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Name of Work:- **Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.**

NIT APPROVAL

Name of Work: Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.

Head of Account	:-	**DST R&D PROJECT – DESIGN AND DEMONSTRATION OF OFF-GRID SELF HEALING AND SUSTAINABLE DC COMMUNITY ENERGY SOLUTIONS**
Estimated Cost	:-	**Rs. 19,40,000/-**
Earnest Money	:-	**Rs. 38,800/-**
Security Deposit	:-	**Rs. 2.5% of Gross Value of Bill**
Performance Guarantee	:-	**Rs. 3% of Tender Value**
Time allowed	:-	**45 DAYS**

NIT approved amounting to **Rs. 19,40,000/-** (**Rs. Nineteen Lakhs Forty Thousand Only)**

Executive Engineer

PRESS NOTICE TO BE ISSUED FOR PUBLICATION IN NEWS PAPERS

NOTICE INVITING E-TENDERS

The Executive Engineer, Delhi invites on behalf of Delhi Technological University, Delhi online item rate tenders for following works:-

NIT No. /21/DTU/EC/

Name of Work: - **Supply and installation of precast structure for the erection of two storey control room, precast solar PV mms foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.**

Estimated Cost: Rs. **19,40,000**/- Earnest Money: Rs. **38,800**/-
Time Allowed: **45 Days**.
Last Date & Time for Online submission of Bid: _____ (upto 15.00 hrs);
The tender documents and other details are available on Delhi Government Website https://govtprocurement.delhi.gov.in vide Tender ID No. _____

Executive Engineer

INSTRUCTION TO CONTRACTOR

Name of Work: **Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.**

The contractor submitting the tender should read the schedule of quantities, additional conditions, additional specifications, particular specifications and other terms and conditions given in the NIT and drawing. The tenderer should also read the General Conditions of Contract for CPWD Works 2014 with upto date correction slips, which is available as Government of India Publications, however provisions included in the tender document shall prevail over the provisions contained in the standard form. The set of drawings and NIT shall be available with the The Executive Engineer, Delhi Technological University, Shahbad Daulatpur, Bawana Road, New Delhi. The following conditions, which already form part of the tender conditions, are specially brought to his notice for compliance while filling the tender. They are requested to comply following instructions.

Tenders with any condition including that of conditional rebates shall be rejected forthwith.

The successful tenderer shall be required to submit a performance guarantee of 3% (Three percent) of the agreement amount in lieu of EMD within 07 days of issue of letter of acceptance. This period can be further extended by Engineer-in-Charge upto a maximum period of 7 days on the written request of the contractor.

GSTIN etc. as applicable shall be borne by the contractor himself. The contractor shall quote his rated considering all such GST.

However, the service tax will be reimburse to the firm after submission of proof of deposit the same to the concerned department.

Executive Engineer

C.P.W.D. – 6

GOVERNMENT OF NCT OF DELHI
DELHI TECHNOLOGICAL UNIVERSITY
NOTICE INVITING TENDER

1. The eligibility criteria mentioned as below:-

   The firms who fulfill the following requirements shall be eligible to apply. (Joint ventures are not accepted):

   The specialized firms who have satisfactorily completed the similar nature works as mentioned below during the last seven years ending previous day of last date of submission of bids:

   Three similar works each costing not less than the amount equal to 40% of the estimated cost put to tender.

   Or Two similar works each costing not less than the amount equal to 60% of the estimated cost put to tender.

   Or One similar completed work of aggregated cost not less than amount equal to 80% of the estimated cost put to tender.

   Similar nature works means works of "SUPPLY AND INSTALLATION OF PRECAST STRUCTURE FOR THE ERECTION OF TWO STOREY CONTROL ROOM, PRECAST SOLAR PV MMS FOUNDATION, PRECAST POLE FOUNDATION AND PRECAST EARTHING CHAMBER AND SUPPLY OF PRECAST HOUSING FOR BATTERY BANK AND POWER CONTROLLER, AT MUSEPUR, PILIBHIT TIGER RESERVE, UTTAR PRADESH.".

   The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to last date of receipt of application for tender.

   Should have average annual financial turnover of 50% of the estimated cost during the last three consecutive years ending 31st March 2020. (Scanned copy of Certificate from CA to be uploaded)

   Should not have incurred any loss in more than two years during the last five years ending 31st March 2020.

   Should have a solvency of 40% of the estimated cost (Scanned copy of original solvency to be uploaded)

   Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/ Certificate from CA mentioning Financial Turnover of last 3 years or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.

2. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.

3. The time allowed for carrying out the work will be 45 DAYS from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the tender documents.
4. The site for the work is available.
5. Tenders forms can be down loaded upto …….. (3.00 PM)
   Tender documents consisting of plans, specifications, the schedule of quantities of the various classes of work to be done and the set of terms & conditions of contract to be complied with by the contractor whose tender may be accepted and other necessary documents can be seen in the office of the Executive Engineer, Delhi Technological University, Delhi between hours of 11.00 AM & 3.00 PM from **…….. to …….** every day except on Sundays and Public holidays. Tender documents, excluding standard form, can be downloaded from the website https://delhi.govtprocurement.co.in free of cost and deposited along the following: -
6. Scanned copies of all required documents viz. Demand draft/ Postal order/Fixed deposit receipt of a schedule bank for EMD in favor of **Registrar, DTU, New Delhi.** Should be uploaded by the contractors for Above mention work**. Original DD/FDR for EMD (Bid security) as well as signed copies of uploaded documents shall be deposited in the tender box placed in Admin. Block, Engineering Cell, DTU Delhi-42** for the same before 1500 hrs. on the last day fixed for uploading of bids failing which their bids shall not be evaluated opened. Price bid shall be uploaded on the website before the last date/time for receipt of the tender. The price bid of only those tenders will be opened whose application are found in order and approved by the competent authority

7. Tenders will be received online by **Executive Engineer**, Delhi Technological University, Shahbad Daulatpur, Bawana Road, New Delhi. upto 03.00 PM on _____ and civil/technical bids will be opened online by him or his authorized representative in his office on the same day and on _____ at 03.30 PM.
8. The contractor whose tender is accepted, will be required to furnish performance guarantee of 3% (Three percent) of the tendered amount within the period specified in Schedule F. This guarantee shall be in the form of Deposit at call receipt of any scheduled bank/ Bankers's Cheque of any scheduled bank/ Demand draft of any scheduled bank/Pay order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form.

9. The description of the work as follows: **As per Schedule of work.**
Copies of other drawings and documents pertaining to the works will be open for inspection by the tenderers at the office of the above-mentioned officer.
Tenderers may inspect and examine the site and its surroundings as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials tools & plants, water, electricity, access facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant etc. will be issued to him by the University/Government and local conditions and other factors having a bearing on the execution of the work.

10. The competent authority on behalf of the DTU does not bind himself to accept the lowest or any other tender, and reserves to himself the authority to reject any or all of the tenders received without the assignment of any reason. All tenders, in which any of the prescribed conditions is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer, shall be summarily rejected.
The public enterprises who avails benefits of the purchase preference should be subjected to adequate penalties for cost overruns etc.

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

12. The competent authority on behalf of the DTU reserves to himself the right to accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.

13. The contractor shall not be permitted to tender for works in the CPWD Circle (responsible for award and execution of contracts) in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

14. No Engineer of gazetted rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of two years after his retirement from Govt. Service without pervious permission of the Govt. of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Govt. of India as aforesaid before submission of the tender or engagement in the contractor's service.

15. The tender for the work shall remain open for acceptance for a period of Ninety (90) days from the date of opening of tenders. If any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier or makes any modifications in the terms and conditions of the tender which are not acceptable to the department, then the Govt. shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid.

16. The Notice Inviting Tender shall form a part of the contract document. The successful Tenderer / Contractor, on acceptance of his tender by the Accepting Authority, shall within Seven (07) days from the stipulated date of start of the work sign the contract consisting of: -

a) The Notice Inviting Tender, all the documents including additional conditions, specifications and drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.

b) Standard C.P.W.D. Form 8.

17. For composite tenders

17.1.1 The tenderer must associate with himself agencies of the appropriate class eligible to tender for the other components individually.

17.1.2. It will be obligatory on the part of the tenderer to sign the tender documents for all the components. (The Schedule of quantities, conditions and special conditions etc.)

17.1.3. After the work is awarded, the contractor will have to enter into separate agreements for each component with the officer concerned.

17.1.4 Executive Engineer in charge of minor component shall make interim payments in respect of minor component of work. Executive Engineer in charge of the major component shall make the payment against final bill of the composite contract.

17.2 The Executive Engineer in charge of the major component will call tenders for the composite work. The cost of tender document and Earnest money will be fixed with respect to the combined estimated cost put to tender for the composite tender. Security deposit will be worked out separately for each component corresponding to the estimated cost of the respective component of works. The earnest money will become part of the security deposit of the major component of work.

17.3 On acceptance of the composite tender by the competent authority the letter of award will be issued by the Executive Engineer in charge of the major competent on behalf of the DTU, making it clear of award that the contractor will have to execute separate agreements for different components of work with the concerned officers of the respective discipline (Designation to be given).

C.P.W.D. – 8

GOVERNMENT OF NCT OF DELHI
PUBLIC WORKS DEPARTMENT

BRANCH: Engineering Cell **DIVISION: DTU**

Item Percentage Rate Tender & Contract for Works

Tender for the work of: - Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur , Pilibhit Tiger Reserve, Uttar Pradesh.

(i) To be submitted by **3.00 P.M.** hours on _____ to **The Executive Engineer,** Delhi Technological University, Shahbad Daulatpur, Bawana Road, New Delhi.
(time) **(date)**
Eligibility criteria to be opened at 3:30 PM on _____ in the office of **The Executive Engineer,** Delhi Technological University, Shahbad Daulatpur, Bawana Road, New Delhi.
(ii)

Price Bid shall be opened at 03:30 PM on _____ in the office of **The Executive Engineer,** Delhi Technological University, Shahbad Daulatpur, Bawana Road, New Delhi.

TENDER

I/We have read and examined the notice inviting tender, schedule, A, B, C, D, E & F. Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the Delhi Technological University, Delhi within the time specified in Schedule 'F', viz., schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

We agree to keep the tender open for Seven (07) days from the due date of submission thereof and not to make any modifications in its terms and conditions.

A sum of Rs. 38,800/- is hereby forwarded in Cash/ Receipt Treasury Challan/Deposit at call receipt of a Scheduled Bank/fixed deposit receipt of scheduled bank/demand draft of a scheduled bank as earnest money. If I/we fail to furnish the prescribed performance guarantee within prescribed period, I/we agree that the said Delhi Technological University, Delhi or his successors in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/we fail to commence work as specified, I/we agree that Delhi Technological University, Delhi or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by him towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered, upto maximum of the percentage mentioned in Schedule 'F' and those in excess of that limit at the rates to be determined in accordance with the

provision contained in Clauses 12.2 and 12.3 of the tender form. Further I/We agree that in case of forfeiture of earnest money or both Earnest Money & Performance Guarantee as aforesaid. I/We shall be debarred for participation in the re-tendering process of the work.

I/We hereby declare that I/We shall treat documents drawings and other records connected with the work as secret/ confidential documents and shall not communicate information /derived there from to any person other than a person to whom I/We am / are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State**.**

Signature of Contractor
Postal Address

Witness:

Address:

Occupation:

ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the Delhi Technological University, Delhi for a sum of Rs. _____(Rupees _____ _____) The letters referred to below shall form part of this contract Agreement:-

a)

b)

c)

For & on behalf of the Delhi Technological University,

Delhi.

Signature _____

Dated ……

Designation _____

LETTER OF TRANSMITTAL
(For NON CPWD contractors and other experienced contractors)

[On the Letterhead paper of the Tenderer, or partner Responsible including full Postal address, telephone no., fax no. and E-Mail and cable address]

No._____ Date: _____

To,

Executive Engineer,
Delhi Technological University
Shahbad Daulatpur,
New Delhi-110018

Name of Work: **Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.**

Sir,

Having examined the details given in press Notice and bid document for the above work, I / We hereby submit the relevant information.

1. I / We hereby certify that all the statements made and information supplied in the enclosed forms A to D and accompanying statement are true and correct.

2. I / We have furnished all information and details necessary for eligibility and have no further pertinent information to supply.

I / We submit the requisite certified solvency certificate and authorize the Executive Engineer Delhi Technological University, Shahbad Daulatpur, Delhi to approach the Bank issuing the solvency certificate to confirm the correctness thereof. I / We also authorize Executive Engineer (Delhi Technological University Shahbad Daulatpur Delhi).

3. To approach individuals, employers, firms and corporation to verify our competence and general reputation.

4. I / We submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following works :

Sl .No.	**Name of work**	**Certificate from**

Enclosures:

Seal of bidder

Date of submission **SIGNATURE(S) OF BIDDER(S)**

FORM 'A'

FINANCIAL INFORMATION

I. Financial Analysis –

(a) Details to be furnished duly supported by figures in balances sheet / profit & loss account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

(b) The information supplied shall be the annual turnover on construction work of the bidder in term of the amount billed to client for each year for work in progress or completed.

Financial Year	**2019-20**	**2018-19**	**2017-18**	**2016-17**	
Gross Annual turnover on Construction works					
Profit / Loss **					

II. Financial arrangements for carrying out the proposed work.

III. Solvency Certificate from Bankers of the bidder in the prescribed Form "B".

* Amount to be filled in all columns ** Loss to be shown in with (-) sign

Signature of Bidder(s).

Signature of Chartered Accountant with Seal.

FORM 'B'

FORM OF BANKER'S CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s / Sh…….....
having marginally noted address, a customer of our bank are/is respectable and can be treated as good for any engagement upto a limit of Rs…….....… (Rupees…….....
.....…….).

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature) For the Bank

NOTE:

(1) Banker's certificates should be on letter head of the Bank.

(2) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

FORM 'C'

DETAILS OF ALL WORKS OF SIMILAR-CLASS COMPLETED DURING THE LAST SEVEN YEARS

S. No.	Name of work / project and location	Owner or sponsoring organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation / Arbitration cases pending / in progress with details *	Name and address / telephone number of officer to whom reference may be made	Remarks i/c grant of extension of Time with/without levy detail	Whether similar works have been executed on back to back basis (Yes/No)
1	2	3	4	5	6	7	8	9	10	

* Indicate gross amount claimed and amount awarded by the Arbitrator

SIGNATURE OF BIDDER(S)

FORM 'D'

PERFORMANCE REPORT OF WORKS REFERRED TO IN FORM "C"

1. Name of Work/Project & Location
2. Agreement No.
3. Estimated Cost
4. Tendered Cost
5. Value of Actual work done
6. Date of Start
7. Date of Completion
   - (i) Stipulated Date of Completion
   - (ii) Actual Date of Completion

Dated:

Executive Engineer or Equivalent
Address & Phone No. :

SCHEDULES

SCHEDULE 'A' **As per Schedule attached at page no: 40-41**

Schedule of quantities (Enclosed.)

