GOVERNMENT OF INDIA

HYDROLOGY PROJECT –PHASE-II

NATIONAL COMPETITIVE BIDDING

NAME OF WORK	:	Renovation of Water Lab including Civil, Electrical and Networking works at 3rd floor in CPCB
PERIOD OF SALE OF BIDDING DOCUMENT	:	FROM 27.06.2011 TO 01.08.2011
TIME AND DATE OF PRE-BID CONFERENCE	:	DATE 19.07.2011 TIME 3.00 p.m.
LAST DATE AND TIME FOR RECEIPT OF BIDS	:	DATE 02.08.2011 TIME 3.00 p.m.
* TIME AND DATE OF OPENING OF BIDS	:	DATE 02.08.2011 TIME 3.30 p.m.
PLACE OF OPENING OF BIDS	:	Training Hall at Ground floor Central Pollution Control Board Parivesh Bhawan, East Arjun Nagar, Delhi -110032
OFFICER INVITING BIDS	:	Member Secretary

INVITATION FOR BID

(IFB)

GOVERNMENT OF INDIA UNDER HYDROLOGY PROJECT
INVITATIONS FOR BIDS (IFB)

NATIONAL COMPETITIVE BIDDING

Date: 27.06.2011
Bid No.: 02/2010-11/CPCB

1. The Government of India has received a loan from the International Bank for Reconstruction & Development towards the cost of Hydrology Project and intends to apply a part of the funds to cover eligible payments under the contracts for construction of works as detailed below. Bidding is open to all bidders from eligible source countries as defined in the *IBRD Guidelines for Procurement.* Bidders from India should, however, be registered with the Government of India or other State Governments/Government of India, or State/Central Government Undertakings. **Bidders are advised to note the minimum qualification criteria specified in Clause 4 of the Instructions to Bidders to qualify for the award of the contract.**

2. The Member Secretary, Employer, Central Pollution Control Board invites bids for the Renovation of Water Lab at 3rd floor as detailed in the table. The bidders may submit bids for any or all of the following works.

3. Bidding documents (and additional copies) may be purchased from the office of SEE, Building from 27.06.2011 to 01.08.2011, for a non-refundable fee (three sets) of Rs.1000/- in the form of Demand Draft on any Scheduled bank payable at Delhi, in favour of Central Pollution Control Board. Interested bidders may obtain further information at the same address. Bidders can also download the tender from CPCB website i.e. *www.cpcb.nic.in*. Those downloading the form from website shall submit the tender cost i.e. Rs. 1000/- in the form of Demand draft at the time of submission of tender, without which the bid would be considered "non-responsive". Bidding documents requested by mail will be dispatched by registered/speed post on payment of an extra amount of Rs. 100/-. The Employer will not be held responsible for the postal delay if any, in the delivery of the documents or non-receipt of the same.

4. Bids must be accompanied by security of the amount specified for the work in the table below, drawn in favour of Central Pollution Control Board. Bid security will have to be in any one of the forms as specified in the bidding document and shall have to be valid for 45 days beyond the validity of the bid.

5. Bids must be dropped in the tender box lying near security counter at Ground Floor of Parivesh Bhawan, Central Pollution Control Board, East Arjun Nagar, Delhi-110032 on or before 3.00 p.m. on 02.08.2011 and will be opened on the same day at 3.30 p.m., in the presence of the bidders who wish to attend in the Training Hall at Ground Floor of Parivesh Bhawan, Central Pollution Control Board, East Arjun Nagar, Delhi-110032. If the office happens to be closed on the date of receipt of the bids as specified, the bids will be received and opened on the next working day at the same time and venue.

6. A pre bid meeting will be held on 19.07.2011.at.3.00 p.m. in the Training Hall at Ground Floor of Parivesh Bhawan, Central Pollution Control Board, East Arjun Nagar, Delhi-110032 to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in Clause 9.2 of 'Instructions to Bidders' of the bidding document.

7. Other details can be seen in the bidding documents.

TABLE

Package No.	Name of work	Approximate value of work (Rs.)	Bid security (Rs.)	Cost of document (Rs.)	Period of completion
1	2	3	4	5	
1.	Renovation of Water Lab including Civil, Electrical, Net Working works at 3rd floor in CPCB	**95,00,000**/-	2,00,000/-	1000/-	6 months

Member Secretary,
Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar,
Delhi -110032

SECTION 1: INSTRUCTIONS TO BIDDERS (ITB)

Section 1: Instructions to Bidders

Table of Clauses

A. General

1. Scope of Bid

1.1 The Member Secretary, Central Pollution Control Board (referred to as Employer in these documents) invites bids for the construction of works (as defined in these documents and referred to as "the works") detailed in the table given in IFB. The bidders may submit bids for any or all of the works detailed in the table given in IFB.

1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.

2. Source of Funds

2.1 The Government of India has received a loan from the International Bank for Reconstruction and Development (hereinafter interchangeably called "the Bank") towards the cost of Hydrology II Project and intends to apply a part of the funds to cover eligible payments under the contract for the Works. Payments by the Bank will be made only at the request of the borrower and upon approval of the Bank in accordance with the *Loan Agreement,* and will be subject in all respects to the terms and conditions of that Agreement. Except as the Bank may specifically otherwise agree, no party other than the borrower shall derive any rights from the *Loan Agreement* or have any rights to the loan proceeds.

2.2 The loan agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security Council, taken under Chapter VII of the Charter of the United Nations.

3. Eligible Bidders

3.1 This *Invitation for Bids* is open to all bidders from the eligible countries as defined under the *IBRD Guidelines for Procurement.* Any materials, equipment, and services to be used in the performance of the Contract shall have their origin in the eligible source countries.

3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is not associated, nor has been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Borrower to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

3.3 Government-owned enterprises in the Employer's country may only participate if they are legally and financially autonomous, operate under commercial law and are not a dependent agency of the Borrower or Sub-borrower.

3.4 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Bank in accordance with sub-clause 37.1.

4. Qualification of the Bidder

4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.

4.2 In the event that Pre-qualification of potential bidders has been undertaken, only bids from pre qualified bidders will be considered for award for Contract. These qualified bidders should submit with their bids any information updating their original prequalification applications or, alternatively, confirm in their bids that the originally submitted prequalification information remains essentially correct as of date of bid submission. The update or confirmation should be provided in Section 2.

4.3 If the Employer has not undertaken prequalification of potential bidders, all bidders shall include the following information and documents with their bids in Section 2:

(a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the Bid to commit the Bidder;

(b) total monetary value of construction work performed for each of the last five years;

(c) experience in works of a similar nature and size for each of the last five years, and details of works under way or contractually committed; and clients who may be contacted for further information on those contracts;

(d) major items of construction equipment proposed to carry out the Contract;

(e) qualifications and experience of key site management and technical personnel proposed for the Contract;

(f) reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past five years;

(g) evidence of adequacy of working capital for this contract (access to line (s) of credit and availability of other financial resources);

(h) authority to seek references from the Bidder's bankers;

(i) information regarding any litigation or arbitration resulting from contracts executed by the Bidder in the last five years or currently under execution. The information shall include the names of the parties concerned, the disputed amount, cause of litigation, and matter in dispute;

(j) proposals for subcontracting components of the Works which in aggregate add to more than 20 percent of the Bid Price (*for each, the qualifications and experience of the identified sub-contractor in the relevant field should be annexed; no vertical splitting of work for sub-contracting is acceptable*); and

(k) Deleted

4.4 ***Bids from Joint ventures incorporate all changes as indicated in the Attachment at the end of this document.***

4.5 **A. To qualify for award of the contract, each bidder in its name should have in the last five years *i.e.2006-07 to 2010-11*:**

(a) achieved, in at least two financial years, a minimum annual financial turnover (in all classes of civil engineering construction works only) of Rs..190 lakhs.@ 2011-12price level.

b) satisfactorily completed , as a prime contractor, or as subcontractor duly certified by the employer/main contractor, at least **one similar work** of value not less than Rs 75 lakh @ 2011-12price level;

(c) Deleted

Financial turnover and cost of completed works of previous years shall be given weightage of 5% per year based on rupee value to bring them to 2011-12 price level.

