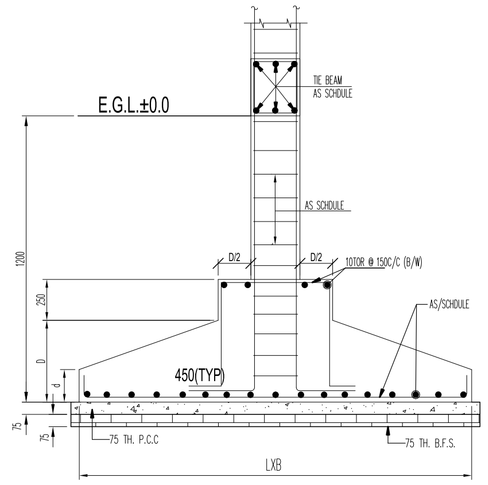
TIE BEAM LAYOUTPLAN

SCHEDULE OF COLUMN: –(M20 AND FE 500)			
COLUMN NOS.	SIZE (MMxMM)	FOUNDATION. TO 1ST FL.	1ST FL. TO ROOF
C1	250x400	8-16ØT	6-16ØT+2-12ØT
C2	250x400	8-16ØT	6-16ØT+2-12ØT
C3	250x400	6-16ØT+2-12ØT	4-16ØT+4-12ØT
C4	250x400	4-16ØT+4120T	8-12ØT
C5	250x400	6-16ØT+2-12ØT	UPTO 1ST FLOOR
C6	250x400	6-16ØT+2-12ØT	UPTO 1ST FLOOR
C7	250x400	8-16ØT	6-16ØT+2-12ØT
C8	250x400	8-16ØT	8-16ØT
C9	250x450	6-16ØT+2-12ØT	4-16ØT+4-12ØT
C10	250x400	4-16ØT+4-12ØT	4-16ØT+4-12ØT
C11	250x400	6-16ØT+2-12ØT	UPTO 1ST FLOOR
C12	250x400	4-16ØT+4-12ØT	UPTO 1ST FLOOR
C13	250x400	8-16ØT	6-16ØT+2-12ØT
C14	250x400	8-16ØT	8-16ØT
C15	250x400	6-16ØT+2-12ØT	4-16ØT+4-12ØT
C16	250x400	6-16ØT+2-12ØT	4-16ØT+4-12ØT
C17	250x400	6-16ØT+2-12ØT	UPTO 1ST FLOOR
C18	250x400	4-16ØT+4-12ØT	UPTO 1ST FLOOR
C19	250x400	4-16ØT+4-12ØT	8-12ØT
C20	250x400	6-16ØT+2-12ØT	4-16ØT+4-12ØT
C21	250x400	6-16ØT+2-12ØT	4-16ØT+4-12ØT
C22	250x400	4-16ØT+4-12ØT	8-12ØT
C23	250x400	6-16ØT+2-12ØT	UPTO 1ST FLOOR
C24	250x400	4-16ØT+4-12ØT	UPTO 1ST FLOOR
C25	250x250	4-12ØT	UPTO 900 MM FROM F.F.L
C26	250x250	4-12ØT	UPTO 900 MM FROM F.F.L
C27	250x250	4-12ØT	UPTO 900 MM FROM F.F.L
C28	250x250	4-12ØT	UPTO 900 MM FROM F.F.L