SCHEDULE 'B'

Schedule of materials to be issued to the contractor.

S.No.	Description Of item	Quantity	Rates in figures & words At which the material will be charged to the contractor.	Place of Issue
1	2	3	4	5

NOT APPLICABLE

SCHEDULE 'C'

Tools and plants to be hired to the contractor.

S.No.	Description	Hire charges per day.	Place of Issue
1	2	3	4

NOT APPLICABLE

SCHEDULE 'D'

Extra schedules for specific requirements / documents for the work, if any. - Enclosed –

Technical particulars, commercial & additional conditions & additional specifications for Supply and Installation of specified work. - Enclosed -

SCHEDULE 'E'

Schedule of component of Cement, Steel, Other Materials, Labour etc. for price escalation.

CLAUSE 10 CC

Component of Cement
expressed as per cent of total value of work Xc **Not Applicable**

Component of Steel
expressed as per cent of total value of work Xs **Not Applicable**

Component of Materials
expressed as per cent of total value of work Xn **Not Applicable**

Component of Labor
expressed as per cent of total value of work Y **Not Applicable**

Component of POL
expressed as per cent of total value of work Z **Not Applicable**

SCHEDULE 'F'

Reference to General Conditions of contract 2014.

Name of Work: **Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.**

Estimated cost of work. : Rs. 19,40,000/-

(i) Earnest Money : Rs. 38,800/-

(ii) Performance Guarantee: 3% (Three percent) of accepted value of work.

(iii) Security Deposit: 2.5% of gross value of the bill

GENERAL RULES & DIRECTIONS:

Officer inviting tender	Executive Engineer, DTU, Delhi
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3	See below.

Definitions:

2 (v)	Engineer –in – charge	Executive Engineer DTU, Delhi
2 (viii)	Accepting Authority	Vice Chancellor Delhi Technological University, New Delhi
2 (x)	Percentage on cost of materials and labour to cover all overheads and profits.	15 %
2 (xi)	Standard Schedule of Rates.	Market Rates/ DSR-2018/
2 (xii)	Department	Autonomous body (Delhi Govt.)
9 (ii)	Standard CPWD Form	CPWD form 8 as modified & corrected upto date.

Clause 1

i)	Time allowed for submission of Performance Guarantee From the date of issue of letter of acceptance, in days	07 Days
ii)	Maximum allowable extension beyond the period provided in i) above in days	07 Days

Clause 2

Authority for fixing Compensation under Clause 2.	Vice Chancellor Delhi Technological University New Delhi

Clause 2 A

Whether Clause 2 A shall be applicable	Not applicable

Clause 5

Number of days from the date of issue of letter Of acceptance for reckoning date of start	10-days

Miles Stone(s) as per table given below:-

TABLE OF MILE STONES (S)

S.No.	Description of Milestone(Physical)	Time Allowed in months (from date of start)	Amount to be with - held in case of non-achievement of milestone.
1.		1.5 Months	1.5 % of Tender Amount

OR

S.No.	Financial Progress	Time Allowed (from date of start)	Amount to be with - held in case of non-achievement of milestone.
N/A			

Time allowed for execution of work 45 Days

Clause 6
Clause applicable (6) 6A

Clause 7

Gross work to be done together with net payment/ adjustment of advances for Material collected, if any, since the last such payment for being eligible to interim payment. Not applicable

Clause 10 A

List of testing equipment to be provided by the contractor at site lab. Not applicable.

Clause 10 B (ii)

Whether Clause 10 B (ii) shall be applicable Not applicable

Clause 10 CA

Material covered under the Clause Not Applicable

Clause 10 CC

Clause 10 CC to be applicable in contracts With stipulated period of completion exceeding The period shown in next columns. ____N/A_____

Clause 11

Specifications to be followed — 1) CPWD Specification for Civil Works Volume-I, Volume-II 2019 amended up to date.
2) CPWD Specification for Electrical Works Internal and external, amended upto date.

Clause 12

12.2 & 12.3	Deviation limit beyond which Clause 12.2. & 12.3 shall apply for original work	NA
12.5	Deviation limit beyond which clauses 12.2 & 12.3 shall apply for foundation work.	NA

Clause 16

Competent Authority for Deciding reduced rates. — Vice Chancellor, DTU New Delhi upto 5% of contract value

Clause 36

Requirement of technical representative (s) and recovery rate(s).

S. No.	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical/ Technical representative)	Minimum Experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36 (i)	
						Figures	Words
1.	Graduate Engineer or Diploma Holder	Electrical	Principal Technical representative	2 Years 5 Years	1 1	Rs. 15000/- Per Month	Rs. Fifteen Thousand Per Month

Assistant Engineer retired from Govt. services that are holding Diploma will be treated at par with Graduate Engineer.

Clause 42

i) (a) Schedule/ statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates **2018** printed by C.P.W.D. — Not Applicable.

ii) Variations permissible on theoretical quantities.

(a) Cement for works with estimated Cost put to tender not more than Rs. 5 Lakhs. : Not applicable

For works with estimated cost put to Tender more than Rs. 5 lakhs. : Not applicable

b) Bitumen All works. : Not applicable

c) Steel Reinforcement and structural steel sections for each diameter, section and category : Not applicable

d) All other materials : Not applicable

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

SI. No.	**Description of Item**	**Rates in figures and words at which recovery shall be made from the Contractor. Rates in schedule 'B' plus 10% in case materials issued by the Department.**	
		Excess beyond permissible variation.	**Less use beyond the permissible variation.**
1.	**Cement**	**NOT APPLICABLE**	
2.	**Steel reinforcement**		
3.	**Structural sections**		
4.	**Bitumen issued free**		
5.	**Bitumen issued at stipulated fixed price.**		

ANNEXURE -"A "

FORM OF EARNEST MONEY (BANK GUARANTEE)

WHEREAS, contractor, M/s..... (Name of contractor) (hereinafter called "the contractor") has submitted his tender dated …..... (date) for the w ork of ..... (name of work) (hereinafter called "the Tender")

(hereinafter called "the Engineer-in-Charge") in the sum of Rs. ...../- (Rs. in words .....) for which
payment well and truly to be made to the said Engineer-in-Charge the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ..... day of ..... 20…….

THE CONDITIONS of this obligation are:

(1) If after tender opening, the Contractor withdraws his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;

(2) If the contractor having been notified of the acceptance of his tender by the Engineer-in-Charge:

(a) Fails or refuses to execute the Form of Agreement in accordance with the Instructions to contractor, if required;

OR

(b) Fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor,

OR

(c) Fails or refuses to start the work, in accordance with the provisions of the contract and Instructions to contractor,

OR

(d) Fails or refuses to submit fresh Bank Guarantee of an equal amount of this Bank Guarantee, against Security Deposit after award of contract.

We undertake to pay to the Engineer-in-Charge **either** up to the above amount **or part thereof** upon receipt of his first written demand, without the Engineer-in-Charge having to substantiates his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by him is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date* ..... after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the Engineer-in-Charge, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE ..... SIGNATURE OF THE BANK WITH SEAL

WITNESS .....

(SIGNATURE, NAME AND ADDRESS)

* Date to be worked out on the basis of validity period of 6 months from last date of submission of tender.

ANNEXURE-"B"

FORM OF PERFORMANCE SECURITY (GUARANTEE)

BANK GRARANTEE BOND

In consideration of the President of India (hereinafter called "The Government") having offered to accept the terms and conditions of the proposed agreement between.....*.....and ..... * ... .(Hereinafter called "the said Contractor(s)") for the work .....*..... ……..(hereafter called "the sa id agreement") having agreed to production of a irrevocable Bank Guarantee for Rs. ……..……. (Rupees.....*.....only) as a secur ity/guarantee from the contractor(s) for compliance of this obligations in accordance with the terms and conditions in the said agreement.

1) We ……..……(hereinafter referred to a s "the Bank") here by (indicate the name of the Bank)
Undertake to pay to the Government in amount not exceeding
Rs …….. (Rupees…...……..

2) We ……do hereby undertake to pay the a mounts due and payable (indicate the name of the Bank)
Under this Guarantee without any demure, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the Bank shall be conclusive as regards the amount due payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs……..(R upees ....*.....only).

3) We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this preset being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

4) We …..……further agree that the guarantee herein contained (indicate the name of the Bank) shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-charge on behalf of the government certified that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor(s) and accordingly discharges this guarantee.

5) We.....further agree with the Government that(indicate the name of the Bank) the government shall have the fullest liberty without our consent and without effecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor (s) and to for bear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the

Government to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6) This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).

7) We……*…….lastly undertake not to revoke this
(indicate the name of the Bank)
guarantee except with the previous consent of the Government in writing.

8) This guarantee shall be valid upto___*_____. Unless extended on demand by Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs.___*_____(Rs. ____*_____only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.
Dated the ____* _____day of ____*_____for ____*_____(indicate the name of bank)

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A F F I D A V I T

I/ We have submitted a bank guarantee for the work _____

(Name of work)

Agreement No._____dated_____from _____

(Name of the Bank with full address)

to the Executive Engineer _____ with a view to seek exemption from payment of security deposit/performance guarantee in cash. This bank guarantee expires on _____. I/We undertake to keep the validity of the bank guarantee intact by getting it extended from time to time at my/our initiative upto a period of _____ months after the recorded date of completion of the work or as directed by the Engineer-in-Charge.

I/We also indemnify the Government against any losses arising out of non-encashment of the bank guarantee, if any.

Note: The affidavit is to be given by the executant before a first class Magistrate.

TERMS AND CONDITIONS

1. Firms/ Contractor shall quote the rates in tender both in “Figures & Words” also. Otherwise the tender will not entertained.

2. All the materials, whatsoever, to be supplied and provided by the contractor should be of standard and approved quality. These should be got approved from the Engineer-in-Charge or his authorized representative before installation. No payment will be made for any unapproved or substandard/ rejected materials used on the work. Rejected materials should be removed from the site of work within 48 hours failing which the same will be liable for removal by the department at the risk and cost of contractor without any liability.

3. The civil work shall be done in closed co-ordination and in phase, strictly with civil works and as & when reqd. during the period of contract at the call. The contractor shall start the work within 24 hrs of the call made to contractor on telephone/ in writing etc as applicable. Where-ever these are in control of this office no claim for idle labor shall be entertained under this agreement.

4. The bidder shall provide a bond for the water proofing of the structure for the duration of 10 years

5. The contractor has to stand warranty for a minimum period of 12 Month from the date of commissioning and acceptance of the job by the department, for satisfactory working of the equipments and entire system and also for faulty workmanship/ equipment.

6. The contractor shall be responsible for watch and ward of the installation till the time the installation is handed over to the department after completion of work in all respects.

7. The work is to be carried out on the site without disturbing the client & nothing shall be paid extra on the account of idea labour.

8. The work involves specialized staff in the field. The firm is directed to engage fully trained staff well-versed with the works.

9. The contractor shall submit inventory of all the equipments alongwith.

10. All watch and ward of the materials installed at work will be responsibility of the contractors till their handing over to the department on completion of work. Merely recording of measurement and running payments made to contractor. There will be regular handing over/ taking over the installation. Any missing item shall have to be make good by the contractor.

11. Persons employed for execution of civil work / electrical work should have civil license / electrical license as required.

12. Department shall not be responsible for any injury partial or permanent or death of any worker at site due to accident or manufacturing of the equipment or by negligence of the staff.

13. No T&P shall be issued by the department for execution of work.

14. First aid box shall be kept by the contractor at site of work. No extra payment shall be made on this account.

15. The firm shall furnish certificate/ undertaking from the labour employed by him that he will not claim security of job from the department at any stage of time.

16. If any condition's is put by the contractor, which is not as per CPWD specifications/ terms and conditions of NIT, his tender is liable to be rejected.

17. Contractor will have to abide by the instructions contained in CPWD Manual Volume-I, Volume-II (upto date) applicable to him.

18. The rates quoted by Firm/ Contractor shall be inclusive of all taxes such as GST, CST, etc. and nothing extra shall be paid on this account. The quoted rates shall be firmed.

19. Contractor will inform the contact number to Deptt. so that in case of emergency the contractor can be informed for the work.

20. The department shall be at liberty to discontinue/ cancel the contract/ agreement found unsatisfactory by without giving any notice in accordance with the above terms and conditions or otherwise, without assigning and reason thereof. Decision of Project-in-Charge shall be final and binding on the contractor for which no claim on any account shall be entertained by the department.

Sd/-

Technical Specifications
And
Scope of Work

SUPPLY AND INSTALLATION OF PRECAST STRUCTURE FOR THE ERECTION OF TWO STOREY CONTROL ROOM, PRECAST SOLAR PV MMS FOUNDATION, PRECAST POLE FOUNDATION AND PRECAST EARTHING CHAMBER AND SUPPLY OF PRECAST HOUSING FOR BATTERY BANK AND POWER CONTROLLER, AT MUSEPUR, PILIBHIT TIGER RESERVE, UTTAR PRADESH.