(d) The contractor or his identified sub-contractor should possess required valid electrical license for executing the building electrification works and should have executed similar electrical works totaling Rupees 25 lakh.@ 2011-12price level in any one year.(2006-07—2010-2011)

(e) The contractor or his identified sub-contractor should possess required valid plumbing license for executing the building plumbing works and should have executed similar plumbing works totaling Rupees 4.0 lakh.@ 2011-12price level in any one year.(2006-07—2010-2011)

4.5 B. Each bidder should further demonstrate:

(a) Deleted

The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations (detailed) as stated in clause 4.3 (k) above to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.

(b) availability for this work of a competent Engineer (BE degree) with no less than five years' experience in construction of similar civil engineering works and other key personnel Construction Supervisor (diploma/degree)with adequate experience as required; and

(c) liquid assets and/or availability of credit facilities of no less than Rs 50 lahk at 2011-12 price level, in the format given in Section 2.
(Credit lines/letter of credit/certificates from Banks for meeting the funds requirement etc.) -

4.5 C. To qualify for a package of contracts made up of this and other contracts for which bids are invited in the IFB, the bidder must demonstrate having experience and resources sufficient to meet the aggregate of the qualifying criteria for the individual contracts.

4.6 Sub-contractors' experience and resources shall not be taken into account in determining the bidder's compliance with the qualifying criteria except to the extent stated in 4.5 (A) (b, d and e) above.

4.7 Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under:

Assessed Available Bid capacity = (A*N*1.5 - B)

where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to2011-12 price level) taking into account the completed as well as works in progress.
N = Number of years prescribed for completion of the works for which bids are invited.
B = Value, at 2011-12 price level, of existing commitments and on-going works to be completed during the next 6 months (period of completion of the works for which bids are invited)

Note: *The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in charge, not below the rank of an Executive Engineer or equivalent.*

4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

5. One Bid per Bidder

5.1 Each bidder shall submit only one bid for one contract. A bidder who submits or participates in more than one Bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

6. Cost of Bidding

6.1 The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

7. Site visit

7.1 The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

B. Bidding Documents

8. Content of Bidding Documents

8.1 The set of bidding documents comprises the documents listed in the table below and addenda issued in accordance with Clause 10:

Invitation for Bids

Section	1	Instructions to Bidders
	2	Forms of Bid and Qualification Information
	3	Conditions of Contract
	4	Contract Data
	5	Specifications
	6	Drawings
	7	Bills of Quantities
	8	Forms of Securities

8.2 Of the three sets of the bidding documents supplied, two sets should be completed and returned with the bid.

9. Clarification of Bidding Documents

9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (hereinafter "cable" includes telex and facsimile) at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the enquiry but without identifying its source.

9.2 Pre-bid meeting

9.2.1 The bidder or his official representative is invited to attend a pre-bid meeting which will take place at Training Hall at Ground floor on 19.07.2011 at 3.00 p.m in Parivesh Bhawan, Central Pollution Control Board, East Arjun Nagar, Delhi.

9.2.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

9.2.3 The bidder is requested to submit any questions in writing or by cable to reach the Employer not later than one week before the meeting.

9.2.4 Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be transmitted without delay to all purchasers of the bidding documents. Any modification of the bidding documents listed in Sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.

9.2.5 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

10.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer.

10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer shall extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

C. Preparation of Bids

11. Language of the Bid

11.1 All documents relating to the bid shall be in the English language.

12. Documents comprising the Bid

12.1 The bid submitted by the bidder shall comprise the following:

(a) The Bid (in the format indicated in Section 2).
(b) Bid Security;
(c) Priced Bill of Quantities;
(d) Qualification Information Form and Documents;

and any other materials required to be completed and submitted by bidders in accordance with these instructions. The documents listed under Sections 2, 4 and 7 of Sub-Clause 8.1 shall be filled in without exception.

12.2 Bidders bidding for this contract together with other contracts stated in the IFB to form a package will so indicate in the bid together with any discounts offered for the award of more than one contract.

13. Bid Prices

13.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill Quantities submitted by the Bidder.

13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the **Bill of Quantities** alongwith total bid price (both in figures and words). *Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.* Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.

13.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder.

Note: *"Bidders may like to ascertain availability of excise/custom duty exemption benefits available in India to the contracts financed under World Bank loan/credits. They are solely responsible for obtaining such benefits which they have considered in their bid and in case of failure to receive such benefits for reasons whatsoever, the employer will not compensate the bidder (contractor). Where the bidder has quoted taking into account such benefits, he must give all information required for issue of certificates in terms of such notifications as per form attached to the Qualification Information in the bid. To the extent the employer determines the quantity indicated therein are reasonable keeping in view the bill of quantities, construction programme and methodology, the certificates will be issued within 60 [sixty] days of signing of contract and no subsequent changes will be permitted. No certificate will be issued for items where no quantity/capacity of equipment is indicated in the statement. The bids which do not conform to the above provisions will be treated as non responsive and rejected. Any delay in procurement of the construction equipment /machinery/goods as a result of the above shall not be a cause for granting any extension of time."*

13.4 The rates and prices quoted by the bidder shall be fixed for the duration of the Contract and shall not be subject to adjustment on any account.

14. Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees.

15. Bid Validity

15.1 Bids shall remain valid for a period not less than ninety days after the deadline date for bid submission specified in Clause 20. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid except as provided in 15.3 hereinafter, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 16 in all respects.

15.3 In the case of contracts in which the Contract Price is fixed (not subject to price adjustment), in the event that the purchaser requests and the Bidder agrees to an extension of the validity period, the contract price, if the Bidder is selected for award shall be the bid price corrected as follows :

The price shall be increased by the factor (. 0.001346) for each week or part of a week that has elapsed from the expiration of the initial bid validity to the date of issue of letter of acceptance to the successful Bidder.

15.4 Bid evaluation will be based on the bid prices without taking into consideration the above correction.

16. Bid Security

16.1 The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This bid security shall be in favour of Central Pollution Control Board and may be in one of the following forms:

- a bank guarantee issued by a nationalized / scheduled bank located in India or a reputable bank located abroad in the form given in Section 8; or

- Bank draft in favour of Central Pollution Control Board payable at Delhi

16.2 Bank guarantees issued as surety for the bid shall be valid for 45 days beyond the validity of the bid.

16.3 Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.

16.4 The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1.

16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.

16.6 The Bid Security may be forfeited

(a) if the Bidder withdraws the Bid after Bid opening during the period of Bid validity;
(b) if the Bidder does not accept the correction of the Bid Price, pursuant to Clause 27; or
(c) in the case of a successful Bidder, if the Bidder fails within the specified time limit to
    (i) sign the Agreement; or
    (ii) furnish the required Performance Security.