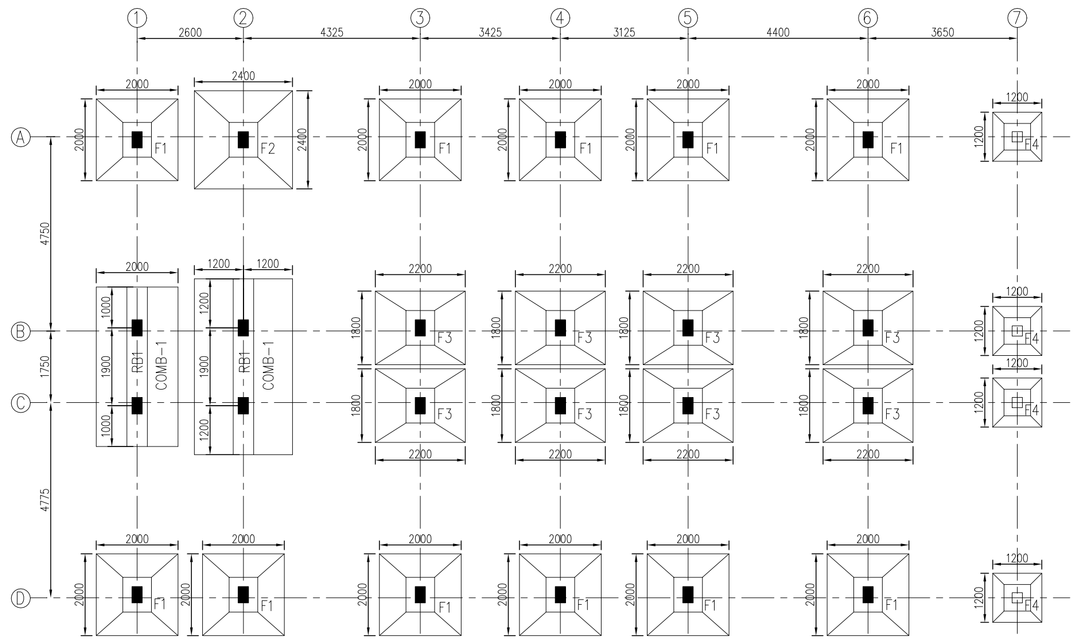


LONG SECTION OF COLUMN
SHOWING LINK DETAILS

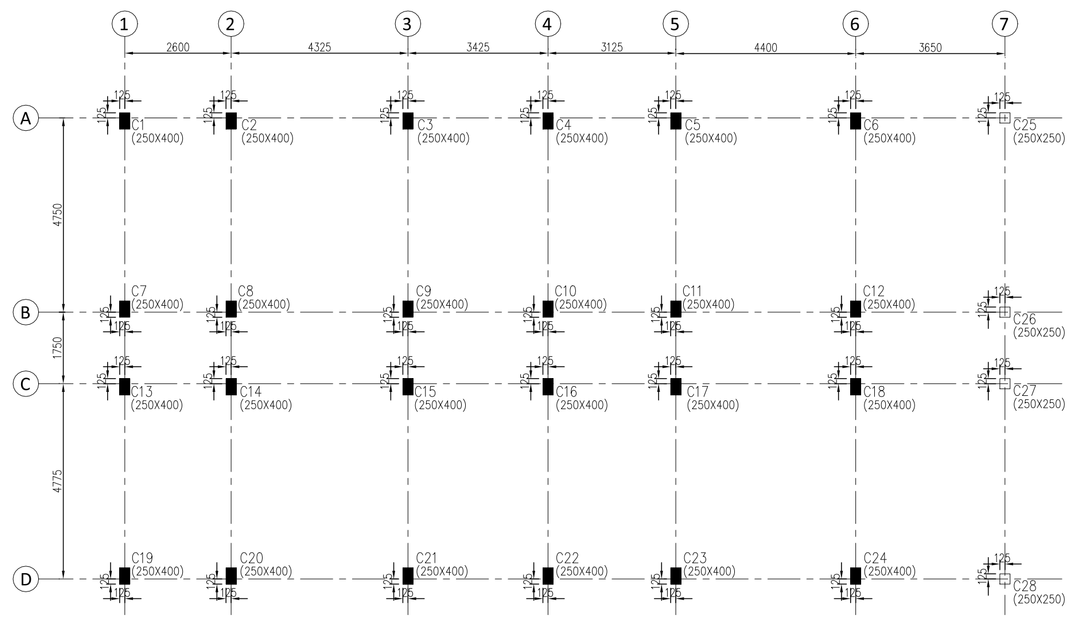
SCHEDULE OF FOUNDATION :- (M20 AND FE 500)						
MKD.	SIZE (mxm)		DEPTH OF BASE SLAB		REINFORCEMENT	
	W	L	D	d	SHORTER(f)	LONGER(e)
F1	2000	2000	400	200	12ØT@150 C/C BOTH. WAYS OF BOTTOM.	
F2	2400	2400	450	200	12ØT@150 C/C BOTH. WAYS OF BOTTOM.	
F3	1800	2200	450	200	12ØT@150 C/C BOTH. WAYS OF BOTTOM.	
F4	1200	1200	350	200	12ØT@150 C/C BOTH. WAYS OF BOTTOM.	
COMB-1	AS SHOWN		400	200	12ØT@125 C/C	10ØT@150 C/C



LONG SECTION
SCALE - 1 : 75



FOUNDATION LAYOUT PLAN



COLUMN LAYOUT PLAN
SCALE 1:100

NOTES :-

1. ALL DIMENSIONS ARE IN MM
2. ALL CONCRETE SHOULD BE OF GRADE AS SPECIFIED
3. COVER TO REINFORCEMENT
   COLUMN = 40mm , BEAM = 30mm
   SLAB = 15mm , FOUNDATION = 50mm
4. DEPTH OF EXCAVATION OF UNDER GROUND SUMP SHOULD BE ABOVE THAT OF FOUNDATION.
5. DO NOT SCALE THE DRAWING . FOLLOW WITH DIMENSION.
6. ALL WALLS ARE AS PER ARCHITECTURAL DRAWINGS
7. LEAN CONCRETE (1:3:6) NOMINAL MIX 75 THK. SHALL BE PROVIDED UNDER FOUNDATION.
8. THE DRAWINGS SHOULD BE STUDIED CAREFULLY AND ALL DIMENSIONS SHOWN HERE SHOULD BE CHECKED AT SITE. CLARIFICATION REGARDING DISCREPANCY IF ANY, SHOULD BE OBTAINED BEFORE COMMENCEMENT OF WORK.
9. SPACER BAR USED SHALL BE OF 20mm. OR DIAMETER OF THE BAR USED N THE JOB WHICH IS LARGER.
10. STEEL TO BE USE SHOULD BE OF Fe-500 GRADE. REINFORCEMENT SHOULD BE WITH COLD TWISTED DEFORMED BARS CONFIRMING TO IS : - 1786 AND HAVE BEEN SHOWN AS q .
11. DEPTH OF EXCAVATION OF UNDER GROUND SUMP/RESERVOIR SHOULD BE ABOVE THE DEPTH OF FOUNDATION OF THE ADJACENT BUILDING / STRUCTURE.
12. LAP LENGTH OF STEEL BAR SHALL BE 50xDIA OF BAR