Site Location: Musepur, Pilibhit Tiger Reserve, Uttar Pradesh				**Google Coordinates 28.599897027438242, 80.25836995290595**		
S. No.	**Description**			**Dimensions**	**Quantity**	**Annexure**
1.	**PRECAST OF THE HOUSING FOR BATTERY BANK & POWER CONTROLLER**					
	1.	Thickness of side walls, top shelf and back wall		50mm	40	Annexure 2.7
	2.	Thickness of bottom shelf		100mm		
	3.	Ground to bottom Shelf Clearance		225mm		
	4.	Height	(a)	875mm	-	
			(b)	500mm		
	5.	Width	(c)	900mm		
			(d)	800mm		
	6.	Depth	(e)	500mm		
			(f)	450mm		
	7.	Conduit Chimney	(g)	250mmx200mmx1000m m , 50 mm thick		
	8.	RCC		M25(1:1:2)		
2.	**PRECAST STREET LIGHT POLE FOUNDATION**					
		Length x Breadth x Height		500mmx500mmx1100mm	57	Annexure 2.8
	1.	Foundation Bolt Length		700mm		
	2.	Bolt Length Above Precast		100mm		
	3.	Thickness & No. of Bolt		16mm X 4 Nos with 3 no's of nuts and washers in each		
	4.	Type of Bolt		Anchor bolts with j-shaped		
	5.	RCC		M20(1:1.5:3)		
3.	**PRECAST TWO STOREY CONTROL ROOM**					
	1.	Building Area		3600mmX4500mm	1	Annexure 2.1 to Annexure 2.6
	2.	Wall Thickness		≥ 100mm		
	3.	Roof Thickness		≥ 125mm		
	4.	Uplifting of Building to Ground/Road Level		1500mm		
	5.	Step Length of Staircase		600mm		
	6.	RCC		M25(1:1:2)		
	7.	3 Section Septic Tank		600mmX1800mm		
	8.	Water Tank		1000 Litres		
	9.	Doors , Windows, Stairs		Galvanized MS	-	
	10.	Electrical Conducting		As per design specified	-	
	11.	Plumbing		As per design specified	-	
4.	**FENCING**					
	1.	Precast Vertical Column 1		100mm X 100mm X 3000mm	32	Annexure 2.10
	2.	Precast Vertical Column 2		100mm X 100mm X 5100mm	12	
	3.	Chain Link Fencing		Height – 7ft	63m running	
5.	**PRECAST EARTHING CHAMBER**					
	1.	Pit Size		450mm X 450mm	3	Annexure 2.11
	2.	Thickness		50mm		
	3.	Lid (Chequered Plate)		Thickness – 6mm		
	4.	Boundary Offset		150mm		

6.		**PRECAST SOLAR MODULE MOUNTING STRUCTURE (MMS) FOUNDATION**			
	1.	Foundation A (Length X Breadth X Height)	13200mm X 2900mm X 800mm	3	Annexure 2.9
	2.	Foundation A - Thickness	600mm		
	3.	Foundation B (Length X Breadth X Height)	600mm X 600mm X 450mm	42	Annexure 2.9
	4.	Thickness & No. of J Bolt 16mm X 4 Nos with 3 no's of nuts and washers in each	Length – 1200mm	168	
	5.	RCC Grade	M25 (1:1:2)	-	
7.		**PRECAST CABLE TRENCHING**			
	1.	Internal Size	300mm X 300mm	-	Annexure 2.10
	2.	Running Length	Specified as per the drawing	-	
	3.	Trench Cover – RCC Slab	Specified as per the drawing	-	
8.		**PRECAST FEEDER PANEL**			
	1.	Feeder Panel Slab	1500mm X 1500mm X 200mm	3	Annexure 2.10

1. EQUIVALENCY OF STANDARDS AND CODES, MEASUREMENTS & MATERIALS

1.1. Wherever reference is made in the contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the contract. In case, no reference is made for any particular work, relevant IS /BIS Codes will be followed.

1.2. Providing and operating necessary measuring and testing devices and materials including all consumables are included in the Scope of Work. No separate measurement or payment for testing the work shall be made but rates quoted for various items shall be deemed to include cost of such tests, which are required to ensure achievement of specified quality. The test which will be undertaken must be specified in the bid.

1.3. All materials shall be of standard quality, manufactured by renowned concerns, conforming to Indian Standards and shall have certification work from Bureau of Indian Standards as far as possible, unless otherwise approved by our Engineer. The contractor shall get all materials approved by our Engineer prior to procurement and use. The contractor shall furnish manufacturer's certificates, for materials supplied by him when asked for. Further to that he shall get materials tested from an approved Test House, if asked for by our Engineer. The cost for all the tests and test certificates shall be borne by the contractor. No separate payment shall be made for the testing. The Engineer shall have the right to determine whether all or any of the materials are suitable.

1.4. All goods and materials to be incorporated in the works shall be new, unused, of the most recent or current models and incorporate all recent improvements in design and materials, unless provided otherwise in the contract.

1.5. Wherever referred to in this tender document, only the latest revision of Specifications, Codes of Practice and other publications of the Indian Standards shall be applicable and updated in the tender bid.

1.6. SHOP DRAWINGS

1.6.1. Shop/fabrication drawings shall be prepared by the contractor for all specialized items of work as indicated in the specifications before starting manufacturing of Precast Material. These shall be carefully prepared in accordance with the specifications and drawings and best trade practices and shall contain all the relevant information required.

1.6.2. Unless otherwise mentioned, the contractor shall submit the shop drawings before the commencement of works for the prior approval of the Project-in-charge. Before submission, the contractor shall check the shop drawings and ensure that these are correct, complete and drawn to the required scale and fully coordinated with all relevant disciplines.

1.6.3. Shop drawings shall be prepared by the contractor for the following works unless specified otherwise: -

1.6.3.1. Structural steel works for Precast Material

1.6.3.2. MS doors, windows

1.6.3.3. Internal and External Plumbing Works.

1.6.3.4. Internal Electrical Works.

2. OFF – GRID DISTRIBUTED PV GENERATION AND CONTROL SITE

Description of Civil Structure for main PV system, foundation for commission of PV panels, control foundation poles for PV panels at individual modes, foundation of poles for fencing, and grounding system etc.

Preferred type of construction technology - Precast Construction Technology where a system of casting concrete in a reusable mould or "form" is made which are treated casted in a controlled environment, transported to the construction site, lifted and commissioned. Precast Construction Technology encompass various precast elements such as walls, beams, slabs, columns, staircase, landing and different customized elements that are standardized and designed for stability, durability and structural integrity of the control room, and structures made for realization for site meeting its requirements. Precast construction involves design, strategic planning, lifting, handling, transportation and commissioning of precast elements. The structures so developed, shall resist seismic and wind induced lateral loads along with gravity loads.

2.1. TYPES OF PRECAST ELEMENTS FOR CONSTRUCTION OF SITE INCLUDING CUSTOMIZED ELEMENTS.

2.1.1. Two main types of precast concrete elements, namely precast reinforced concrete elements and precast pre-stressed concrete elements which will be used as per the details given in sections later in the tender documents.

2.1.1.1. Precast reinforced concrete elements: These shall consist of reinforcement bars and/or welded wire meshes within the elements to provide the structural strength as per requirement of the component.

2.1.1.2. Precast pre-stressed concrete elements: These shall consist of pre-stressing tendons within the elements to provide a predetermined force needed to resist external loadings and cracks.

2.1.2. MOULDS

Moulds for precast elements may preferably be made of steel and concrete. Keeping in mind the rigidity and strength and water tightness of the mould taking into consideration the forces due to pouring of concrete, pestering requirements and vibration.

2.2. PRE-CAST INSTALLATION

2.2.1. Proper planning and preparatory works shall be made before the actual installation of precast concrete elements in order to ensure quality installation. The following items are suggestive:

2.2.1.1. Method of sequence of assembly and installation by identification on their location number and tagging.

2.2.1.2. Method of providing temporary support: Temporary support may be planned before the elements for precasting gets stabilized. The structural members with adjustable ends may be used for securing the panels. Shims may be used to adjust the panels to ensure dimensional correctness.

2.2.1.3. Installation tolerances: Installation tolerances may be based on codal provisions and design considerations and accordingly be clearly indicated.

2.2.1.4. Handling and rigging requirements: Elements should be checked for handling stresses before lifting and the cranes may have sufficient capacity to handle the precast panels. At least 10% impact may be considered while calculating the lifting capacity of the crane.

At site locations, panels may first be unloaded and stacked or directly lifted by the crane. The elements only then be installed on the site and may be supported by temporary jacks. The cranes shall be released for next lifting only when the temporary supports are in place. Shims shall be used to carefully align the element before grouting. The panels shall be grouted after the final adjustments are done.

2.2.2 WATERPROOFING

External joints shall be sealed with baker rods and sealants after filling the joints with grout to avoid the leakage. Additional waterproofing treatment shall be provided at external joints and wet areas to ensure water tightness.

All the plumbing work must be ensured leak-proof. Necessary measure must ensure by the contractor as specified and others required.

2.2.3 Mechanical, Electrical & Plumbing Fittings

2.2.3.1 Mechanical, Electrical & Plumbing fittings shall be kept concealed as per the requirements. For concealed fittings, provision for grooves, blackouts shall be made in casting moulds.

2.2.3.2 The conduits and electrical boxes shall be embedded and fixed in moulds before casting.

2.2.4 FIRE RATING

2.2.4.1. Precast concrete shall be designed for fire rating as per codal requirements.

2.2.5 FINISHES

2.2.5.1 Variety of shapes, colours, textures and finishes may be obtained with precast concrete.

2.2.5.2 The surface treatments shall be done by rebating, grooving, surface coatings, cement based renders, oxide colouring etc.

2.2.5.3 Precast concrete facades of various shapes and textures may be moulded and installed.

2.3. DESIGN CONSIDERATIONS AND REQUIREMENTS

2.3.1. STRUCTURAL DESIGN APPROACH

Since the precast structure is dependent on the behaviour of the connections, it must provide:

2.3.1.1. Resistance to all design forces

2.3.1.2. Ductility in case of excessive deformation

2.3.1.3. Resistance to volume changes and related forces

2.3.1.4. Adequate durability

2.3.1.5. Required fire resistance

2.3.1.6. Feasible construction considerations

2.3.2. FLOOR PANELS

For reinforced concrete elements, the concrete of minimum grade M 25 shall be used. Pre-stressed concrete elements shall satisfy the strength requirements with, a minimum of M 25 for post-tensioned and pre- tensioned works. The thickness of the elements as specified later, shall be such that the serviceability requirements are satisfied. In general, precasting shall be designed in accordance with the recommendations given in IS 456:2000 for governing reinforcement and detailing. The compliance of different standards is depicted in later section of this tender documents.

2.3.3. WALLS

Structural load bearing walls shall be designed as pre stressed precast technologies complying to a minimum of codal provisions as given in IS 456:2000 and IS 13920:1993 as applicable. Such walls may also be built using alternate partition wall systems. For concrete walls, grade of concrete shall be as per structural requirement mentioned later in the tender documents.

2.3.4. CONNECTIONS

The precast large construction panel system should be designed using the emulative detailing concept such that once the structure is completed it will behave similar to an equivalent RCC System and will provide necessary strength and ductility. Typically, wet connections may be used to achieve the emulative behavior.

2.3.5. DESIGN PHILOSOPHY

The precast structure should be analysed as a monolithic one and the joints in them be designed to take the forces of an equivalent discrete system. Resistance to horizontal loading shall be provided by having appropriate moment and shear resisting joints. The individual components should be designed, taking into consideration the appropriate end conditions and loads at various stages of construction. The components of the structure shall be designed for loads in accordance with IS 875 (Parts 1-5):1987 and IS 1893 (Part 1):2002. In addition, members shall be designed for handling, erection and impact loads that might be expected during handling and erection.

2.3.5.1. STRUCTURAL SYSTEM

The structural system of superstructure consists of precast construction of RCC wall, columns, slabs and beams etc. Floor slab should be considered to act as a rigid diaphragm to transfer the lateral forces to walls/column and be designed to take the cantilever load of the above floors. Both the floors of control room, and other elements should be constructed by precast technology.

2.3.5.2. FIRE RATING

Period of fire resistance should meet the fire rating requirement, provision specified in IS 456:2000 and all applicable codes should be followed, where ever applicable.

2.3.5.3. DESIGN LOADS

2.3.5.3.1. Dead loads – the dead load shall comprise of self-weight of all the frames and shell elements modelled in the structure as well as self-weight of slabs.

2.3.5.3.2. Imposed or line loads – The imposed/line loads to be assumed in the design of buildings and other precasted elements shall be the greatest loads that probably will be produced by the intended use or occupancy, but shall not be less than the equivalent minimum loads specified in IS 875 (Part 2)

2.3.5.4. WIND LOAD

The wind pressure shall be calculated on the basis of data specified in clause 5.3 of IS 875 (Part 3):1987.

2.3.5.5. EARTHQUAKE LOADS

For seismic purpose, the pre cast technology system design shall be in compliance with the provisions of IS 1893:2002.

2.3.5.6. LOAD COMBINATIONS

The various loads shall be combined as given below and as specified in IS 875 (Part 5):1987; whichever combination produces the most unfavourable effect in the building foundation or structural member concerned shall be adopted:

Load Combination	Limit state of collapse			Limit state of serviceability		
	DL	LL	WL/EL	DL	LL	WL/EL
DL+LL	1.5	1.5	--	1.0	1.0	--
DL+WL	1.5/0.9*	--	1.5	1.0	--	1.0

DL+LL+WL	1.2	1.2	1.2	1.0	0.8	0.8
DL+EL	1.5/0.9*	--	1.5	1.0	--	1.0
DL+LL+EL	1.2	1.2	1.2	1.0	0.8	0.8

* To be considered when stability against overturning and stress reversal is critical

Where DL -- Dead load, LL – Live load, WL – Wind load & EL – Earthquake load

Wind load and earthquake load shall be considered for both x and y directions. Whenever imposed load is combined with earthquake load, the appropriate part of imposed load as specified in IS 1893:2002 shall be used both for evaluating earthquake effect and for combined load effects used in such combination.

2.3.6. PROGRESSIVE COLLAPSE

In prefabricated construction, the possibility of gas or other explosions which can remove primary structural elements leading to progressive collapse of the structure shall be taken into account. It is therefore be necessary to consider the possibility of progressive collapse in which the failure or displacement of one element of a structure causing the failure or displacement of another element and resulting in partial or total collapse. The building shall be designed to prevent progressive collapse as per the codal provisions of IS 15916:2010.

2.3.7. ANALYSIS METHODS

The analysis of the structure should be carried out using FEM software package. The entire superstructure should be modelled using shell elements and membrane element as appropriate. Beams and columns shall be modelled as frame elements, walls as shell elements and slab as membrane elements and likewise for other precast elements given in the tender. The slab shall be considered as diaphragm at the respective floor levels to transfer the lateral forces. Appropriate loads and its combinations as per provisions specified in IS 875:1987 and IS 1893:2002, for most unfavorable effects shall be chosen for design.

For Structural analysis of prefabricated elements including loads, analysis of shear walls, floors, walls, joints and accidental forces, reference may be made to IS 11447:1985.

2.3.8. DESIGN METHODOLOGY

All structural elements shall be designed according to the Limit state method as specified in IS 456:2000. For design of ties, key elements and joints etc. reference may be made to IS 15916:2010.

2.4. USE OF THE SYSTEM

2.4.1. Special Aspects of use:

2.4.1.1. The site to be constructed using the precast technology system shall be in accordance with the specifications and manufacturing, & construction process prescribed and designed by competent structural Engineers.

2.4.1.2. Plumbing & Electrical services, Doors & windows and Utilities etc. shall be governed by the provisions and details as per requirements shown in the tentative art given in the tender. However, if the changes are suggested by Architect/structural engineer, the same be brought to the knowledge of the tenderee to finalize the minimalist details.

2.4.1.3. Buildings to be constructed with the Technology should be constructed only with technical support or supervision by qualified engineers and builders, based on structural designs and Seismic evaluation & Wind forces carried out to comply with prevailing standards to provide safety of structures.