17. Alternative Proposals by Bidders

17.1 Bidders shall submit offers that comply with the requirements of the bidding documents, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered.

18. Format and Signing of Bid

18.1 The Bidder shall prepare one original and one copy of the documents comprising the bid as described in Clause 12 of these *Instructions to Bidders*, bound with the volume containing the Form of Bid, and clearly marked "**ORIGINAL**" and "**COPY"** as appropriate. In the event of discrepancy between them, the original shall prevail.

18.2 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder, pursuant to Sub-Clauses 4.3. All pages of the bid where entries or amendments have been made shall be initialled by the person or persons signing the bid.

18.3 The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialled by the person or persons signing the bid.

18.4 The Bidder shall furnish information as described in the Form of Bid on commissions or gratuities, if any, paid or to be paid to agents relating to this Bid, and to contract execution if the Bidder is awarded the contract.

D. Submission of Bids

19. Sealing and Marking of Bids

19.1 The Bidder shall seal the original and copy of the Bid in separate envelopes, duly marking the envelopes as "**ORIGINAL**" and "**COPY**". These envelopes (called as inner envelopes) shall then be put inside one outer envelope.

19.2 The **inner and outer** envelopes shall

(a) be addressed to the Employer at the following address:
Member Secretary
Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
Delhi -110032

and

(b) bear the following identification:

- Bid for Renovation of Water Lab [name of contract]
- Bid Reference No.02/2010-11/CPCB.[insert number]
- DO NOT OPEN BEFORE 3.30 p.m. on 02.08.2011 [time and date for bid opening, per Clause 23]

19.3 In addition to the identification required in Sub-Clause 19.2, the inner envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared late, pursuant to Clause 21.

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

20. Deadline for Submission of the Bids

20.1 Bids must be received by the Employer at the address specified above no later than 3.00 p.m. on 02.08.2011. In the event of the specified date for the submission of bids declared a holiday for the Employer, the Bids will be received upto the appointed time on the next working day.

20.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

21. Late Bids

21.1 Any Bid received by the Employer after the deadline prescribed in Clause 20 will be returned unopened to the bidder.

22. Modification and Withdrawal of Bids

22.1 Bidders may modify or withdraw their bids by giving notice in writing before the deadline prescribed in Clause 20.

22.2 Each Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with Clause 18 & 19, with the outer and inner envelopes additionally marked "**MODIFICATION**" or "**WITHDRAWAL**", as appropriate.

22.3 No bid may be modified after the deadline for submission of Bids.

22.4 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

22.5 Bidders may offer discounts to, or modify the prices of their Bids only by submitting Bid modifications in accordance with this clause, or included in the original Bid submission.

E. Bid Opening and Evaluation

23. Bid Opening

23.1 The Employer will open all the Bids received (except those received late), including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at 3.30 p.m. on the date and the place specified in Clause 20. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

23.2 Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 22 shall not be opened. Subsequently all envelopes marked "Modification" shall be opened and the submissions therein read out in appropriate detail.

23.3 The Bidders' names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No bid shall be rejected at bid opening except for the late bids pursuant to Clause 21. Bids [and modifications] sent pursuant to Clause 22 that are not opened and read out at bid opening will not be considered for further evaluation regardless of the circumstances. Late and withdrawn bids will be returned un-opened to bidders.

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.3.

24. Process to Be Confidential

24.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

25. Clarification of Bids

25.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of the unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause 27.

25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.

25.3 Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidders' bid.

26. Examination of Bids and Determination of Responsiveness

26.1 Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding documents.

26.2 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

26.3 If a Bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

27. Correction of Errors

27.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer **as follows**:

(a) where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and

(b) where there is a discrepancy between the unit and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

27.2 The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount the Bid will be rejected, and the Bid security may be forfeited in accordance with Sub-Clause 16.6 (b).

28. Deleted

29. Evaluation and Comparison of Bids

29.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause 26.

29.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

(a) making any correction for errors pursuant to Clause 27; or

(b) making an appropriate adjustments for any other acceptable variations, deviations; and

(c) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Sub Clause 22.5.

29.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Bid evaluation.

29.4 Deleted

29.5 If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

30. Deleted

F. Award of Contract

31. Award Criteria

31.1 Subject to Clause 32, the Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 3, and (b) qualified in accordance with the provisions of Clause 4.

31.2 If, pursuant to Clause 12.2 this contract is being let alongwith other contracts, the lowest evaluated Bid Price will be determined when evaluating this contract in conjunction with other contracts to be awarded concurrently, taking into account any discounts offered by the bidders for the award of more than one contract.

32. Employer's Right to Accept any Bid and to Reject any or all Bids

32.1 Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

33. Notification of Award and Signing of Agreement

33.1 The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the *Conditions of Contract* called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

33.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 34.

33.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and kept ready for signature of the successful bidder in the office of employer within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.

33.4 Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34. Performance Security

34.1 Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced Bids in accordance with Clause 29.5 of ITB and Clause 52 of Conditions of Contract:

- a bank guarantee in the form given in Section 8; or
- Bank draft, in favour of Central Pollution Control Board payable at .Delhi

34.2 If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer or (c) by a foreign bank through a correspondent Bank in India [scheduled or nationalized].

34.3 Failure of the successful bidder to comply with the requirements of sub-clause 34.1 shall constitute a breach of contract, cause for annulment of the award, forfeiture of the bid security, and any such other remedy the Employer may take under the contract, and the Employer may resort to awarding the contract to the next ranked bidder.

35 Deleted

36. Adjudicator

36.1 The Employer proposes that Sh. P. S. Chaddha, Retd. A.D.G., CPWD be appointed as Adjudicator under the Contract, at a daily fee of Rs.3000/-.plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in the Bid. If in the Letter of Acceptance, the Employer has not agreed on the appointment of the Adjudicator, the Adjudicator shall be appointed by President, Institution of Engineers, Delhi chapter at the request of either party.

37. Corrupt or Fraudulent Practices

37.1 It is the Bank's policy to require that Borrowers (including beneficiaries of Bank loans), as well as bidders, suppliers, and contractors and their agents (whether declared or not), personnel, subcontractors, sub-consultants, service providers and supplier under Bank-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Bank:

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice"[2] is the offering, giving, receiving or soliciting, directly or indirectly of anything of value to influence improperly the action of another party;

(ii) "fraudulent practice"[3] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) "collusive practice"[4] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "coercive practice"[5] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) "obstructive practice" is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or

(bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under sub-clause 37.1(e) below

(b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) will cancel the portion of the loan allocated to a contract if it determines at any time that representative of the Borrower or of a beneficiary of the loan engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to the Bank to remedy the situation;

(d) will sanction a firm or an individual, at any time, in accordance with prevailing Bank's sanctions procedures[aa] *A firm or an individual may be declared ineligible to be awarded a Bank-financed contract upon completion of the Bank's sanctions proceedings as per its sanctions procedures, including inter alia: (i) temporary suspension in connection with an ongoing sanctions proceeding; (ii) cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks; and (iii) the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption.'* including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated[bb] *A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which either has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the bidder's pre-qualification application or the bid; or (ii) appointed by the Borrower.* sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract and

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1. In this context, any action taken by a bidder, supplier, contractor, or a sub-contractor to influence the procurement process or contract execution for undue advantage is improper.
2. "another party" refers to a public official acting in relation to the procurement process or contract execution}. In this context, "public official" includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.
3. a "party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution and the "act or omission" is intended to influence the procurement process or contract execution.
4. "parties" refers to participants in the procurement process(including public officials) attempting to establish bid prices at artificial, non competitive levels.
5. a "party" refers to a participant in the procurement process or contract execution.