DRAWING RELEASE FOR TENDER

REV.	DATE	DESCRIPTION	BY	CHK	APD.

REVISION

PROPOSED TWO STORIED BUILDING AT MOUZA - SHIULIGORYA, L.R. KHATIAN NO. - 75, L.R. DAG NO.- 148, P.O. - CHHATNA, P.S. - CHHATNA, BANKURA, WEST BENGAL, INDIA, PIN - 700132

Clint :	Development Research Communication And Service Center 58A, Dharmatala Road, Bosepukur Road, Kasba, Kolkata - 700 042
Project Title :	COMMON FACILITY CENTRE ON FOOD PROCESSING BUILDING AT SHIULIGARYA
Drawing Title :	STRUCTURAL DETAIL DRAWING

ARCHITECT & CONSULTANTS:
R.S. CONSULTANTS
ARCHITECT:-ENGINEER-VALUERS/PROJ.CONSULTANTS.
98, SUBODH PARK, (PADMA APARTMRNT)
KOLKATA-700070

Design By	–	Scale	1:100
Drawn By	U. Mondal	Date	05-12-20
Checked & Approved By	D. Bhowmik	Sheet	01
Drawing No.	RS/BNK/STR/01/20	Revision	0

Cad File : RS/BNK/STR/01/20 | Sheet Size : A1 (841 x 594) | Plot Scale : 1:100

SCHEDULE OF FLOOR BEAM (M20 AND FE 500)

MKD.	SIZE	TOP		BOTT.		STIRRUPS (2 LEGGED)	
	(MMxMM)	ALTH	EXT(AT SUPT.)	ALTH	EXT(MID SPAN)	AT SUPPORT	AT SPAN.
B1	250x400	2-16ØT	2-16ØT	2-16ØT	2-16ØT	8ØT@125mm C/C	8ØT@150mm C/C
B2	250x400	2-16ØT	2-16ØT	2-16ØT	2-12ØT	8ØT@125mm C/C	8ØT@150mm C/C
B3	250x400	2-16ØT+2-12ØT	2-16ØT	3-16ØT	2-16ØT	8ØT@125mm C/C	8ØT@150mm C/C
B4	250x400	2-16ØT+2-12ØT +2-16ØT	-	2-16ØT+ 2-16ØT	-	8ØT@125mm C/C	8ØT@150mm C/C
HLB	250x400	3-16ØT	-	3-16ØT	-	8ØT@125mm C/C	8ØT@150mm C/C

SCHEDULE OF SLAB (S1)

SLAB THICKNESS AS MENTIONED :- 115 MM
(ALONG SHORTER DIRECTION) (M20 AND FE 500)

SUPPORT	8mmØ@ 150mm c/c at top of support & extended upto L/3 from beam.
SPAN	8mmØ@ 165mm c/c at span & alternately curtained at L/4 from beam

SLAB THICKNESS AS MENTIONED :-115 MM
(ALONG LONGER DIRECTION) (M20 AND FE 500)

SUPPORT	8mmØ@ 165mm c/c at top of support & extended upto L/3 from beam.
SPAN	8mmØ@ 175mm c/c at span & alternately curtained at L/4 from beam

SCHEDULE OF SLAB (S2)

SLAB THICKNESS AS MENTIONED :- 125 MM
(ALONG SHORTER DIRECTION) (M20 AND FE 500)

SUPPORT	8mmØ@ 135mm c/c at top of support & extended upto L/3 from beam.
SPAN	8mmØ@ 150mm c/c at span & alternately curtained at L/4 from beam

SLAB THICKNESS AS MENTIONED :-125 MM
(ALONG LONGER DIRECTION) (M20 AND FE 500)