2.4.1.4. It is strongly required that structural engineers and building designers associated with precast construction should be thoroughly familiar with the various structural aspects. It is also

required that the Architects and Construction Engineers who undertake such site element building design and construction shall have adequate familiarity with the properties and materials, characteristics of the System and their applications.

2.5. CONDITIONS OF CERTIFICATION

2.5.1. TECHNICAL CONDITIONS

2.5.1.1. Raw materials and the finished precast elements shall conform to the requirements of the prescribed specifications.

2.5.1.2. The design assumptions, detailed calculations, references to necessary and detailed design drawings shall be made available on demand, if required. The structural design calculations should clearly demonstrate structural integrity and stability including connection details.

2.5.2. QUALITY ASSURANCE

The qualified bidders shall implement & maintain a quality assurance system in accordance with the Annexure I attached with this tender document.

2.5.3. SCOPE OF INSPECTION

Scope of inspection shall include performance, supply of quality material, adherence to timely conduct of activities, transportation & handling and erection/commission at the site including competence of technical personnel and status of quality assurance.

2.5.4. HANDLING OF USER COMPLAINTS

2.5.4.1. The bidder is required to provide quick redressal of complaints within the conditions of tender.

2.5.4.2. The data on such complaints be maintained with a view to assess the complaint satisfaction and suitable preventive measures taken.

2.6. SUGGESTIVE REQUIREMENTS DURING PRECASTING

2.6.1. CASTING CONCRETE

The procedure for casting concrete may be as follows:

2.6.1.1. Precast concrete elements may be produced on horizontal, flat steel surfaced tilting tables, or as per requirements.

2.6.1.2. Side shutter maybe fixed in position.

2.6.1.3. Mould release agents may be applying to the sides and bottom.

2.6.1.4. Steel reinforcement may be kept in position using adequate spacers to ensure correct position and concrete cover.

2.6.1.5. Prior to casting, electrical conduits, plumbing grooves and sleeves, and other required accessories like lifting anchors, loop boxes and dowel tubes shall be fixed in position.

2.6.1.6. During casting, table vibrators (as & when required) shall be used to achieve the best compaction. Top surface shall be finished with hand operated trowel to provide smooth finish.

2.6.1.7. Care should be taken on embedded items while concreting.

2.6.1.8. After casting, all exposed surfaces may be covered with a tarpaulin (as and when required) to avoid vaporization. Casted elements shall only be de-moulded once the strength meets the design requirements. Thereafter, curing should be carried out for minimum 5 days.

2.6.2. CURING

The curing of the prefabricated elements may be done by the normal methods of curing by sprinkling water and keeping the elements moist.

2.7. TRANSPORTATION OF ELEMENTS

The process of transportation of precast elements from yard to site shall be as follows:

2.7.1. LOADING OF SLAB OVER TRAILER

2.7.1.1. It must be ensured that the identification mark on the slab should be the same as per dispatch list.

2.7.1.2. Any damage occurred during loading should be informed to the concerned authority.

2.7.1.3. The lifting clamps/clutches shall be fixed to the lifting beam at proper position.

2.7.1.4. The lifting beam shall be placed over the precast elements and ensured that the clutches are locked properly before lifting.

2.7.1.5. Instruction regarding loading height, positioning of precast elements over the trailer should be followed as per capacity of the trailer.

2.7.1.6. The wooden rubber shall be placed in between the slabs with a minimum of 500 mm from each end.

2.7.1.7. Some of precast elements should be placed vertically and transported through "A" frame fixed vehicle.

2.7.1.8. The slab shall not be overhanging from the trailer.

2.7.1.9. The slab shall be tied firmly to the trailer by means of belt/rope as moving the load without proper tie can cause damage.

2.7.1.10. While transporting elements vertically, the vehicle should be loaded equally on both the sides.

2.7.2. UNLOADING OF SLAB FROM TRAILER AND PLACING IT ON SITE

2.7.2.1. Every slab shall be inspected for dimensions' / identification mark and damages etc. prior to unloading at site.

2.7.2.2. The stacking area should be levelled and hard enough for stacking the elements.

2.8. ERECTION

2.8.1. Before starting erection a survey of the area to receive precast elements shall be done to monitor any difference in dimensions or levels exceeding the tolerances. In case of unacceptable tolerances, necessary action shall be taken for rectification

2.8.2. Installation shall be done by tower crane with sufficient capacity.

2.8.3. As the elements are lifted to its final position, vertical and horizontal alignment of the panel shall be adjusted. The gap between the element and adjusted elements shall be maintained as per the drawings within the allowable tolerances. Shims and spacers shall be used for levelling and adjustment.

2.8.4. Temporary propping jacks shall be provided for restraining the walls laterally until grouting.

2.8.5. After completion of fixing, alignment of the panels it shall be checked again.

2.8.6. Minor damages, if any to the precast panels shall be repaired by approved materials. And, if major damages (viz. cracks, breakage, large chipping (1 sq. inches)), be replaced

2.8.7. After completion of installation and alignment, elements shall be handed over for inspection.

2.8.8. The joints between the precast wall panels shall be filled with joint filler material.

2.8.9. Precast slab wherever concealed Electrical/Plumbing conduits/fitting are embedded shall be erected without any scaffolding system.

2.8.10. Installation of the first floor shall start only after completion of the ground floor.

2.8.11. The sequence of erection shall be as follows:

2.8.11.1. Installation of precast wall panels above cast-in-situ slab

2.8.11.2. Provide temporary props/jacks for restraining of the walls laterally.

2.8.11.2.1. Grout the connection between the wall panels & ground floor slab and the joint between each wall panel.

2.8.11.3. Installation of precast slab panels above the erected precast wall panels.

2.8.11.4. Installation of the wall panels over the floor slab.

2.8.11.5. Installation of the roof panels such as parapets etc.

2.9. INSPECTIONS & TESTING

Inspections & testing shall be done at appropriate stages of manufacturing process of all the components. The inspected frames and panels shall be stored & packed to ensure that no damage occurs during transportation. As part of quality assurance, regular in process inspections shall be carried out by the tendree.

2.10. GUARANTEES/WARRANTIES PROVIDED BY THE BIDDER

Bidder shall provide necessary guarantees/ warranties of the system to the tenderee.

3. WORK SPECIFICATIONS

The works will be executed, as indicated in Drawings, Specification and Terms and Conditions shall be read in conjunction with those given in this Contract.

3.1. PRE CAST (PRE STRESSED) CONCRETE WORK

Precast Work shall be done within the standards adhere to RCC as per the drawings.

3.1.1. FINE AGGREGATES

Coarse sand of approved quality conforming to relevant IS code shall be used as fine aggregate. For reinforced cement concrete and concrete of any other type, sand / quarries dust shall be cleaned and absolutely free from dirt and no other deleterious material shall be permitted. Samples of sand to be used shall be approved by Project-in-charge or his authorized representative. The sand used in various items of work shall generally conform to the IS/BIS standards. The sand to be used in concrete and R.C.C. shall have a fineness modulus of not less than 2.5 except for items otherwise specified in schedule of quantities. The sand used in items where use of 'Fine Sand' is mentioned in schedule of quantities and in all items under 'Finishing' (shall have a fineness modulus of not less than 1.0)

3.1.2. COARSE AGGREGATE

The coarse aggregate which may be either stone ballast or stone chips as directed, should be well graded and preferably machine broken and should conform to relevant IS code and should be obtained from approved quarries. The stone should be free from soft thin elongated or laminated or decayed particles. The aggregates should be free from dust. Cleaning and washing, if necessary, should be carried out. The mention of any sources does not, however, absolve the contractor's for his / their liability to ensure that the coarse sand, stone chips and ballast as may be required for the work strictly in accordance with Standard Specification .In case, these materials cannot be had according to specification, from these sources the contractor may bring the materials from any other sources by obtaining prior permission of the Project – in- charge, provided materials are according to standard specifications. In addition to the routine tests, special tests on materials will be carried out whenever required by our Engineer. The cost of the special test to be done will be borne by the contractor. Necessary facilities in the form of moulds, cones, scales materials, labour for casting, curing, specimen and such other facilities as pre –requisite to any standard concrete tests will in any case be afforded by the contractor.

3.1.3. FORM WORK AND SHUTTERING

3.1.3.1. For cement concrete in Battery Storage Casing, Pole Foundation, 2 storey building, the contractor should use water proof plywood / steel shuttering plate sets as per the drawing. The steel plate should have smooth surface and should be free of bulge during the concreting. The entire shuttering should be water proof and conform to relevant IS Code. If however, the contractor

wants to use wooden shuttering, he will have to use new planks and scanting, for fabrication of such shuttering so as to ensure smooth and leak proof surface.

3.1.3.2. Design & Tolerance in Construction: Form work shall be designed and constructed to the shapes, lines and dimensions shown on the Drawings with the tolerance ± 0.05 times the specified thickness

3.1.4. REINFORCEMENT

3.1.4.1. Reinforcement steel. High strength deformed steel bars produced by Thermo Mechanical Treatment Process (TMT) Steel bars of grade Fe 500D meeting all other requirements of IS: 1786-1985.shall be used for all RCC Works.

3.1.4.2. There is no BIS code for TMT bars. The available code BIS 1786 pertains to HSD Bars. Therefore, there should be no stipulation that TMT bars should conform to relevant BIS code.

3.1.4.3. Design, drawing, specification in compliance within the standards of T.M.T. bar, Steel Mesh and other types of reinforcement of various dimensions for RCC work shall arranged by the contractor and must be submitted along with the bid.

3.1.4.4. All works shall be done in accordance with the approved drawings and no departure shall be made by the contractor without the order of the Project-in-charge in writing.

3.1.4.5. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in precast, its fasteners, and nuts and bolts. Necessary protection towards rusting need to be provided either by coating or anodization. The fasteners/ Nuts and Bolts used shall be made up of stainless steel as per standards.

3.1.5. ALUMINIUM/ FIBRE VERTICAL SHUTTER DOOR.

Design, drawing, specification shall be submitted by contractor for Aluminium / Fibre Channel Section fixed in front which includes a vertical slider Gate along with a lock adhere to latest standards.

3.1.6. WATER PROOF CHEMICAL

Waterproofing External joints shall be sealed with sealants and other means necessary after filling the joints with grout to avoid the leakage. Additional waterproofing treatment shall be provided at external joints and wet areas to ensure water tightness.

3.2. SITE CLEARANCE

Before the earthwork is started, the area coming under cutting and filling shall be cleared of shrubs, rank vegetation, grass, brushwood, trees and sapling of girth up to 30cm. measured at a height of one meter above ground level and rubbish removed outside boundary. The roots of trees and saplings shall be removed to a depth of 60 cm. below ground level or 30 cm below formation level or 15cm below sub-grade level whichever is lower and holes or hollows filled up with the earth, rammed or levelled.

3.3. POLE CIVIL FOUNDATION

Making Precast RCC Street Light Pole foundation of grade M20 (1 cement: 1.5 sand: 3 stone/brick aggregate) of size 500mm x 500mm x 1100mm using 4 no. 12mm dia steel reinforcement of grade Fe-500 with 50mm clear cover to reinforcement and rings using 8mm dia steel reinforcement @ 250 C/C (Centre to centre) spacing using shuttering. 'J' type foundation bolts shall be anchored in the foundation (PCD of 200mm) in such a way that 100mm length of bolt is projected above foundation. It includes water curing as required. Refer civil foundation drawing attached with the tender.

3.4. IN-HOUSE BATTERY BANK AND POWER CONVERTER CASING

3.4.1. Making precast RCC In-house Battery Bank Casing of grade M25 (1 cement: 1 sand: 2 stone/brick aggregate) of outer dimension:(c)900mm X (e)500mm X (a)875mm using steel reinforced mesh for pre - stressed precast as mentioned in drawing. This Precast includes a conduit chimney of size 250mmX200mmX1000mm with thickness of 50 mm and shall incorporate 8 no. of M8 nuts and bolts long enough for connecting it with the casing structure, with 3 nos. of nuts and washers in each.

3.4.2. Enclosing of the casing using Fibre sheet of 3 mm thickness door with MS Pipe as vertical slider with lock. Contractor shall take the approval from Project-in-charge for the Color of fibre sheet and paint of MS pipe. Refer civil drawings attached with the tender.

3.5. SOLAR MMS PRECAST FOUNDATION

3.5.1. Making a pre – stressed RCC Solar MMS Foundation of Grade M25 (1 cement: 1 sand: 2 stone/brick aggregate) using at least 12mm dia steel reinforcement of Grade Fe-500 and rings using at least 8 mm dia steel reinforcement. Any specifications, material and drawings that are not included but requisite shall be deemed to be included in the scope and contractor shall include such specifications, materials and drawings in their bids shall be specified in bids

3.6. CABLE TRENCH AND BASE OF FEEDER PANEL

3.6.1. For laying the power cables of solar power plant to the control room, RCC grade M25(1:1:2) precast ground level trench of 300mm depth and 300mm width shall be constructed and RCC slab of 75mm width to cover the trench.

3.6.2. The construction of trench is required to have an inclined slope to prevent water logging. For length and placement of trench refer to the drawing.

3.6.3. Precast of base of feeder panel using RCC M25 (1:1:2) of dimension 1500mm X 1500mm X 200mm shall be Constructed and placed at the specified locations mentioned in drawing.

3.7. SUPPLY OF EARTH PIT CHAMBER

Internal dimensions of earth pit chamber is 450mm x 450mm x 450mm. The pit shall be provided with hinged type 6mm thick chequered plate cover resting on MS angle channel fixed inside the earth pit chamber and shall be provided with a lifting handle. On the top of chequered plate cover, earthing symbol. The tapered boundary around earth pit chamber with offset of 150mm shall be constructed. Refer to the drawings attached with the tender

3.8. FENCING OF SOLAR SITE

3.8.1. Fencing shall be done around the solar site with height of 7 feet above the solar site ground level / road level. To hold the fencing hooks must be preinstalled into the poles. Poles must be erected straight and 3 feet below ground for 7 feet pole and 5 feet below ground for 12 feet pole. Refer to the drawing attached with the tender.

3.8.2. Pole Dimension: 100mmx100mm, RCC M25 (1:1:2)

3.8.3. Fence Type: TATA Chain Link Fence Jali.

3.8.4. Columns for fencing will be installed 3 metres apart from one another. Column must have precasted M6 bolts to fix the angles on both side for locking the mesh link fence which is embedded in a MS pipe frame that has to be arranged by the contractor.

3.9. TWO STOREY CONTROL ROOM INSTALLATION

For all the detailed measurements and plan refer to the drawings attached to the tender. Site Floor has to be uplifted 5ft to make the floor plan for the building at ground level via foundation and filling the empty area such that it can bear the load of the entire building. Staircases shall incorporate for bridging site floor to ground level.