(e) will have the right to require that a provision be included in bidding documents and in contracts financed by a Bank Loan, requiring bidders, suppliers, contractors and consultants to permit the Bank to inspect their accounts and records and other documents relating to the Bid submission and contract performance and to have them audited by auditors appointed by the Bank.

37.2 In further pursuance of this policy, Bidders shall permit the Bank to inspect any accounts and records and other documents relating to the Bid submission and contract performance, and to have them audited by auditors appointed by the Bank.

37.3 Furthermore, bidders shall be aware of the provision stated in Sub-Clauses 23.2 and 64 of the conditions of contract.

SECTION 2: **FORMS OF BID, QUALIFICATION INFORMATION AND LETTER OF ACCEPTANCE**

Table of Forms:

Contractor's Bid

Description of the Works: Renovation of Water Lab including Civil, Electrical, Net Working works at 3rd floor in CPCB [1]

BID

To : The Member Secretary [the Employer]

Address : Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
Delhi -110032 [2]

GENTLEMEN,

Having examined the bidding documents including addendum, we offer to execute the Works described above in accordance with the Conditions of Contract, Specifications, Drawings and Bill of Quantities accompanying this Bid for the Contract Price of _____ *[in figures] (*_____) *[in letters]*.[3]

We accept the appointment of _____ as the Adjudicator.

(OR)

We do not accept the appointment of _____ as the Adjudicator and propose instead that _____ be appointed as Adjudicator whose daily fees and biographical data are attached.

This Bid and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Bid you receive.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

We also undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below :

Name and address of agent	Amount	Purpose of Commission or gratuity
_____ _____	_____	
_____ _____	_____	
_____ _____	(if none, state "none")	

1 To be filled in by the Bidder, together with his particulars and date of submission at the bottom of the Form of Bid.

We hereby confirm that this Bid complies with the Eligibility, Bid Validity and Bid Security required by the Bidding documents.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory: _____

Name of Bidder : _____

Address : _____

Qualification Information

The information to be filled in by the Bidder in the following pages will be used for purposes of post qualification as provided for in Clause 4 of the Instructions to Bidders. This information will not be incorporated in the Contract.

1. **For Individual Bidders**

1.1 Constitution or legal status of Bidder
[Attach copy]

Place of registration: _____

Principal place of business: _____

Power of attorney of signatory of Bid
[Attach]

1.2 Total value of Civil Engineering construction work executed and payments received in the last five years** (in Rs. Million)

β ----------
2006 – 2007----------
2007-2008_____
2008 - 2009_____
2009 - 2010_____
2010-2011----------

1.3.1 Work performed as prime contractor (in the same name) on works of a similar nature over the last five years. (2006-07 to 2010-11)

_____

Project Name	Name of the Employer*	Descrip-tion of work	Contract No.	Value of contract (Rs. Million)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remarks explaining reasons for delay and work completed

_____
_____

1.3.2 Quantities of work executed as prime contractor (in the same name and style) in the last five years: **DELETED**

Year	Name of the Work	Name of the Employer*	Quantity of work performed (cum) @			Remarks * (indicate contract Ref)
			Cement concrete (including RCC&PCC)	Masonry	E/works	
2006-2007						
2007-2008						
2008-2009-						
2009-2010						
2010-2011						

**Attach certificate(s) from the Engineer(s)-in-Charge*

@The item of work for which data is requested should tally with that specified in ITB clause 4.5A(c).
β Attach certificate from Chartered Accountant.

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Name and Address of Employer	Value of Contract (Rs. million)	Stipulated period of completion	Value of works* remaining to be completed (Rs. million)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(B) Works for which bids already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated value of works (Rs. million)	Stipulated period of completion	Date when decision is expected	Remarks if any
(1)	(2)	(3)	(4)	(5)	(6)	(7)

* *Attach certificate(s) from the Engineer(s)-in-Charge*.

1.5 Deleted

1.6 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data. Refer also to Sub Clause 4.3 (e) and 4.5 (B) (b) of instructions to Bidders and Sub Clause 9.1 of the Conditions of Contract.

Position	Name	Qualifications	Years of experience (general)	Years of experience in the proposed position
*	*	*	*	
Engineer-Construction Supervisor_	_____	BE (Civil) Degree/Diploma in Civil Eng_____		

1.7 Proposed subcontracts and firms involved. [Refer ITB Clause 4.3 (j)]

Sections of the works	Value of Sub-contract	Sub-contractor (name and address)	Experience in similar work
*	*	*	*
	*	*	
*	*	*	*
	*	*	
*	*	*	*
	*	*	

1.8 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporation), etc. List them below and attach copies.

1.9 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copies of support documents *[sample format attached]*.

1.10. Name, address, and telephone, telex, and fax numbers of the Bidders' bankers who may provide references if contacted by the Employer.

1.11 Information on litigation history in which the Bidder is involved.

Other party(ies)	Employer	Cause of dispute	Amount involved	Remarks showing present status

1.12 Statement of compliance under the requirements of Sub Clause 3.2 of the instructions to Bidders.

1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. [Refer ITB Clause 4.1 and 4.3 (k)].

2. Joint Ventures - Deleted

3. Additional Requirements

3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.

SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES –* CLAUSE 4.5 [B] [c] OF ITB

BANK CERTIFICATE

This is to certify that M/s. …… is a reputed company with a good financial standing.

If the contract for the work, namely …….. [funded by the World Bank] is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. …… to meet their working capital requirements for executing the above contract.

__ Sd. __
Name of Bank
Senior Bank Manager
Address of the Bank

HYDROLOGY PROJECT-II

(Declaration regarding customs/excise duty exemption for materials/

construction equipment bought for the work)

(Bidder's Name and Address)

To: ……

(Name of the Employer)

Dear Sir:

Re: *[Name of Work]* …… -

Certificate for Import/Procurement of Goods/Construction Equipment

1. We confirm that we are solely responsible for obtaining customs/excise duty waivers which we have considered in our bid and in case of failure to receive such waivers for reasons whatsoever, the Employer will not compensate us.
2. We are furnishing below the information required by the Employer for issue of the necessary certificates in terms of the Government of India Central Excise Notification No. 108/95 and Customs Notification No. 85/99.
3. The goods/construction equipment for which certificates are required are as under:

Items	Make/ Brand Name	Capacity [where applicable]	Quantity	Value	State whether it will be procured locally or imported [if so from which country]	Remarks regarding justification for the quantity and their usage in works
Goods						
[a] cement (b)stell						
[c] Others						
Construction Equipment						
[a]						
[b]						
[c]						
[d]						

4. We agree that no modification to the above list is permitted after bids are opened.

5. We agree that the certificate will be issued only to the extent considered reasonable by the Employer for the work, based on the Bill of Quantities and the construction programme and methodology as furnished by us alongwith the bid.

6. We confirm that the above goods will be exclusively used for the construction of the above work and construction equipment will not be sold or otherwise disposed of in any manner for a period of five years from the date of acquisition.

Date: _____ (Signature) _____

Place: _____ (Printed Name) _____

(Designation) _____
(Common Seal) _____

This certificate will be issued within 60 days of signing of contract and no subsequent changes will be permitted.