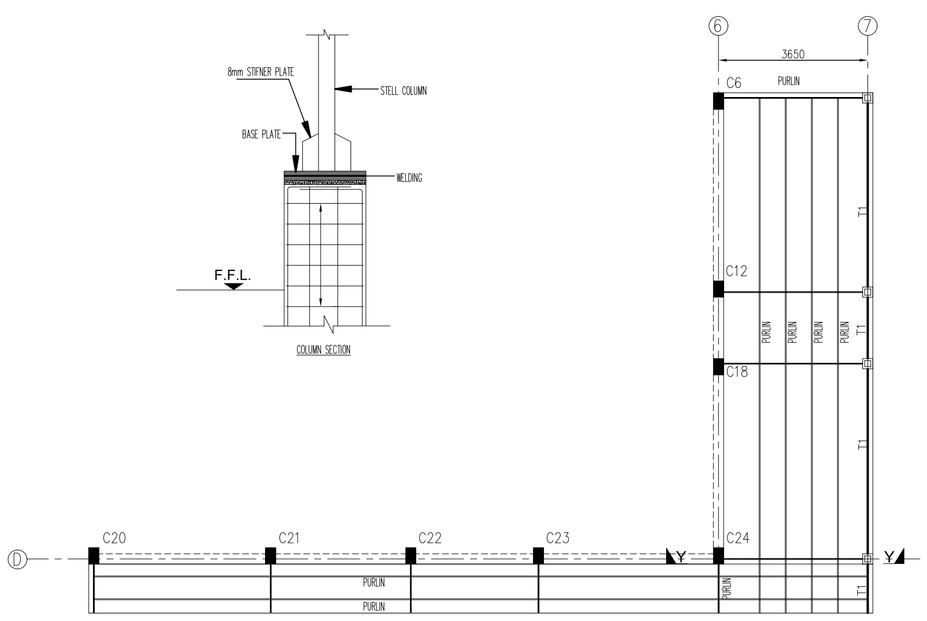
SUPPORT	8mmØ@ 150mm c/c at top of support & extended upto L/3 from beam.
SPAN	8mmØ@ 165mm c/c at span & alternately curtained at L/4 from beam

SCHEDULE OF TIE BEAM (M20 AND FE 500)

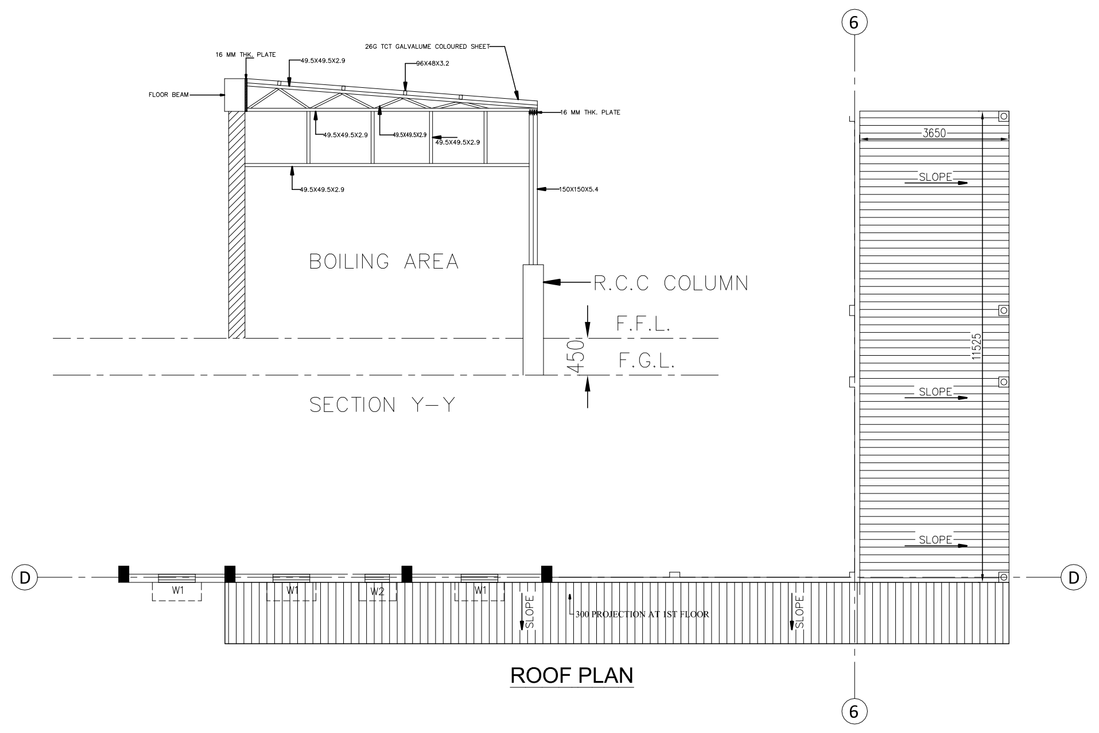
MKD.	SIZE	TOP		BOTT.		STIRRUPS (2 LEGGED)	
	(MMxMM)	ALTH	EXT(AT SUPT.)	ALTH	EXT(MID SPAN)	AT SUPPORT	AT SPAN.
TB1	250x350	2-12ØT	2-16ØT	2-16ØT	2-12ØT	8ØT@125mm C/C	8ØT@150mm C/C
TB2	250x350	2-12ØT	2-12ØT	2-16ØT	2-12ØT	8ØT@125mm C/C	8ØT@150mm C/C