3.9.1. DOORS, WINDOWS AND STAIRS

3.9.1.1. Doors and Windows must be made up of strong and durable MS to avoid any wild life intrusions such as tiger, Monkey, Snakes etc. Doors and windows shall proper fit into the frames and seal the area completely to avoid reptiles and insects.

3.9.1.2. All the doors opening shall be inside the control room as specified in the drawing references.

3.9.1.3. Windows of control room is of 2 types

3.9.1.3.1. Type A: MS Frame with Mosquito net / hard drawn wire

3.9.1.3.2. Type B: MS Frame with 2mm

3.9.1.4. Both type of windows will be installed together, Type A window shall open inside the control room and type B window shall open outside the control room.

3.9.1.5. 6mm dial steel bar mesh shall be incorporated in between the windows for protection as per the drawing as per IS 1361 (1978) standards

3.9.1.6. Stairs must be made up of Mild steel as per IS standards, refer to the drawings.

3.9.2. PRIMER AND PAINTING

The tubular steel work shall be painted with one coat of approved steel primer after fabrication. All fabrication and welding is to be done in approved workshop. The joint details shall be generally as per S.P-38 of B.I.S publication.

The primer for iron work or plastered surface shall be as specified in the description of item. Primer for plaster/iron & steel shall be as specified below.

1. Iron, steel and galvanized steel Red oxide zinc chromate primer as per ls2074

2. Cement/Concrete/RCC work, plastered Cement primer conforming to ls 109 surfaces, non-asbestos surface to receive.

Distempering with oil bound washable distemper of approved brand and manufacture to give an even shade

3.9.2.1. PREPARATION OF SURFACES

Iron & steel surface: All rust and scales shall be removed b scrapping or by brushing with Steel wire brushes. Hard skin of oxide formed on the surface or wrought iron during rolling which becomes loose by the 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.

3.9.2.2. APPLICATION

The Primer shall be applied with brushes, worked well into the surface and spread even and smooth. The painting shall be done as per clause No. 13.22.3.3 of CPWD Specifications 2009.

3.9.3. PLUMBING INTERNAL WORKS

Work under this Contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required. The Contractor is required to completely furnish all the plumbing and other specialised services as described hereinafter and as specified in the schedule of quantities, contractor shall submit approved plumbing drawings.

Internal Plumbing into the precast wall designs shall be submitted as discussed with our Engineer before construction of any Precast Forms.

Without restricting to the generality of the foregoing, the sanitary installations shall include the following as required:

A) Plumbing Works

B) Sanitary Fixtures

C) Waste, Vent, Rainwater Pipes, Septic Tank & Fittings

D) Water Supply System

Items not covered under these specifications or due to any ambiguity or misprints, or additional works, the work shall be carried out as per specifications of the latest Central Public Works Department with up to date amendments as applicable in the Contract.

3.9.3.1. COMPLETION DRAWING

On completion of work, Contractor shall submit one complete set of original tracings and two prints of "as built" drawings to the Project-in-charge. These drawings shall have the following information.

A) Run of all piping, diameters on all floors, vertical stacks and location of external services.

B) Ground and invert levels of all drainage pipes together with location of all manholes and connections up to outfall.

C) Run of all water supply lines with diameters, locations of control valves, access panels.

D) Location of all mechanical equipment with layout and piping connections and mechanical equipment.

E) All shop drawings shall be updated from time to time for the purpose of making completion drawings.

F) No completion certificate shall be issued unless the above drawings are submitted.

G) All "warranty cards" given by the manufacturers shall be handed over to the Project Manager.

3.9.3.2. Indian W.C. Indian Water closet (IWC) shall be provided with 'P' or 'S' trap outlet with a low volume cistern porcelain /plastic flushing cistern with all internal flushing mechanism. Flush pipe/bend shall be connected to IWC by means of a suitable rubber adaptor

3.9.3.3. Each basin shall be supported on MS galvanised or CI brackets and clips and the basin securely fixed to wall or on the counter. The design of the brackets shall suit the basin selected and as recommended by the manufacturer. Each basin shall be provided with 32 mm dia C.P.waste with overflow, pop-up or standard waste with rubber plug and chain, 32 mm dia C.P. brass bottle trap with CP pipe to wall and flange

3.9.3.4. Balcony/Planter drainage Wherever required, all balconies, terraces, planters and other formal landscape areas will be drained by vertical down takes or other type of drainage system directed by the Architect/ our Engineer.

3.9.3.5. Roof top Water Tank of 1000 litres of approved manufacturer like Sintex etc. must be install as per the drawing. Before installation of the water tank contractor must ensure the waterproofing of the roof top to prevent any kind of seepage or leakage which later may effect the structure.

3.9.3.6. Precast 3 section Septic Tank for 3-person use shall be installed as per the drawing details, revisions (if any) must approved by Architect/ Our Engineer.

3.9.3.7. All sanitary fittings shall be of approved manufacturer in their packaging, if otherwise not mentioned above, all the material and quantities must be specified in the bid.

3.10. INDOOR ELECTRICAL WORKS

All the conduiting, fan and light boxes of the electrical work shall be incorporated in precast before the construction.

3.10.1. PVC Conduits of approved makes like BEC, AKG, Atul, Polycab in the precasted control room shall be as given below:

3.10.1.1. Indoor: medium gauge Rigid PVC conduit.

3.10.1.2. The conduit shall generally be as specified under section `CONDUIT WIRING'.

3.10.1.3. Knockout holes of appropriate size and number shall be provided in the marshall box / switch board in conformity with the location of incoming and outgoing conduits/cables.

3.11. INSTALLATION

3.11.1. POLE CIVIL FOUNDATION

All Pole foundations shall be installed as per the drawing at the project site after the approval from our engineer. The pole foundations (Qty – 13) shall be installed 40m apart. The installation of remaining pole foundations shall be finalized at the project site at the time of installation.

3.11.2. CABLE TRENCHING

Precast cable trench for the electrical wires from the solar plant to the control room must be installed at ground level.

3.11.3. INSTALLATION INSTRUCTIONS

3.11.3.1. Lower Foundation (a) as mentioned in drawing shall be levelled to the ground such with zero tilt to ensure proper mounting of the solar panel structure

3.11.3.2. Before mounting the upper foundation (b) as mentioned in drawing, Vertical Post Legs of MMS must be bolted properly to foundation (a) such that the distance between vertical poles must be in accordance as per drawing. Foundation (b) shall be mounted over the foundation (a) after installation of vertical posts. Joints shall be bind properly using proper standards of installation.

3.12. MOBILISATION OF MEN, MATERIALS AND MACHINERY:

3.12.1. It will be the responsibility of the Contractor to arrange all machinery, trucks, vibratory etc., required by him for execution of works.

3.12.2. The contractor will also arrange for getting permission (for their use) if required from local or other concerned authorities for use as well as for their transportation to site.

3.12.3. All expenditure incurred in this connection will be borne by the Contractor.

3.12.4. All expenses towards mobilization at site and de-mobilization including bringing in equipment, work force, materials, dismantling the equipment's, clearing the site etc. shall be deemed to be included in prices quoted and no separate payment on account of such expenses shall be entertained.

3.12.5. It shall be the responsibility of the Contractor to provide, operate and maintain all necessary construction equipment's, scaffoldings and safety, gadget, lifting tackles, tools and appliances to perform the work in a workman like and efficient manner and complete all jobs as per the specifications and within the schedule time of completion of work. Further, contractor shall also be responsible for obtaining temporary electric and water connection for all purposes. The contractor shall also make standby arrangement for water & electricity to ensure un-interrupted supply.

3.12.6. The procurement and supply in sequence and at the appropriate time of all materials and consumable shall be entirely the contractor's responsibilities and his rates for execution of work shall be inclusive of supply of all these items.

3.12.7. It is mandatory for the contractor to provide safety equipment's and gadgets to its all workers, supervisory and Technical staff engaged in the execution of the work while working. The cost of the

above equipment's/ gadgets are deemed to be included in the rates quoted by the contractor for the items & works as per Bill of Quantities and contractor shall not be entitled for any extra cost in these regard. The above norm is to be strictly complied with at site. The decision of the Engineer-in-charge shall be final and binding on contractor in this regard.

3.13. ARRANGEMENT OF WATER FOR EXECUTION OF WORKS

The contractor will have to make his own arrangements for obtaining water to be used for execution of the works.

3.14. ARRANGEMENTS FOR ELECTRIC CONNECTION, LIGHTING & OTHER PURPOSE

Contractor will have to make his own arrangements for arranging electricity if the same is required for illumination purposes or for running of any plant or machinery and nothing extra will be paid for the same

3.15. SECURE TRANSPORT

Transportation, loading, unloading of the ready material is in the scope of contractor. All expenditure incurred in this connection will be borne by the Contractor. The contractor will also arrange for getting permission (for their use) if required from local or other concerned authorities for use as well as for their transportation to site.

Handling during transportation shall be secured as to ensure no damage occur. In case contractor fails to rectify the damages (if so) caused during transportation/loading/unloading under their custody, replacement of the material shall be provided by the contractor. Contractor will not have any claim whatsoever on this account.

3.16. MISCELLANEOUS

3.16.1. Any damage done by the contractor or his work-men to any existing work during the course of execution of the work, tendered for, shall be made good by him at his own cost.

3.16.2. The contractor shall maintain in good condition all work executed till the completion of entire work allotted to the contractor.

3.16.3. **CARE OF STAFF:** - No guarantee will be provided by us for accommodation of the contractor or any of his staff employed on the work. The contractor may be allowed to erect labour camps for housing the labour at or near the site of work on available land. The contractor shall at his own cost make all necessary and adequate arrangements for importation, feeding and preservation of the hygiene of his staff.

3.16.4. The contactor shall clean the site thoroughly of all rubbish etc. left out of his materials on completion of the work and roughly dress the site around the building line to the satisfaction of the Engineer-in-Charge.

SCHEDULE OF WORK

Name of Work: - Supply and installation of precast structure for the erection of two storey control room, precast solar PV MMS foundation, precast pole foundation and precast earthing chamber and supply of precast housing for battery bank and power controller, at Musepur, Pilibhit Tiger Reserve, Uttar Pradesh.

S. No.	Description			Dimensions	Quantity	Annexure	Rate	Unit	Amount
1.	**Supply of precast of the housing for battery bank & power controller**								
	1.	Thickness of side walls, top shelf and back wall		50mm	40	Annexure 2.7			
	2.	Thickness of bottom shelf		100mm					
	3.	Ground to bottom Shelf Clearance		225mm					
	4.	Height	(a)	875mm	-				
			(b)	500mm					
	5.	Width	(c)	900mm					
			(d)	800mm					
	6.	Depth	(e)	500mm					
			(f)	450mm					
	7.	Conduit Chimney	(g)	250mmx200mm x1000m m , 50 mm thick					
	8.	RCC		M25(1:1:2)					
2.	**Supply and Installation of precast street light pole foundation**								
		Length x Breadth x Height		500mmx500mm x1100mm	57	Annexure 2.8			
	1.	Foundation Bolt Length		700mm					
	2.	Bolt Length Above Precast		100mm					
	3.	Thickness & No. of Bolt		16mm X 4 Nos with 3 no's of nuts and washers in each					
	4.	Type of Bolt		Anchor bolts with j-shaped					
	5.	RCC		M20(1:1.5:3)					
3.	**Supply and Installation of precast two storey control room**								
	1.	Building Area		3600mmX4500 mm	1	Annexure 2.1 to Annexure 2.6			
	2.	Wall Thickness		≥ 100mm					
	3.	Roof Thickness		≥ 125mm					
	4.	Uplifting of Building to Ground/Road Level		1500mm					
	5.	Step Length of Staircase		600mm					
	6.	RCC		M25(1:1:2)					
	7.	3 Section Septic Tank		600mmX1800m m					
	8.	Water Tank		1000 Litres					

	9.	Doors , Windows, Stairs	Galvanized MS	-				
	10.	Electrical Conducting	As per design specified	-				
	11.	Plumbing	As per design specified	-				
4.	**Supply and Installation of fencing**							
	1.	Precast Vertical Column 1	100mm X 100mm X 3000mm	32	Annexure 2.10			
	2.	Precast Vertical Column 2	100mm X 100mm X 5100mm	12				
	3.	Chain Link Fencing	Height – 7ft	63m running				
5.	**Supply and Installation of precast earthing chamber**							
	1.	Pit Size	450mm X 450mm	3	Annexure 2.11			
	2.	Thickness	50mm					
	3.	Lid (Chequered Plate)	Thickness – 6mm					
	4.	Boundary Offset	150mm					
6.	**Supply and Installation of precast solar module mounting structure (mms) foundation**							
	1.	Foundation A (Length X Breadth X Height)	13200mm X 2900mm X 800mm	3	Annexure 2.9			
	2.	Foundation A - Thickness	600mm					
	3.	Foundation B (Length X Breadth X Height)	600mm X 600mm X 450mm	42				
	4.	Thickness & No. of J Bolt 16mm X 4 Nos with 3 no's of nuts and washers in each	Length – 1200mm	168	Annexure 2.9			
	5.	RCC Grade	M25 (1:1:2)	-				
7.	**Supply and Installation of precast cable trenching**							
	1.	Internal Size	300mm X 300mm	-	Annexure 2.10			
	2.	Running Length	Specified as per the drawing	-				
	3.	Trench Cover – RCC Slab	Specified as per the drawing	-				
8.	**Supply and Installation of precast feeder panel**							
	1.	Feeder Panel Slab	1500mm X 1500mm X 200mm	3	Annexure 2.10			
TOTAL								