Letter of Acceptance

(letterhead paper of the Employer)

_____[date]

To: _____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of the _____ _____ [name of the contract and identification number, as given in the Instructions to Bidders] for the Contract Price of Rupees ———————————— _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Bidders[1] is hereby accepted by our Agency.

We accept/do not accept that _____ be appointed as the Adjudicator[2].

We note that as per bid, you do not intend to subcontract any component of work.

[OR]

We note that as per bid, you propose to employ M/s. ..... as sub-contractor for executing .....

[Delete whichever is not applicable]

You are hereby requested to furnish Performance Security, plus additional security for unbalanced bids in terms of ITB clause 29.5, in the form detailed in Para 34.1 of ITB for an amount of Rs.——————— within 21 days of the receipt of this letter of acceptance valid upto 28 days from the date of expiry of Defects Liability Period i.e. upto ..... and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

We have reviewed the construction methodology submitted by you alongwith the bid in response to ITB Clause 4.3[k] and our comments are given in the attachment. You are requested to submit a revised Program including environmental management plan as per Clause 27 of General Conditions of Contract within 14 days of receipt of this letter.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency

1 Delete "corrected and" or "and modified" if only one of these actions applies. Delete "as corrected and modified in accordance with the Instructions to Bidders" if corrections or modifications have not been effected.

2 To be used only if the Contractor disagrees in his Bid with the Adjudicator proposed by the Employer in the "Instructions to Bidders."

Issue of Notice to proceed with the work

(letterhead of the Employer)

——————— (date)

To

——————————————————— (name and address of the Contractor)

——————————————————

——————————————————

Dear Sirs:

Pursuant to your furnishing the requisite security as stipulated in ITB clause 34.1 and signing of the contract agreement for the construction of ——————— @ a Bid Price of Rs.———————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

Agreement

This agreement, made the _____ day of _____19_____, between_____Member Secretary, CPCB_, NEW DELHI_____[name and address of Employer]

(hereinafter called "the Employer)" of the one part and _____

_____[

name and address of contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____

_____

_____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein, at a contract price of Rs.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:

   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Bid;
   iv) Contract Data;
   v) Conditions of contract (including Special Conditions of Contract);
   vi) Specifications;
   vii) Drawings;
   viii) Bill of Quantities; and
   ix) Any other document listed in the Contract Data as forming part of the contract.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____

was hereunto affixed in the presence of:
Signed, Sealed and Delivered by the said _____
in the presence of:
Binding Signature of Employer _____ ___

Binding Signature of Contractor _____

SECTION 3: CONDITIONS OF CONTRACT

Conditions of Contract

Table of Contents

Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in Clauses 24 and 25. The name of the Adjudicator is defined in the Contract Data.

Bill of Quantities means the priced and completed **Bill of Quantities** forming part of the Bid.

Compensation Events are those defined in Clause 44 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

The **Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the execution of the works and administering the Contract.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Site Investigation Reports are those which were included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

Temporary Works are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Engineer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about the Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement

(2) Letter of Acceptance, notice to proceed with the works

(3) Contractor's Bid

(4) Contract Data

(5) Conditions of Contract including Special Conditions of Contract

(6) Specifications

(7) Drawings

(8) **Bill of Quantities** and

(9) any other document listed in the Contract Data as forming part of the Contract.

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Engineer's Decisions

4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 The Engineer may delegate any of his duties and responsibilities to other people except to the Adjudicator after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors. The Contractor shall as referred to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modification.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

9.2 If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's Risks

11.1 The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works in the Employer's country, the risks of war, hostilities, invasion, act of foreign enemies, rebellion,

revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b) a cause due solely to the design of the Works, other than the Contractor's design.

12. Contractor's Risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:

(a) loss of or damage to the Works, Plant and Materials;

(b) loss of or damage to Equipment;

(c) loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and

(d) personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports

14.1 The Contractor, in preparing the Bid, shall rely on any site Investigation Reports referred to in the Contract Data, supplemented by any information available to the Bidder.

15. Queries about the Contract Data

15.1 The Engineer will clarify queries on the Contract Data.

16. Contractor to Construct the Works

16.1 The Contractor shall construct and install the Works in accordance with the Specification and Drawings, and as per instructions of Engineer.

17. The Works to Be Completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

18. Approval by the Engineer

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for design of Temporary Works.

18.3 The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. Instructions

23.1.1 The Contractor shall carry out all instructions of the Engineer which comply with the applicable laws where the Site is located.

23.2 Inspections and Audits by the Bank

The Contractor shall permit, and shall cause its Subcontractors and sub consultants to permit, the Bank and/or persons appointed by the Bank to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract and the submission of the bid, and to have such accounts and records audited by auditors appointed by the Bank if requested by the Bank. The Contractor's and its Subcontractors' and sub consultants' attention is drawn to Sub-Clause 64.1 which provides, inter alia, that acts intended to materially impede

the exercise of the Bank's inspection and audit rights provided for under Sub-Clause 23.2 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures

24. Disputes

24.1 If the Contractor believes that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Engineer's decision.

25. Procedure for Disputes

25.1 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.

25.2 The Adjudicator shall be paid daily at the rate specified in the Contract Data together with reimbursable expenses of the types specified in the Contract Data and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision will be final and binding.

25.3 The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

26. Replacement of Adjudicator

26.1 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not fulfilling his functions in accordance with the provisions of the Contract, a new Adjudicator will be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the Contract Data at the request of either party, within 14 days of receipt of such request.

B. Time Control

27. Program

27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Program including Environmental Management Plan showing the general methods, arrangements, order, and timing for all the activities in the Works along with monthly cash flow forecast.

27.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

27.3 The Contractor shall submit to the Engineer, for approval, an updated Program at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Program within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.

27.4 The Engineer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

28. Extension of the Intended Completion Date

28.1 The Engineer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

29. Deleted

30. Delays Ordered by the Engineer

30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the Works.

31. Management Meetings

31.1 Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

31.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

32. Early Warning

32.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.

32.2 The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

C. Quality Control

33. Identifying Defects

33.1 The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

33.2 The contractor shall permit the Employer's Technical auditor to check the contractor's work and notify the Engineer and Contractor of any defects that are found. Such a check shall not affect the Contractor's or the Engineer's responsibility as defined in the Contract Agreement.

34. Tests

34.1 If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

35. Correction of Defects

35.1 The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

36. Uncorrected Defects

36.1 If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

Note: Where in certain cases, the technical specifications provide for acceptance of works within specified tolerance limits at reduced rates, Engineer will certify payments to Contractor accordingly.

D. Cost Control

37. Bill of Quantities

37.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the contractor.

37.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

38. Changes in the Quantities

38.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1% of Initial Contract Price, the Engineer shall adjust the rate to allow for the change.

38.2 The Engineer shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the Prior approval of the Employer.

38.3 If requested by the Engineer, the Contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of Quantities.

39. Variations

39.1 All Variations shall be included in updated Programs produced by the Contractor.

40. Payments for Variations

40.1 The Contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the Variation is ordered.

40.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Engineer, the quantity of work above the limit stated in Sub Clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in form of new rates for the relevant items of work.

40.3 If the Contractor's quotation is unreasonable (or if the contractor fails to provide the Engineer with a quotation within a reasonable time specified by the engineer in accordance with Clause 40.1), the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.

40.4 If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

40.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

41. Cash flow forecasts

41.1 When the Program is updated, the contractor is to provide the Engineer with an updated cash flow forecast.

42. Payment Certificates

42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously alongwith details of measurement of the quantity of works executed in a tabulated form as approved by the Engineer.