NOTES :-

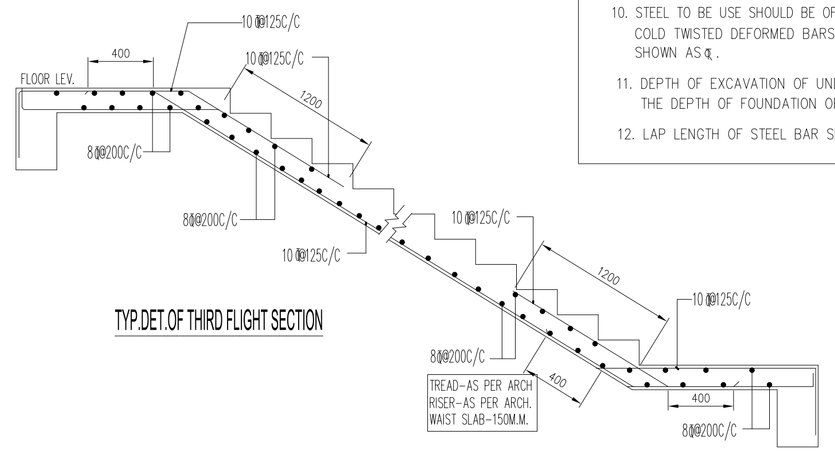
1. ALL DIMENSIONS ARE IN MM
2. ALL CONCRETE SHOULD BE OF GRADE AS SPECIFIED
3. COVER TO REINFORCEMENT
   COLUMN = 40mm , BEAM = 30mm
   SLAB = 15mm , FOUNDATION = 50mm
4. DEPTH OF EXCAVATION OF UNDER GROUND SUMP SHOULD BE ABOVE THAT OF FOUNDATION.
5. DO NOT SCALE THE DRAWING . FOLLOW WITH DIMENSION.
6. ALL WALLS ARE AS PER ARCHITECTURAL DRAWINGS
7. LEAN CONCRETE (1:3:6) NOMINAL MIX 75 THK. SHALL BE PROVIDED UNDER FOUNDATION.
8. THE DRAWINGS SHOULD BE STUDIED CAREFULLY AND ALL DIMENSIONS SHOWN HERE SHOULD BE CHECKED AT SITE. CLARIFICATION REGARDING DISCREPANCY IF ANY, SHOULD BE OBTAINED BEFORE COMMENCEMENT OF WORK.
9. SPACER BAR USED SHALL BE OF 20mm. OR DIAMETER OF THE BAR USED N THE JOB WHICH IS LARGER.
10. STEEL TO BE USE SHOULD BE OF Fe-500 GRADE. REINFORCEMENT SHOULD BE WITH COLD TWISTED DEFORMED BARS CONFIRMING TO IS : - 1786 AND HAVE BEEN SHOWN AS .
11. DEPTH OF EXCAVATION OF UNDER GROUND SUMP/RESERVOIR SHOULD BE ABOVE THE DEPTH OF FOUNDATION OF THE ADJACENT BUILDING / STRUCTURE.
12. LAP LENGTH OF STEEL BAR SHALL BE 50xDIA OF BAR