ANNEXURE I

ANNEXURE I

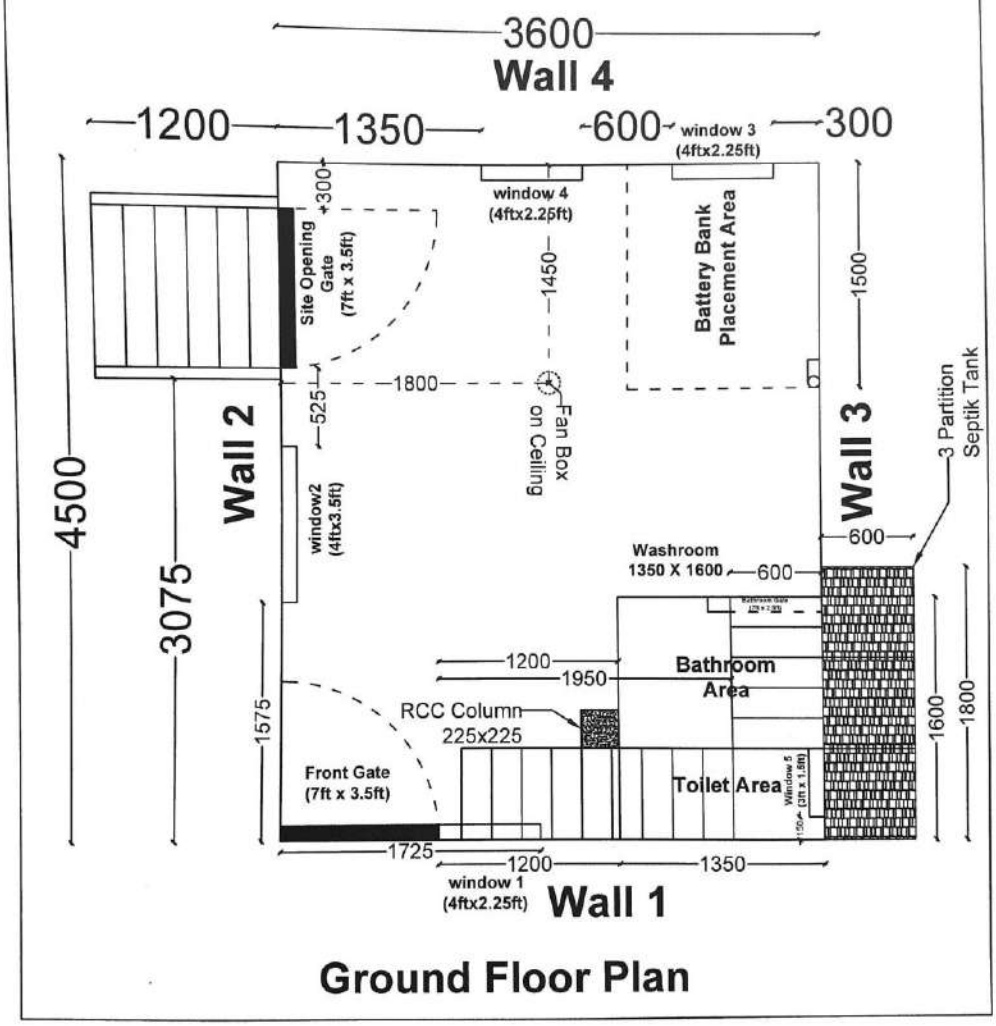
QUALITY ASSURANCE PLAN FOR PRECAST CONSTRUCTION TECHNOLOGY

SR. No	Parameters to be inspected	Requirement specified	Test method	Frequency of Testing
I. RAW MATERIALS:				
1	Cement	OPC 53 Grade	IS 12269:1987	Manufacturer will provide test certificate (MTC)
2	Fine Aggregate	Should pass through following test -Sieve Analysis -Silt Content	IS 383:1970 & IS 2386:1963	Every truck
		-Sp. Gravity and water absorption		Monthly
3	Coarse Aggregate	Should be passed through following test -Gradation test -sieve analysis	IS 2386:1963	Every Truck
		-Impact test		Monthly
4	Fly ash	Fly ash shall confirm IS 3812(P-1):2003	IS 1727:1967	Manufacturer will provide test certificate (MTC)
5	Additives	PC Based (Polycarboxilic)	IS 9103:1999	Manufacturer will provide test certificate (MTC)
6	Reinforcement steel	Physical test and chemical test as per IS 1786:1985	IS 1786:1985	Manufacturer will provide test certificate (MTC) per consignment
7	Water	-pH: 6.5-8.5 -Sulphate=400mg/lit -Chlorides=2000 mg/lit (PCC), 500 mg/lit (RCC)	IS 456: 2000	As per source
8	Anchors	Swift lift anchor shall have two anchors in each wall panel and four anchors in each floor panel spacing of anchor shall be accordingly to cut-outs provision in respective	IS 1608	Manufacturer will provide test certificate (MTC)

SR. No	Parameters to be inspected	Requirement specified	Test method	Frequency of Testing
		panel		
9	Anchor bolt		IS 1363:2002	Manufacturer will provide test certificate (MTC)

10	Non-shrink grout	Cement based flowable grout shall have compressive strength and flexural strength as per relevant code at 28 days	ASTM C1107 or equivalent	Manufacturer will provide test certificate (MTC)
11	PU Sealant		As per ASTM C 920 Class-35	Manufacturer will provide test certificate (MTC)
Note: Relevant year for code shall be as specified by structural engineer/competent authority				
II. Precast Construction Technology				
1	Structural stability	IS 11447:1985 & IS 15916:2010		
2	Durability			
3	Compressive strength	IS 516:1969		
4	Flexural strength	IS 516:1969		
5	Axial compression	IS 2095 (Part-1):1996		
6	Thermal resistance	IS 3346:1980		
7	Acoustic resistance	IS 9901:1981		
8	Fire resistance	IS 456:2000		
9	Earthquake resistance	IS 1893:2002		
10	Wind resistance	IS 875:1987		

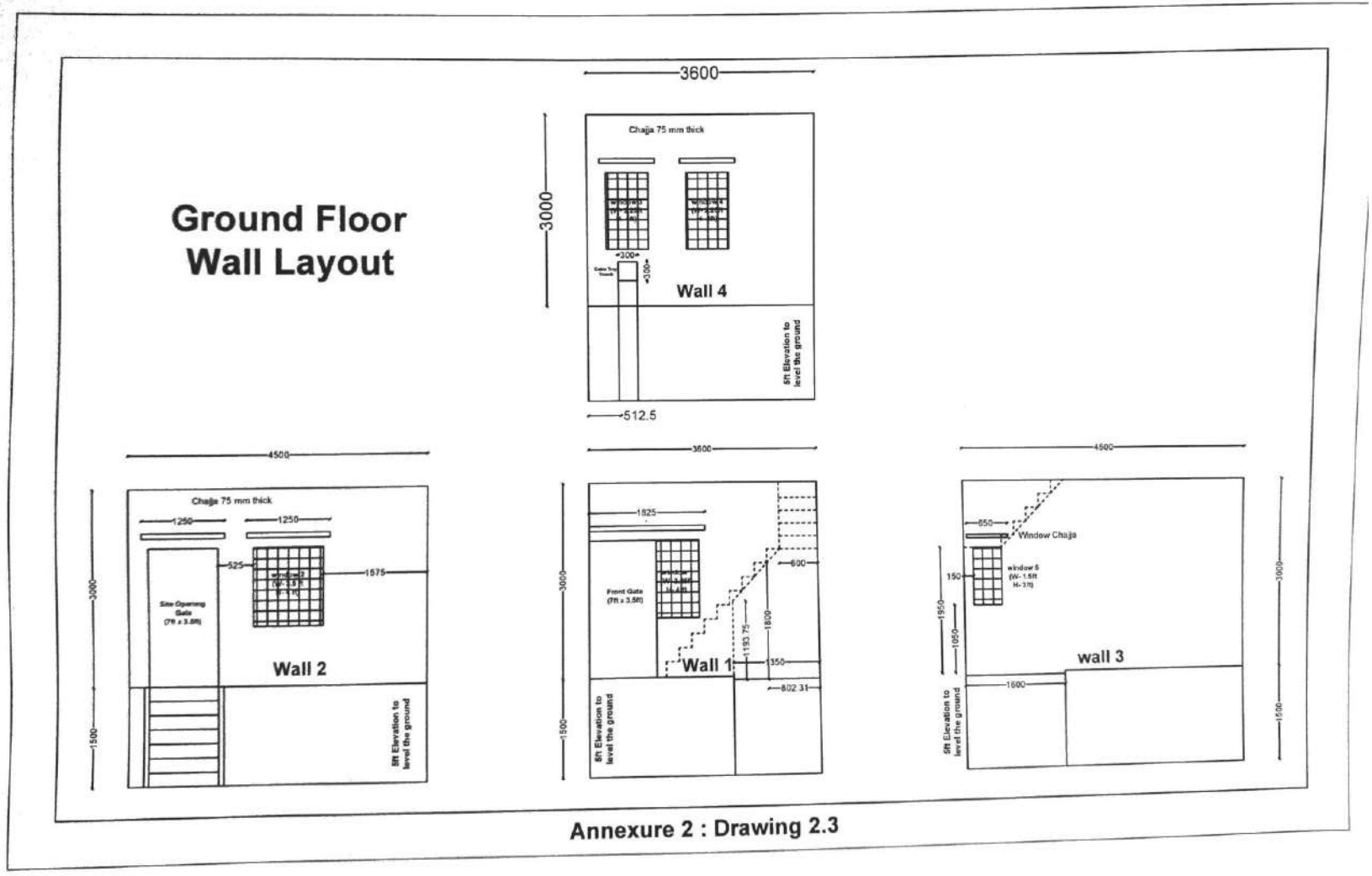
ANNEXURE II



Annexure 2 : Drawing 2.1

Annexure 2 : Drawing 2.1

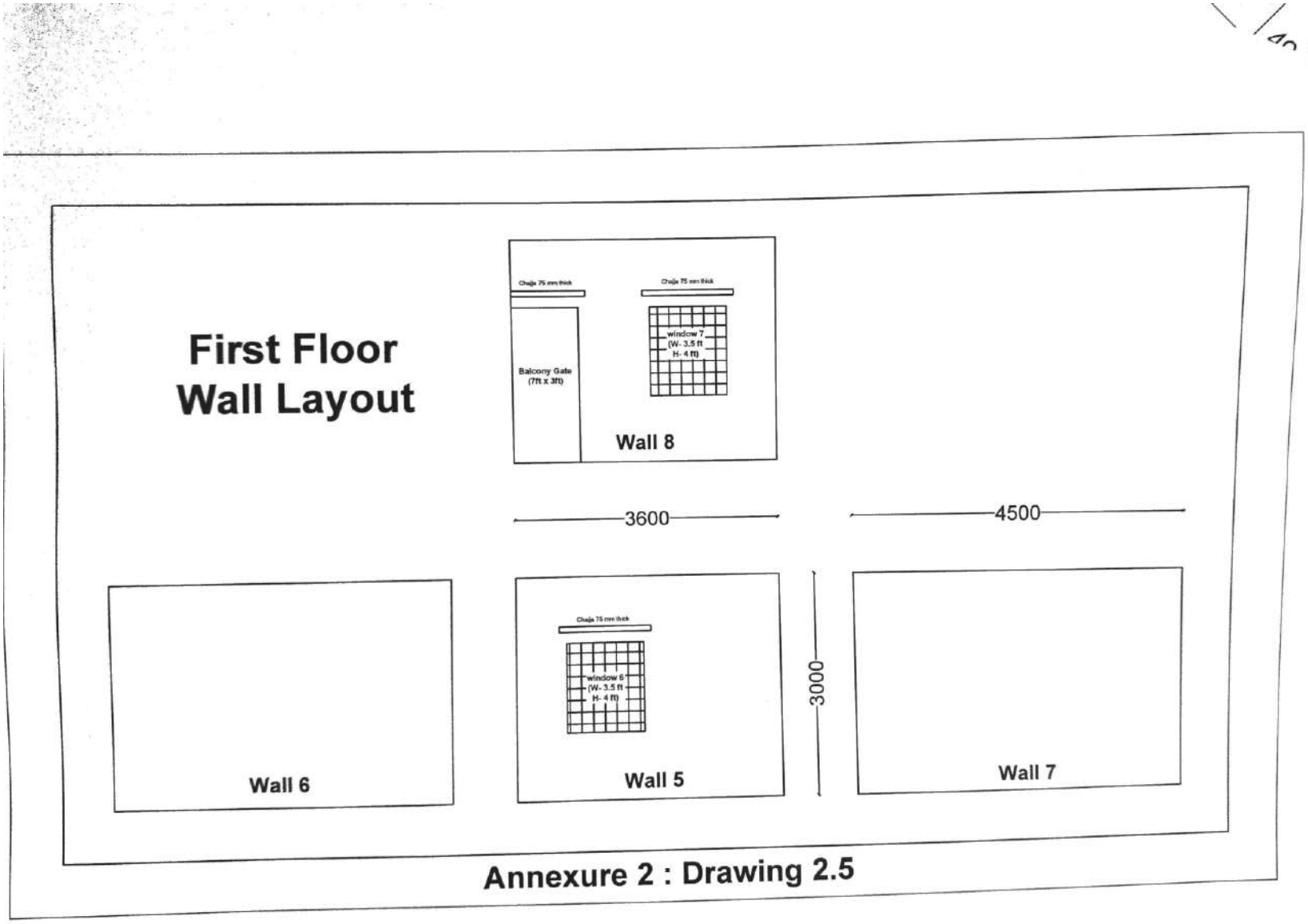

Annexure 2 : Drawing 2.2
Bathroom Gate
(7ft x 2.5ft)
Shower Head
and Water Tap
Bathroom
Area
Wash Basin
600X300
275
1000
600
Toilet Area
Window 5
(3ft x 1.5ft)
Toilet Tap
150
1350
Washroom Plan