42.2 The Engineer shall check the details given in the Contractor's monthly statement and within 14 days certify the amounts to be paid to the Contractor after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause 51(3) of the Contract Data (Secured Advance).

42.3 The value of work executed shall be determined by the Engineer after due check measurement of the quantities claimed as executed by the contractor.

42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed..

42.5 The value of work executed shall include the valuation of Variations and Compensation Events.

42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

43. Payments

43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made upto the date when the late payment is made at 8% per annum.

43.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

43.3 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

44. Compensation Events

44.1 The following are Compensation Events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.
(b) The Employer modifies the schedule of other contractors in a way which affects the work of the contractor under the contract.
(c) The Engineer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
(d) The Engineer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.
(e) The Engineer unreasonably does not approve for a subcontract to be let.
(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of Letter of Acceptance from the information issued to Bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
(g) The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
(h) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
(i) The advance payment is delayed.
(j) The effect on the Contractor of any of the Employer's Risks.
(k) The Engineer unreasonably delays issuing a Certificate of Completion.
(l) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

44.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Engineer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Engineer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Engineer shall adjust the Contract Price based on Engineer's own forecast. The Engineer will assume that the Contractor will react competently and promptly to the event.

44.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Engineer.

45. Tax

45.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

46. Currencies

46.1 All payments shall be made in Indian Rupees.

47. Deleted

48. Retention

48.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.

48.3 On completion of the whole works, the contractor may substitute retention money *(balance half)* with an "on demand" Bank guarantee.

49. Liquidated Damages

49.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the over payment calculated from the date of payment to the date of repayment at the rates specified in Sub Clause 43.1.

50. Deleted

51. Advance Payment

51.1 The Employer shall make advance payment to the Contractor of the amounts stated in the Contract Data by the date stated in the Contract Data, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.

51.2 The Contractor is to use the advance payment only to pay for Equipment, Plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Engineer.

51.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance (mobilization and equipment only) payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, or Liquidated Damages.

51.4 Secured Advance:

The Engineer shall make advance payment in respect of materials intended for but not yet incorporated in the Works in accordance with conditions stipulated in the Contract Data.

52. Securities

52.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of

expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

53. Deleted

54. Cost of Repairs

54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

55. Completion

55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the Works and the Engineer will do so upon deciding that the Work is completed.

56. Taking Over

56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

57. Final Account

57.1 The Contractor shall supply to the Engineer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.

58. Operating and Maintenance Manuals

58.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

59. Termination

59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 28 days when no stoppage of work is shown on the current program and the stoppage has not been authorized by the Engineer;

(b) the Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days;

(c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate;

(e) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;

(f) the Contractor does not maintain a security which is required;

(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Purchaser has engaged in fraud and corruption, as defined in GCC Clause 64, in competing for or in executing the Contract.

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

59.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

60. Payment upon Termination

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due

to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply . If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

61. Property

61.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor’s default.

62. Release from Performance

62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

63. Suspension of World Bank Loan or Credit

63.1 In the event that the World Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the World Bank's suspension notice.

(b) If the Contractor has not received sums due to it upon the expiration of the 28 days for payment provided for in Sub-Clause 43.1, the Contractor may immediately issue a 14-day termination notice.

64. Fraud and Corruption

64.1 If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 59 shall apply as if such expulsion had been made under Sub-cluse 59.5 [Termination by Employer].

64.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Work, then that employee shall be removed in accordance with Clause 9{Personnel}.

64.3 For the purpose of this Sub-Clause

(i) "corrupt practice"[6] is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the action of another party;

(ii) "fraudulent practice" [7] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation

(iii) "collusive practice"[8] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the action of another party;

(iv) "coercive practice"[9]is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the action of a party;

(v) "obstructive practice" is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or

(bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under Sub-Clause 23.2
[Inspection and Audits by the Bank]."

6 "parties" refers to participants in the procurement process(including public officials) attempting to establish bid prices at artificial, non competitive levels.

7 a" party" refer to a participant in the procurement process or contract execution.

8 "parties" refers to participants in the procurement process(including public officials) attempting to establish bid prices at artificial, non competitive levels.

9 a" party" refer to a participant in the procurement process or contract execution.

F. Special Conditions of Contract

1. **LABOUR :**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

2. **COMPLIANCE WITH LABOUR REGULATIONS** :

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK

(The law as current on the date of bid opening will apply)

a) Workmen Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

b) Payment of Gratuity Act 1972: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

c) Employees P.F. and Miscellaneous Provision Act 1952 *(since amended)*: The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are :

(i) Pension or family pension on retirement or death, as the case may be.

(ii) Deposit linked insurance on the death in harness of the worker.

(iii) payment of P.F. accumulation on retirement/death etc.

d) Maternity Benefit Act 1951: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

e) Contract Labour (Regulation & Abolition) Act 1970: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor

is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.

f) Minimum Wages Act 1948: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.

g) Payment of Wages Act 1936: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

h) Equal Remuneration Act 1979: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/-per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above upto Rs.3500/- per month shall be worked out by taking wages as Rs.2500/-per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

j) Industrial Disputes Act 1947: The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

k) Industrial Employment (Standing Orders) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.

n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back, etc.

o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

p) Factories Act 1948: The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

3. SUB-CONTRACTING (GCC Clause 7)

Please add the following as Clause 7.2:

The contractor shall not be required to obtain any consent from the employer for:

a) the sub-contracting of any part of the Works for which the Sub-contractor is named in the contract;
b) the provision of labour; and
c) the purchase of materials which are in accordance with the standards specified in the Contract.

Beyond this if the contractor proposes sub-contracting any part of the work during execution of works, because of some unforeseen circumstances to enable him to complete the work as per terms of the contract, the Engineer will consider the following before according approval:

- The contractor shall not sub-contract the whole of the Works.

- The contractor shall not sub-contract any part of the Work without prior consent of the Engineer. Any such consent shall not relieve the contractor from any liability or obligations under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents or workmen as fully as if they were the acts, defaults or neglects of the contractor, his agents or workmen.

- The Engineer should satisfy whether (a) the circumstances warrant such sub-contracting; and (b) the sub-contractors so proposed for the Work possess the experience, qualifications and equipment necessary for the job proposed to be entrusted to them in proportion to the quantum of work to be sub-contracted.

- If payments are proposed to be made directly to that sub-contractor, this should be subject to specific authorization by the prime contractor so that this arrangement does not alter the contractor's liability or obligations under the contract.

4. ARBITRATION (GCC Clause 25.3)

The procedure for arbitration will be as follows :

25.3 (a) In case of Dispute or difference arising between the Employer and a domestic contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996. The arbitral tribunal shall consist of 3 arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the President of the Institution of Engineers (India),Delhi Chapter.

(Note: 1. All bidders are expected to indicate clearly in the bid, if they proposed sub-contracting elements of the works amounting to more than 20 percent of the Bid Price. For each such proposal the qualification and the experience of the identified sub-contractor in the relevant field should be furnished alongwith the bid to enable the employer to satisfy himself about their qualifications before agreeing for such sub-contracting and include it in the contract. In view of the above, normally no additional sub-contracting should arise during execution of the contract.