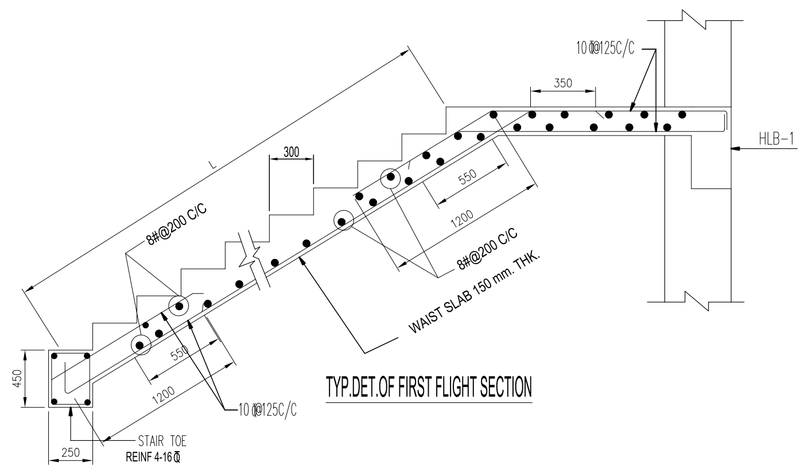
PLAN AT TRUSS LEVEL



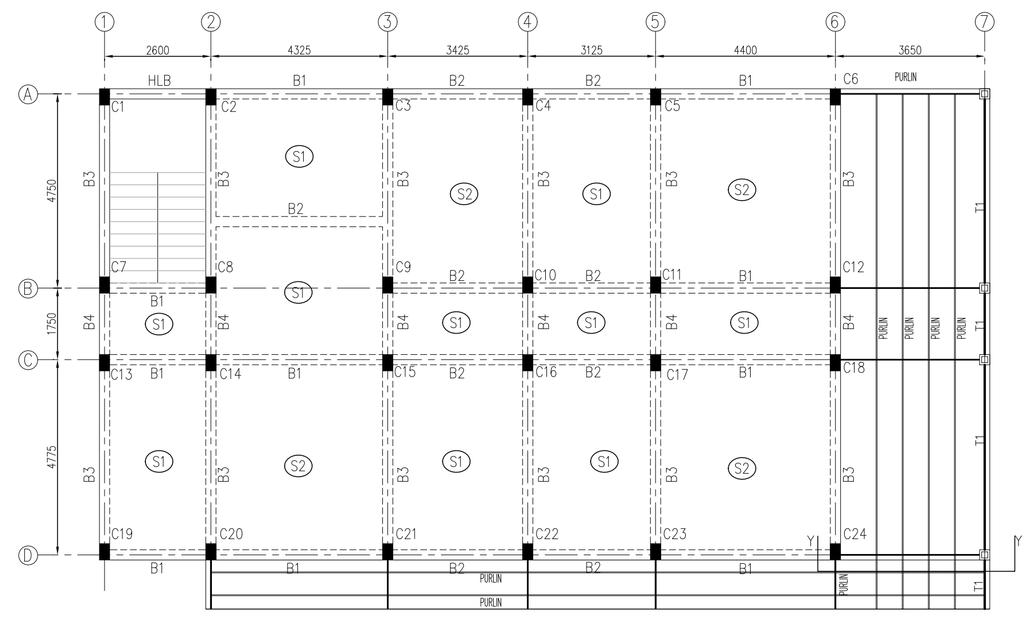
ROOF PLAN



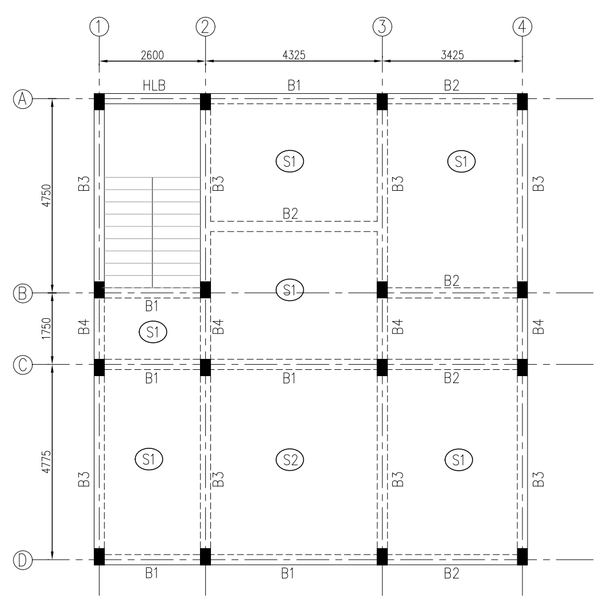
TYP.DET.OF THIRD FLIGHT SECTION



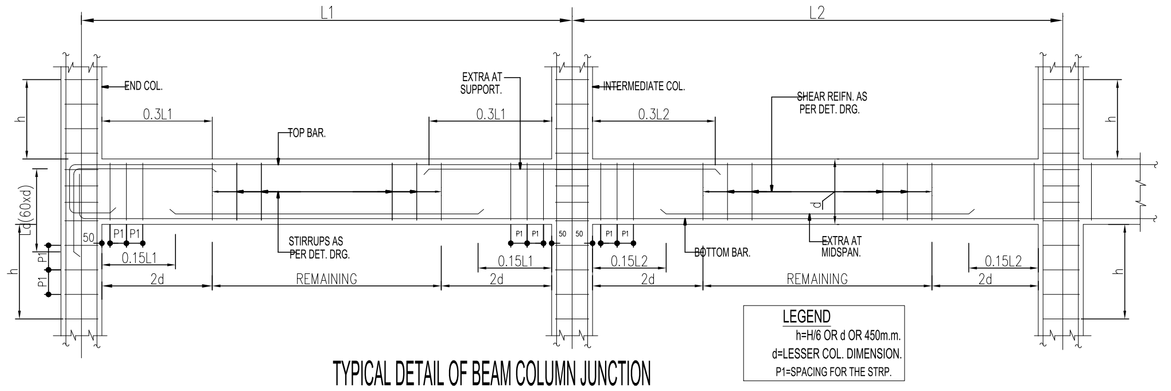
TYP.DET.OF FIRST FLIGHT SECTION



FIRST FLOOR BEAM PLAN



ROOF BEAM PLAN



TYPICAL DETAIL OF BEAM COLUMN JUNCTION

DRAWING RELEASE FOR TENDER

REV.	DATE	DESCRIPTION	BY	CHK	APD.