Annexure 2 : Drawing 2.3

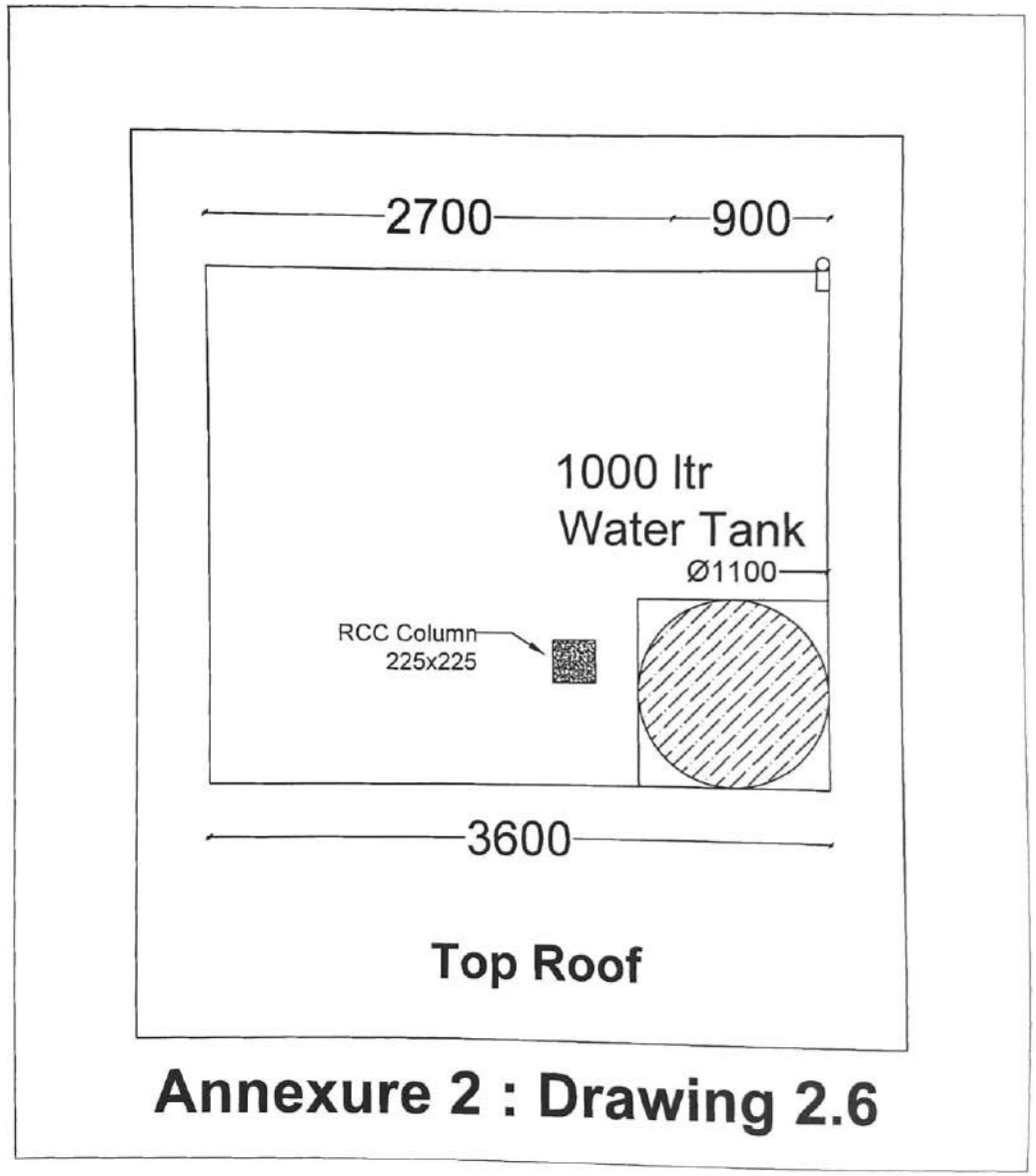
48

3600
Parapet
Height - 900mm
Width - 75mm
Balcony
(5ftx12ft)
Wall 8
1500
675
window 7
(4ft x 3.5ft)
975
Balcony Gate
(7ft x 3ft)
1500
Fan Box
on Ceiling
600
3000
Wall 6
1500
Parapet
Height - 900
Width - 75
Wall 7
RCC Column
225x225
1600
675
window 6
(4ft x 3.5ft)
600
2000
1600
Wall 5
First Floor Plan
Annexure 2 : Drawing 2.4



Annexure 2 : Drawing 2.5

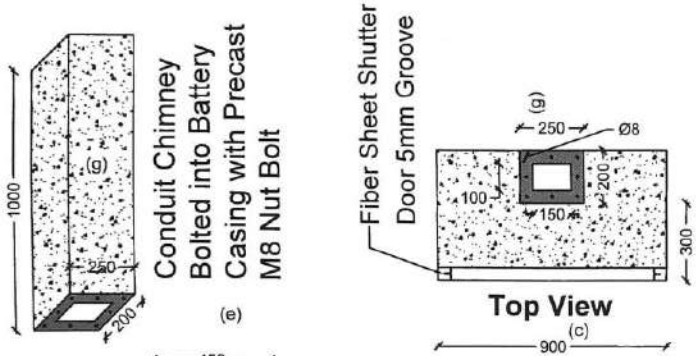
50

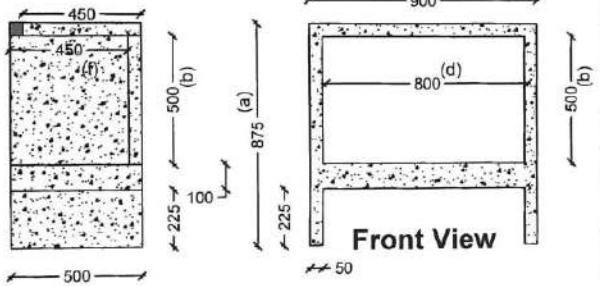


Annexure 2 : Drawing 2.6

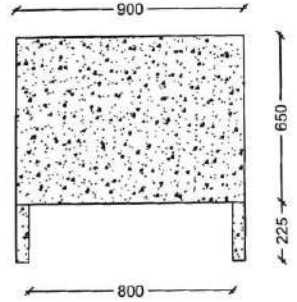
51

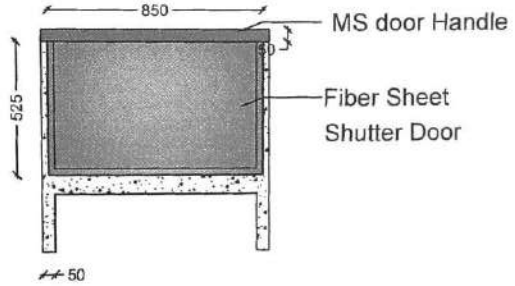
Inhouse Battery Bank and Power Converter Casing





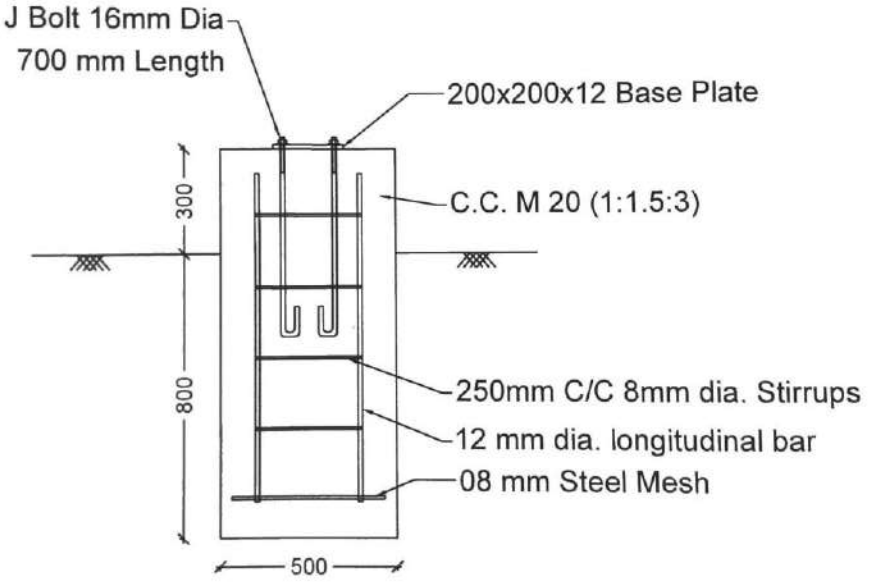
Precast of Battery Bank In house Storage			
1	Thickness of side walls, top shelf and back wall		50mm
2	Thickness of bottom shef		100mm
3	Ground to bottom Shelf Clearance		225mm
4	Height	(a)	875mm
		(b)	500mm
5	Width	(c)	900mm
		(d)	800mm
6	Depth	(e)	500mm
		(f)	450mm
7	Conduit Chimney	(g)	250mmx200mmx1000mm , 50 mm thick
8	RCC		M25(1:1:2)



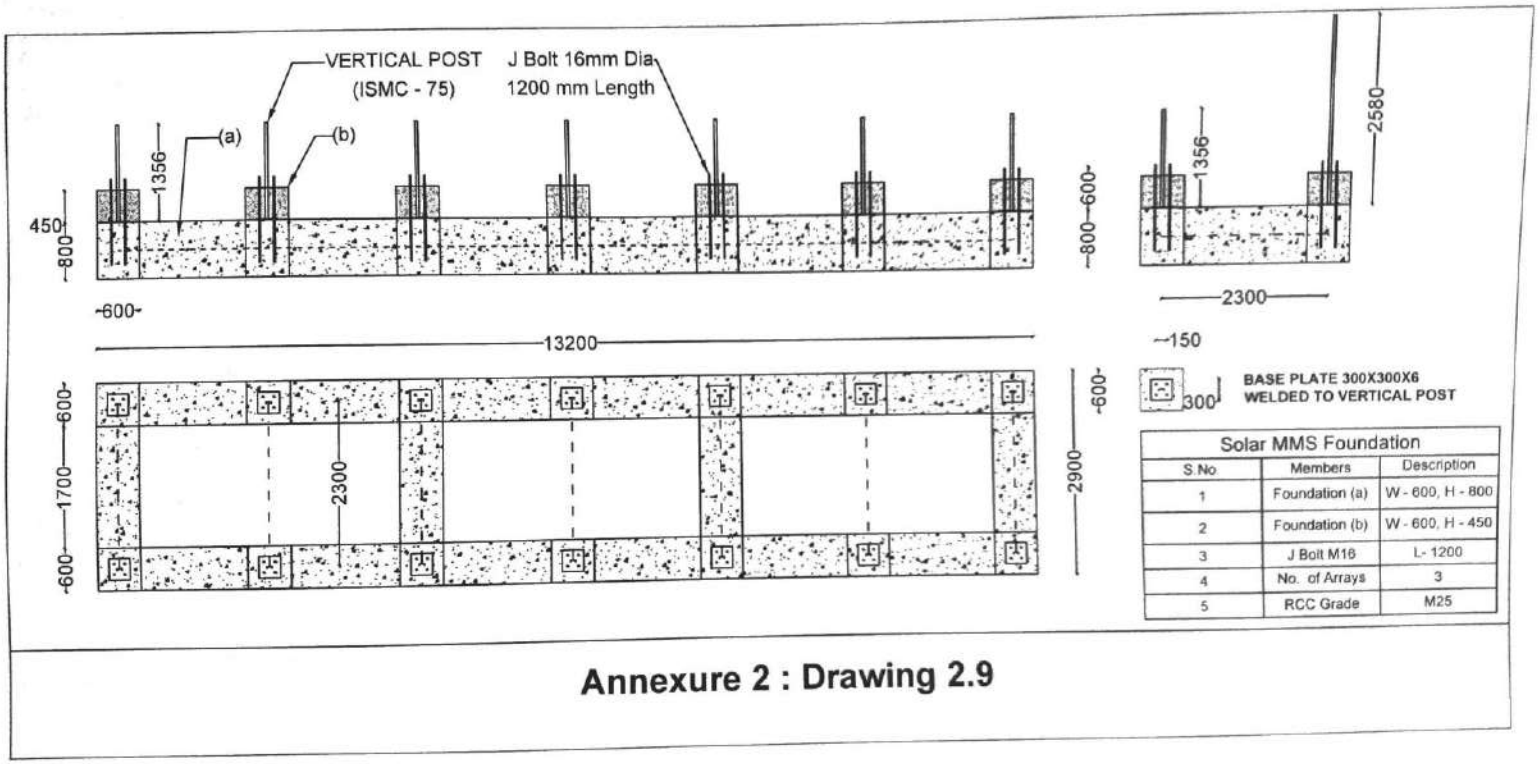


Annexure 2 : Drawing 2.7

Precast Pole Foundation



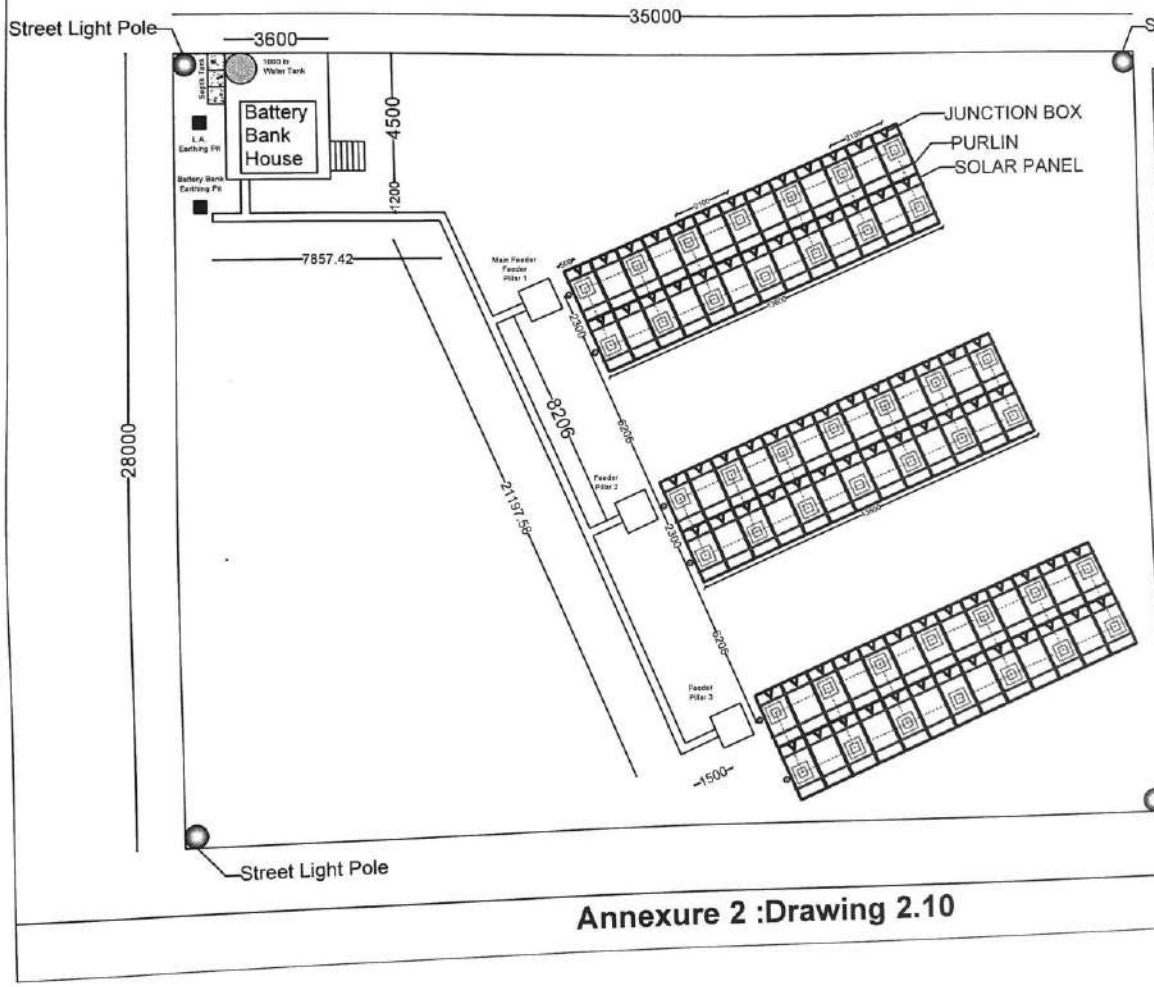
Annexure 2 : Drawing 2.8



Solar MMS Foundation		
S.No	Members	Description
1	Foundation (a)	W - 600, H - 800
2	Foundation (b)	W - 600, H - 450
3	J Bolt M16	L- 1200
4	No. of Arrays	3
5	RCC Grade	M25