2. However, [a] sub contracting for certain specialized elements of the work is not unusual and acceptable for carrying out the works more effectively; but vertical splitting of the works for subcontracting is not acceptable. [b] In any case, proposal for sub-contracting in addition to what was specified in bid and stated in contract agreement will not be acceptable if the value of such additional sub-contracting exceeds 25% of value of work which was to be executed by Contractor without sub-contracting.

3. Assignment of the contract may be acceptable only under exceptional circumstances such as insolvencies/liquidation or merger of companies etc.

(b) In the case of dispute with a Foreign contractor the dispute shall be settled in accordance with provisions of UNCITRAL Arbitration Rules. The Arbitral Tribunal shall consist of three Arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties, and shall act a presiding arbitrator. In case of failure
of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding arbitrator shall be appointed by the President of the Institution of Engineers (India) ,Delhi chapter

(c) If one of the parties fails to appoint its arbitrator in pursuance of sub-clause (a) and (b) above within 30 days after receipt of the notice of the appointment of its arbitrator by the other party, then the President of the Institution of Engineers (India) , Delhi chapter, both in cases of the Foreign Contractor as well as Indian Contractor, shall appoint the arbitrator. A certified copy of the order of the President of the Institution of Engineers (India) Delhi chapter, making such an appointment shall be furnished to each of the parties.

(d) Arbitration proceedings shall be held at New Delhi, India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

(e) The decision of the majority of arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as determined by the arbitral tribunal. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the arbitrator appointed by such party or on its behalf shall be borne by each party itself.

(f) Where the value of the contract is Rs.50 millions and below, the disputes or differences arising shall be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority, namely the President of the Institution of Engineers (India), Delhi Chapter.

(g) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the owners shall not be withheld, unless they are the subject matter of the arbitration proceedings.

5. PROTECTION OF ENVIRONMENT:

Add the following as GCC Clause 16.2:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.
During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below :
The Water (Prevention and Control of Pollution) Act, 1974, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.
The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government.

[Employers should note that the Loan Agreement between IBRD and the borrowing country may establish specific measures to be taken during construction of the Works for the protection of the environment. Sub-clause 16.2 should be modified/expanded to take into account such specific measures or other measures considered appropriate by the Employer]

6. LIQUIDATED DAMAGES:

Sub-clause 49.1:

Please substitute the last sentence with the following:
"Time is the essence of the contract and payment or deduction of liquidated damages shall not relieve the contractor from his obligation to complete the work as per agreed construction program and milestones or from any other of the contractor's obligations and liabilities under the contract."

SECTION 4: CONTRACT DATA

Contract Data

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:		**Clause Reference**
· The Schedule of Operating and Maintenance Manuals	Nil	[58]
· The Schedule of Other Contractors	Nil	[8]
· The Schedule of Key Personnel		[9]
· The Methodology and Program of Construction & Environmental Management Plan		[27]
· The Schedule of Key and Critical equipment to be deployed on the work as per agreed program of construction	Nil	[27]
· Site Investigation reports	Nil	[14

The Borrower is Government of India/_MoWR_____ [1.1]
[name of Borrower and statement of relationship with the Employer, if different from the Borrower].

The World Bank means ___IBRD_____ [1.1]
_____
and loan refers to an __IN:_____4749 - IN_____

The above insertions should correspond to the information provided in the Invitation of Bids.

The Employer is Member Secretary

Name: Central Pollution Control Board (1.1)

Address: Parivesh Bhawan, East Arjun Nagar, Delhi-110032

Name of authorized Representative: Member Secretary

The Engineer is (1.1)

Name: Paritosh Kumar

Address: Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

Name of Authorized Representative: Rakesh Ahuja

The Adjudicator appointed jointly by the Employer and Contractor is:

Name : Sh. P. S. Chaddha, Retd. A.D.G., CPWD (1.1)

Address :674, G.F., Double Story, New Rajendra Nagar
The name and identification number of the Contract is 02/2010-11/CPCB
_____

The Works consist of- Renovation of Water Lab including Civil, Electrical and Net Working at 3rd floor in CPCB (1.1)
[brief summary, including relationship to other contracts under the Project].
The Start Date shall be the date of issue of notice to proceed with the work. (1.1)

The Intended Completion Date for the whole
of the Works is-Six Months- with the following milestones: [17, 28]

Milestone 1: : Completion of civil and water supply works------3 months from issue of contract agreement with work.
Milestone 2 : Completion of all other works, with handing over to CPCB,
including as-built drawings and issue of completion Certificate by CPCB….6 Months from date of contract agreement.
The following documents also form part of the Contract: [2.3]
Renovation Drawings of civil works, drainage works and electrical works as enclosed

The Contractor shall submit a revised Program including Environmental
Management Plan for the Works (in such form and detail as the
engineer shall reasonably prescribe) within 14 days of
delivery of the Letter of Acceptance. [27]

[This program should be in adequate detail and generally conform to the program submitted alongwith bid in response to ITB Clause 4.3 (k). Deviations if any from that should be clearly explained and should be satisfactory to the Engineer]

The Site Possession Dates shall be: 7 days from the date of award of contract [21]

The Site is located at 3rd floor , Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi-110032
and is defined in drawings nos. as enclosed.

The Defects Liability Period is 365 days from the date of certification of completion of works. (where sectional completion certificate is issued this will apply from those dates for those sections). [35]

Insurance requirements are as under: [13]

		Minimum Cover for Insurance	Maximum deductible for Insurance
(i)	Works and Plant and Materials	Contract Value of works	20,000/-
(ii)	Loss or damage to Equipment	10 lakh-	10,000/--
(iii)	Other Property	15 lakh	10,000/-
(iv)	Personal injury or death insurance: a) for other people;	5.0 lakh per person for 4 occurrences at any time	20,000/-
	b) for Contractor's Employees	In accordance with the statutory requirements applicable to India	

The following events shall also be Compensation Events: Nil [44]

The period between Program updates shall be _30_____ days. Nil [27]

The amount to be withheld for late submission of an updated
Program shall be _____ 20,000/-_____ [27]

The language of the Contract documents is English [3]
e law which applies to the Contract is the laws of Union of India [3]

The currency of the Contract is Indian Rupees. [46]

Fees and types of reimbursable expenses to be paid to the Adjudicator [25]
Rs.3000/- per day excluding boarding and traveling allowance

Appointing Authority for the Adjudicator -- President of Institution of Engineers, Delhi Chapter [26]
The proportion of payments retained (retention money) shall be 6% from each bill

subject to a maximum of 5% of final contract price [48]

The liquidated damages for the whole of the works are

(51)

Rs.—4750/-————————— (*amount*) per day and that for the milestone are as under : [49]

For milestone 1 Rs 2000/- per day

For milestone 2 Rs 4750/- per day

The maximum amount of liquidated damages for the whole of the works is ten percent of final contract price [49]

The placement of technical supervision is a critical and mandatory for smooth and quality implementation of work. In case of non – placement of Technical supervision team the recovery shall be as follow:-

1. Engineer Rs. 7000 per day
2. Construction supervisor Rs. 3000 per day

The amounts of the advance payment are: [51]

Nature of Advance	Amount (Rs.)	Conditions to be fulfilled
1. Mobilization	5% of the Contract price	On submission of un-conditional Bank Guarantee. (to be drawn before end of 20% of Contract period)
2. Equipment	Deleted	
3. Secured advance for non-perishable materials brought to site	Deleted	

(The advance payment will be paid to the Contractor no later than 15 days after fulfillment of the above conditions).