REVISION

PROPOSED TWO STORIED BUILDING AT MOUZA - SHIULIGORYA, L.R. KHATIAN NO. - 75, L.R. DAG NO.- 148, P.O. - CHHATNA, P.S. - CHHATNA, BANKURA, WEST BENGAL, INDIA, PIN - 700132

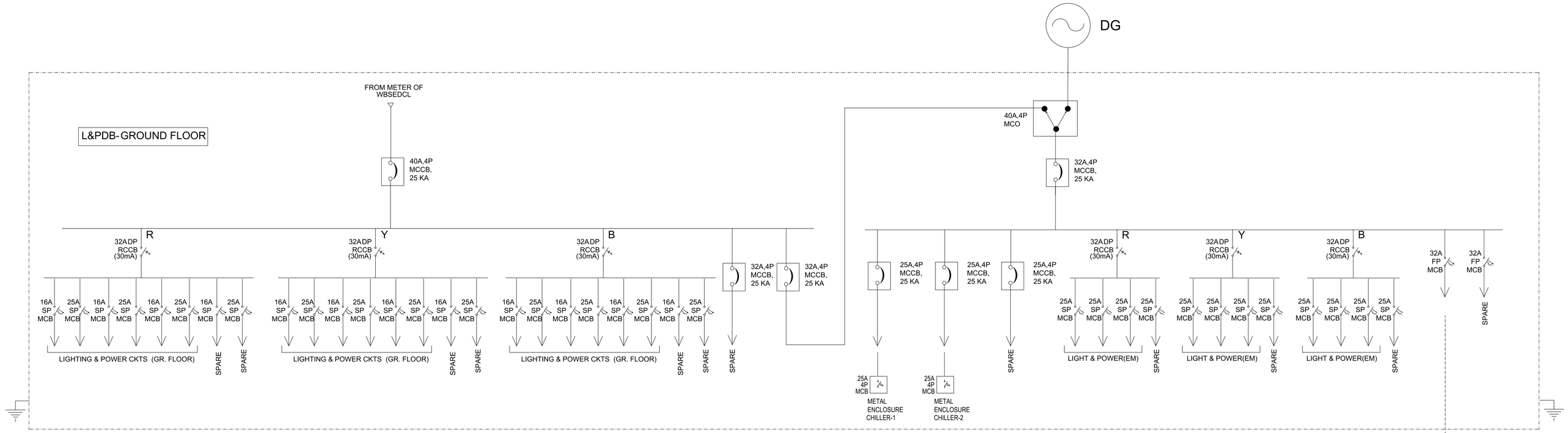
Clint :	Development Research Communication And Service Center 58A, Dharmatala Road, Bosepukur Road, Kasba, Kolkata - 700 042
Project Title :	COMMON FACILITY CENTRE ON FOOD PROCESSING BUILDING AT SHIULIGARYA
Drawing Title :	STRUCTURAL DETAIL DRAWING

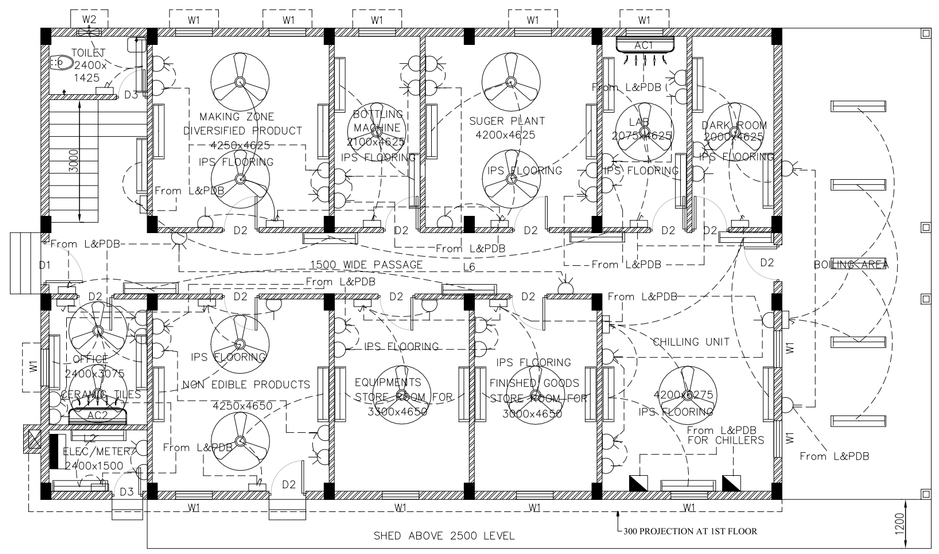
ARCHITECT & CONSULTANTS:
R.S. CONSULTANTS
ARCHITECT:-ENGINEER:-VALUERS/PROJ.CONSULTANTS.
98, SUBODH PARK (PADMA APARTMRNT)
KOLKATA-700070

Design By	-	Scale	1: 100
Drawn By	U. Mondal	Date	05-12-20
Checked & Approved By	D. Bhowmik	Sheet	01
Drawing No.	RS/BNK/STR/02/20	Revision	0
Cad File : RS/BNK/STR/02/20	Sheet Size : A1 (841 x 594)	Plot Scale : 1:100	