Annexure 2 : Drawing 2.9

Layout for Cable Trenching / Feeder Panel / Fencing / Control Room

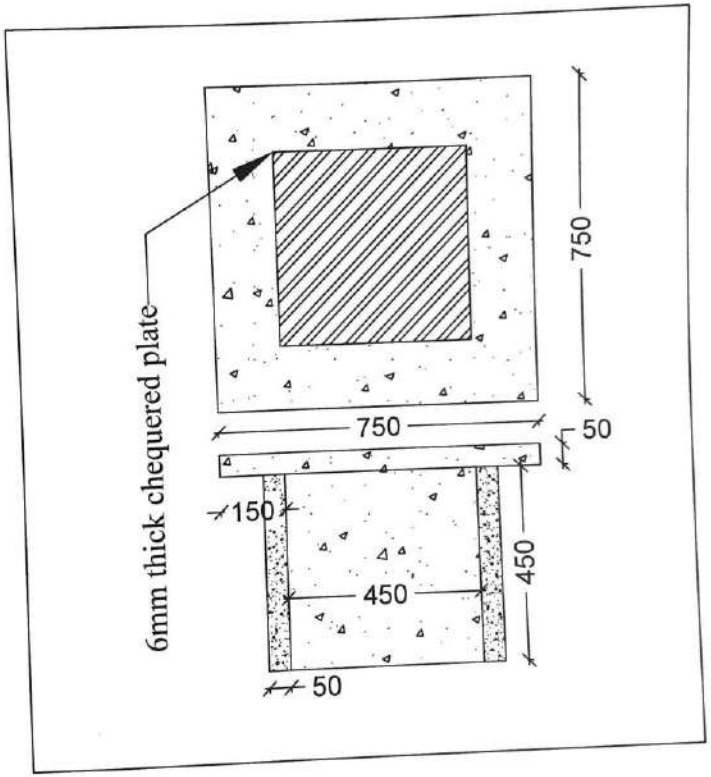


Specifications

S. No.	Description of Members	Quantity
1	Site Capacity	25.74 KW
2	Precast Civil Foundation	3
3	Short Leg	21
4	Long Leg	21
5	Solar Panels	78
6	Azimuth	23°
7	Angle of Inclination	28°

Annexure 2 :Drawing 2.10

Precast Earthing Chamber



Annexure 2 : Drawing 2.11

ANNEXURE III

Annexure III
APPROVED MAKES OF MATERIALS (CIVIL)

The Contractor shall obtain prior approval from the Engineer-in-charge before placing order for any specific material or engaging any of the specialized agencies. The Contractor shall make a detailed submission with catalogues and proposed specifications, as well as full details of the works executed by the specialized agency, as specified.
Unless otherwise specified, the brands/makes of the material as specified in the item nomenclature, in the list of approved materials attached in the tender and in the particular specifications shall be used in the work.
In case of non-availability of the brands specified in the contract the Contractor may be allowed to use alternate equivalent brand of the material by Engineer-in-Charge with the prior approval of NIT Approving Authority subject to submission of documentary evidence of non - availability of the specified brands by contractor. The necessary cost adjustments on account of above change shall be made for the same.
The contractor would submit original bills and manufacturer's test certificate for all lots of material procured for the work, payments would be released only for the items for which original bills & manufacturer's test report for the material consumed has been submitted to Engineer-in-Charge. Department shall also get random testing of material from testing Laboratory of its choice.

SL. NO.	ITEM	APPROVED MAKE/BRANDS
	CEMENT (OPC 43) GRADE)	ULTRA TECH/ A.C.C./ GUJARAT AMBUJA/ J.K. CEMENT/SHREE CEMENT
	WHITE CEMENT	J.K. WHITE/ BIRLA WHITE/ TRAVANCORE
	READY MIX CONCRETE	UNITECH, ACC, ADITYA BIRLA, TECHNO CONCRETE & AHLCON, LAFARGE, ULTRATECH, AFCON, L&T, NDCON, RMC INDIA, RAJ READY MIX, SHAILA ENTERPRISES, TECHNO EASY CRETE.
	SUPERPLASTICIZERS	MC BAUCHEMIE/FOSROC/ SIKA/ MBT
	WATERPROOFING COMPOUND (LIQUID)	PIDILITE / FOSROC/ CICO/ LATICRETE/DOCTOR FIXIT
	AAC BLOCK	BILTECH/INSTABLOCK/ULTRATECH/J.K. SMART BLOX, FINECREET, MAGICRETE, SHREE, KANAV BUILDER PVT.LTD., SIPOREX
	REINFORCEMENT STEEL	TATA STEEL LTD./ SAIL/RINL/JSPL/JSW
	STRUCTURAL STEEL	TATA STEEL LTD./ SAIL/ RINL/JSPL/ JSW
	CERAMIC GLAZED TILES	JOHNSON/ RAK/ VARMORA/SOMANY/NITCO/SIMPOLO/KAJARIA/ORIENT BELL/ASIAN(AGL)
	VITRIFIED TILES/ DIGITAL TILE	RAK /VARMORA/ SOMANY/ SIMPOLO /KAJARIA/ORIENT BELL/ ASIAN(AGL)
	Alkali Resistant Tiles	RAK/VARMORA/SIMPOLO/SOMANY/KAJARIA/ORIENT BELL/ ASIAN(AGL)
	FLUSH DOORS	DURO/KITPLY/UNI PLY/DURIAN/MERINO
	NATURAL WOOD VENEERS/ Block Board	DURO/DURIAN/KITPLY/UNIPLY
	Prelaminated Particle/ compressed ply Board/MDF Bond	MERINO/GREENLAM/DURIAN/ kit ply
	POLYSULPHIDE SEALANT	FOSROC/PIDILITE/TUFFSEAL/SIKKA
	DASH FASTENERS	HILTI/FISCHER/BOSCH
	STAINLESS STEEL SCREWS (UNLESS OTHERWISE SPECIFIED)	KUNDAN/ARROW/NETTLEFOLD/GKW
	STEEL WINDOWS	METAL WINDOWS/SKS/KALSI/UNITED/PD Industries
	CLEAR/ FLOAT/ TOUGHENED GLASS	ST. GOBAIN / PILKINGTON/AIS
	PU ENAMEL METALIC PAINTS ON MS STRUCTURE	SKK/OIKOS/ACRO
	EPOXY PRIMER AND PAINTS	ICI/ ASIAN PAINTS/BERGER
	GYPSUM BOARD	ST. GOBAIN/ GYPROC GYPSUM/ BORAL
	G I PIPE	TATA/JINDAL HISSAR/SURYA
	GI FITTINGS (Malleable Cast iron)	ZOLOTO/UNIK/ICS
	CPVC PIPES & FITTINGS	SFMC/ FINOLEX/ SUPREME/ PRAYAG
	SWR PIPE & FITTINGS	SFMC/ FINOLEX/ SUPREME
	PVC WATER TANK	SFMC/ SINTEX/ SHEETAL
	CALCIUM SILICATE FALSE CEILING	AEROLITE/ ULTRALITE

	FALSE CEILING SYSTEM ALONG WITH SUPPORTING GRID AND METALLIC TILES	ARMSTRONG INDUSTRIES PVT. LTD/HUNTER DOUGLAS INDIA PVT. LTD/AURA SYNERGY INDIA PVT. LTD
	ACOUSTICAL WALL PANELLING	DECOSONIC/ ARMSTRONG/ AEROLITE/ ULTRALITE/USG/DAIKEN
	ACRYLIC DISTEMPER	BISON (BERGER)/ TRACTOR (ASIAN)/ MAXILITE (ICI)
	SYNTHETIC ENAMEL PAINT	LUXOL HIGLOSS (BERGER)/ APCOLITE PREMIUM (ASIAN)/ DULUX GLOSS (ICI)
	ACRYLIC EMULSION	SILK LUXURY (BERGER)/ ROYAL (ASIAN)/ VELVET TOUCH (ICI)/ SUPERSATIN(OIKOS)
	CEMENT PRIMER	BP WHITE (BERGER)/ DECOPRIME (ASIAN)/ WHITE PRIMER (ICI)
	CEMENT PAINT	DUROCEM (BERGER)/ SNOWCEM/ ASIAN
	TEXTURED PAINT	WEATHER COAT TEXTURED (BERGER)/ ULTIMA (ASIAN)/ ICI/NAROLAC
	SILICON BASED WATER REPELLENT COAT	FERROUS CRETE (FERRO 201)/ ARDEX ENDURA (HEAVY DUTY IM[REGNALING & STONE SEALER)/ PIDILITE (ROFF STONE GUARD WB)
	STUD ANCHORS/ ANCHOR FASTENERS	HILTI/FISCHER/BOSCH / AXCEL / CANON
	CLAMP SYSTEM FOR DRY STONE CLADDING	HILTI/FISCHER/BOSCH/ AXCEL
	WOOD ADHESIVES	FEVICOL/ANCHOR/DUNLOP/3M
	TILE ADHESIVE& EPOXY GROUT	FERROUS CRET (FERRO-1122)/ARDEX ENDURA (GOLD STAR)/ PIDILITE (FEVIMATE XL)
	STONE ADHESIVE	FERROUS CRET (FERRO-1122)/ARDEX ENDURA (GOLD STAR)/ PIDILITE (FEVIMATE XL)/ /MAGICRETE(MAGIC BOND
	GYPSUM PLASTER	FERROUS CRETE (FERRO-500)/GYPROC SAINT GOBAIN (ELITE-90) / ULTRATECH/ MAGICRETE(MAGIC PLAST)
	AAC BLOCK ADHESIVE	FERROUS CRETE (FERRO-1188)/ARDEX ENDURA(WHITE STAR)/ ULTRATECH (FIXO BLOCK)/ MAGICRETE(MAGIC BOND)
	WALL PUTTY	J.K.WHITE/BIRLA WHITE/FERROUS CRETE
	MIRROR	SAINT GOBAIN/ MODIGUARD/AIS/ ATUL
	WEATHER SILICON SEALANT (NON Bleeding)	WACKER/DOW CORNING/MCCOY SOUDAL/ALSTONE
	STRUCTURAL SEALANT BACKUP	WACKER/DOW CORNING/GE/ALSTONE
	BACKER ROD	SUPREME IND LTD./SYSTRANS POLYMERS
	EPDM ACOUSTICAL/FIRE SEAL	ENVIROSEAL
	EPDM GASKET	HANU/ANAND
	EPOXY MORTAR	FOSROC/SIKA/CICO/LATICRETE/FEROUS
	EUROPEAN WC/ WASHBASIN/ URINAL (CHINA WARE)	JAQUAR/ PARRYWARE/ RAK / CERA
	RCC PIPES	PRAGATI/LAKSHMI/SOOD & SOOD/K.K./JYOTI
	CRYSTALINE CEMENTIOUS WATERPROOFING COMPOUND	XYPEX/CONSRUCTION CHEMICALS/ KRYTONE
	STAINLESS STEEL SINKS/WASH BASINS/WC	NEELKANTH/NIRALI/ANUPAM/JAYNA
	SPUN CAST IRON PIPES & FITTINGS (IS:3989)	JAISWAL/ NECO/SKF/HEPCO
	HDPE PIPES & FITTINGS	JAIN/ORIPLAST/KISAN
	C.I. S/S PIPES & FITTINGS	JAISWAL/ NECO/SKF/HEPCO
	G.I. PIPE JOINTING MATERIAL	LOCTITE 55/DR.FIXIT
	RUBBER INSULATION	ARMAFLEX/VIDEOFLEX/ AFLEX
	SS HINGED GRATING	GMGR/NEER/CHILLY
	STONEWARE PIPES AND GULLY TRAPS	PERFECT/BURN/ANAND/PARRY
	GUNMETAL VALVES (FULL WAY VALVE) CLASS-I	ZOLOTO/CASTLE/KARTAR

	CI DOUBLE FLANGED SLUICE VALVE	KIRLOSKAR/IVC/SONDHI/KEJRIWAL
	CI MANHOLE FRAME & COVERS AND GI GRATING	NECO/SKF/HEPCO
	SFRC MANHOLE COVERS & GRATING	K.K./PRAGATI/KJS CONCERTE/ DALAL TILES
	SANITARY ACCESSORIES	JAQUAR/KIMBERLY CLARKE/DLINE/ EURONICS/ KOPAL
	CP BATH ROOM FITTINGS	JAQUAR/PARRYWARE/ HINDWARE/ PRAYAG/PARKO
	PTMT FITTINGS	PRAYAG POLYMER PVT. LTD./ SHAKTI ENTERPRISES/ POLYTUF
	RHS, M.S. TUBES, M.S. PLATES	TISCO/SAIL/RINL/JINDAL
	EPOXY PAINTS ON CONCRETE	TUFF COAT/ASIAN PAINTS/BERGER /PAINTS / FOSROC SHALIMAR
	SOLID ACRYLIC SURFACES	DU PONT/SAMSUNG/LG HAUSYS/ALSTONE
	FLOOR TRAPS	JAYNA/CHILLY/NIRALI
	ACP FOR CLADDING/SIGNAGE	ALUCOBOND/REYNOBOND/ALPOLIC/ALOMAX/ALUDECOR/ALSTONE
	PVDF	RADIANT ANODIZERS/AKZONOBLE/ METAL COATING SOLUTIONS
	SS MESH	GKD/WMW
	LOUVERS/ ROLLER BLINDS	HUNTER DOUGLAS/MARC/VISTA
	GRASS PAVERS	OVILITE/VICTORIA/VIRENDRA TEXTILES/DALAL TILES/K.K.
	Precast Kerb stone/Drain Cover	UNISTONE/DALAL TILES/SWASTIC TILES/K.K.
	CC/Chequered tiles	JMD TILES/ DALAL TILES/ SWASTIC TILES/K.K.
	EXPANSION JOINTS	CONSTRUCTION SPECIALITIES/ HERCULES/BIZZAR
	EXTRUDED POLYSTRENE SHEET (XPS)	SUPREME / DOWCORNING/OWENS CORNING
	PVC Doors & Frames	RAJSHRI/ SINTEX/ACCURA/POLYLINE
	SIGNAGE	VISTA SYSTEMS/COSIGN INDIA PVT.LTD./ CLARKE SYSTEMS
	PPGL PUF insulated roofing panel	SHILPKAR/Jindal mectec/Epack/METECNO/LLOYD INSULATION/SUPER DISCO ISPAT PVT.LTD.
	Common Burnt Brick Clay Tile	JINDAL, POINEER, BHARAT