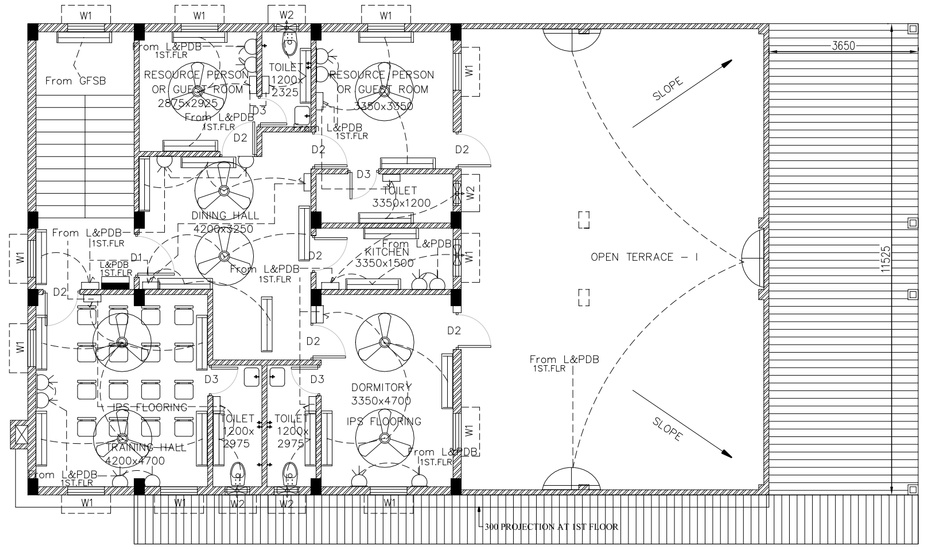
LEGEND

SYMBOL	DESCRIPTION
	CEILING FAN 80W 1200mm dia
	WINDOW EXHAUST FAN 250mm 45W WITH 6 AMP SOCKET
	SURFACE/WALL MOUNT LED TUBE 1X18 W
	6/16 AMP SOCKET POINT WITH SWITCH
	6 AMP SOCKET POINT WITH SWITCH
	SURFACE MOUNTED SWITCH BOARD
	LIGHTING & POWER DB AT +1800MMAFFL
	SURFACE/WALL MOUNT LED TUBE 1X18 W
	SPLIT A.C 2/1.5TR
	BULK HEAD FITTING (OD)
	MCB/ISO

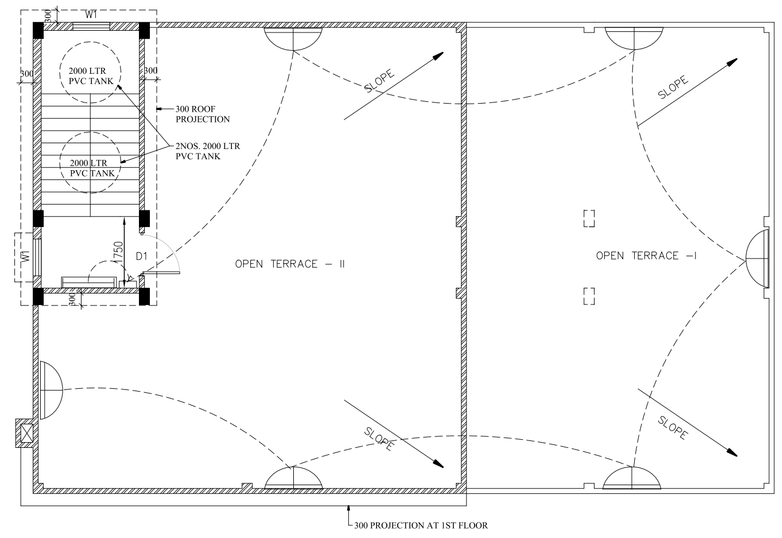




PROPOSED GROUND FLOOR PLAN



PROPOSED FIRST FLOOR PLAN



PROPOSED ROOF PLAN

DRAWING RELEASE FOR TENDER

REV.	DATE	DESCRIPTION	BY	CHK	APD.
		REVISION			

PROPOSED TWO STORIED BUILDING AT MOUZA - SHIULIGORYA, L.R. KHATIAN NO. - 75, L.R. DAG NO.- 148, P.O. - CHHATNA, P.S. - CHHATNA, BANKURA, WEST BENGAL, INDIA, PIN - 700132

Clint :	Development Research Communication And Service Center 58A, Dharmatala Road, Bosepukur Road, Kasba, Kolkata - 700 042
Project Title :	COMMON FACILITY CENTRE ON FOOD PROCESSING BUILDING AT SHIULIGARYA
Drawing Title :	ELECTRICAL DETAIL DRAWING

ARCHITECT & CONSULTANTS:
R.S. CONSULTANTS
ARCHITECT,-ENGINEER,-VALUERS/PROJ.CONSULTANTS.
98, SUBODH PARK, (PADMA APARTMRNT)
KOLKATA-700070

Design By	–	Scale	1:100
Drawn By	U. Mondal	Date	05–12–20
Checked & Approved By	D. Bhowmik	Sheet	01
Drawing No.	RS/BNK/ELEC/01/20	Revision	0

Cad File : RS/BNK/ELEC/01/20 | Sheet Size : A1 (841 x 594) | Plot Scale : 1:100