Repayment of advance payment for mobilization and equipment: [51]

The advance shall be repaid with percentage deductions from the interim payments certified by the Engineer under the Contract. Deductions shall commence in the next Interim Payment Certificate

following that in which the total of all such payments to the Contractor has reached not less than 15 percent of the Contract Price or —two— months from the date of payment of first installment of advance, whichever period concludes earlier, and shall be made at the rate of 7.5 percent of the amounts of all Interim Payment Certificates until such time as the advance has been repaid, always provided that the advance shall be completely repaid prior to the expiry of the original time for completion.

Repayment of secured advance:

The advance shall be repaid from each succeeding monthly payments to the extent materials [for which advance was previously paid pursuant to Clause 51.4 of G.C

The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract Price: [52]

Performance Security for 5 per cent of contract price plus Rs. ..... as additional security for unbalanced bids [*in terms of ITB Clause 29.5*].

The standard form of Performance Security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents.

The date by which "as-built" drawings (in suitable scale in 2 sets are required is within 28 days of issue of certificate of completion of whole or section of the work, as the case may be. [58]

The amount to be withheld for failing to supply "as built" drawings by the date required is Rs.2,50,000/-.

The following events shall also be fundamental breach of contract: [59.2]

1. The Contractor has contravened Sub-clause 7 of GCC read with SCC and Clause 9.0 of GCC
2. The contractor does not adhere to the agreed construction program and agreed environmental management plan (Clause 27 of GCC) and also fails to take satisfactory remedial action as per agreements reached in the management meetings (Clause 31) for a period of 60 days.
3. The contractor fails to carry out of the instructions of Engineer within a reasonable time determined by the Engineer in accordance with GCC Clause 16.1 and 23.1.

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be 20 percent. (60)

SECTION 5: SPECIFICATIONS

SPECIFICATIONS FOR CIVIL WORKS

1.0 Unless otherwise specified, CPWD Specifications 2007 volume I to VI with up to date correction slips and revised CPWD, specifications 2002 for mortar, Cement Concrete and R.C.C shall be followed in general. Any additional item of work if taken up subsequently shall also confirm to the relevant CPWD specifications mentioned above.

1.1 Wherever any reference to any Bureau of Indian Standard Specifications occurs in The documents relating to this contract, the same shall be inclusive of all amendments issued there to or revisions thereof, if any, up to the date of receipt of tenders.

1.2 Unless otherwise specified in the schedule of quantities, the rates for all items or work shall be considered as inclusive of pumping out or bailing out of water, if required for which no extra payment will be made. This will include water encountered from any source such as rains, floods, sub soil water table being high and/or due to any other cause whatsoever.

1.3.1 The work shall be executed and measured as per metric dimensions given in the schedule of quantities, drawings etc.

1.3.2 The following modifications to the above specifications and some additional specifications shall however apply.

2.1 All stone aggregate and stone ballast shall be of hard stone variety to be obtained from approved quarries _____ to be got approved by the Engineer-in-Charge.

2.2 Coarse Sand should be obtained from __ any source to be got approved by the Engineer-in-Charge and screened as required. The same shall be clean and sharp angular grit type. If the sand brought to site is dirty it must be washed in clean water.

2.3 Fine sand should be obtained from any __source to be got approved by the Engineer-in-Charge and screened as required. The same shall be clean and sharp angular grit type. If the sand brought to site is dirty it must be washed in clean water.

2.4 No crushed sand stone or stone dust shall be used .

2.5 The minimum compressive strength of bricks to be used shall not be less than 35 kg/sq.cm. and average water absorption of bricks when immersed in water for 24 hours shall not be more than 20% of dry weight.

2.6 Cast iron pipe and fittings without ear shall be used. However, pipes and fitting with ears may be accepted without any extra payment in such cases, clamps are not required for and no extra payment will be made for fixing the pipes.

2.7 The rates for all items of work, shall unless clearly specified otherwise, include cost of all labour, materials and other inputs involved in the execution of the item.

3.0 EMBEDDING OF PIPES, CONDUITS ETC.

3.1 The brick work for the portions of the external wall or W.C. through which pipes are taken, will be done after the pipes are fixed as far as practicable.

3.2 All crossings, embedments etc. in wall and floors for water supply, drainage and sanitary pipes, fittings etc. shall be provided as per previously prepared detailed drawings for individual walls and floors so as to avoid cuttings of brick work and floors. All such areas shall be made good during finishing and nothing extra shall be paid for this.

4.0 WATER SUPPLY, SANITARY FITTINGS, PAINTS AND OTHER MATERIALS

4.1 All the materials required to be tested shall be tested as per provisions of the relevant ISI codes. Should there be any difference between acceptance CRITERIA given in ISI Codes, CPWD Specifications and special conditions, the acceptance CRITERIA shall be in the following order of preference:

i. Special conditions.
ii. C.P.W.D. Specifications.
iii. BIS Codes.

4.2 The Contractor's rate for the items involving the use of materials shall be deemed to cover the cost of samples.

4.3 The Sanitary pipe and G.I. pipe wherever, necessary shall be fixed to RCC columns, beams etc. with rawl plugs and nothing extra shall be paid on this account.

5.0 INTEGRAL CEMENT BASED WATER PROOFING TREATMENT

5.1 TREATMENT FOR ROOF SURFACE.

5.1.1 The brick bats shall be from well burnt bricks. The proprietary water proofing compound shall bear ISI mark and shall conform to I.S. 2645-1975. Before execution of work, water proofing compound has to be brought to site from which random sample would be got tested and certificate of its conforming to ISI code should be produced. The proprietary water proofing compound shall be added at the rate recommended by the specialist firms but not exceeding 3 percent by weight of cement.

5.1.2 The finished surface after water proofing treatment shall have minimum slope of 1 in 80. At no point the thickness of water proofing treatment shall be not less than 65mm.

5.1.3 While treatment of roof surface is done, it shall be ensured that the outlet drain pipes have been fixed and mouths at the entrance have been eased and rounded off properly for easy flow of water.

5.1.4 The surface where the water proofing is to be done shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and dusted off. The surface shall be treated with neat cement slurry admixed with proprietary water proofing compound, to penetrate into crevices and fill up all the pores in the surface. This cement slurry shall be applied at the junction of parapet and terrace slab including the vertical face of the parapet.

5.1.5 After the slurry coat is laid, layer of well burnt brick bats shall be laid in cement mortar of mix as specified by the specialist firm but not leaner than 1:5 (1 cement : 5 coarse sand) admixed with proprietary water proofing compound to required gradient and joints filled to half the depth. The brick bat layer shall be rounded at the junction with the parapet and tapered towards top for a height of 300 mm. Curing of this layer shall be done for 2 days.

5.1.6 After curing, the surfaces shall be applied with a coat of cement slurry admixed with proprietary water proofing compound.

5.1.7 Joints of bricks bat layer shall be filled fully with cement mortar of mix as specified by the specialist firm but not leaner than 1:4 (1 cement : 4 coarse sand) admixed with proprietary water proofing compound and finally top finished with average 20mm thick layer of same mortar and finished smooth with cement slurry admixed with proprietary water proofing compound. The finished surface shall have marking of 300 x 300 mm false squares to give the appearance of tiles.

5.1.8 Curing of water, proofing treatment shall be done for a minimum period of two weeks.

5.1.9 MEASUREMENTS

The measurements shall be taken along the finished surface of treatment including the rounded and tapered portion at junction of parapet wall. Length and breadth shall be measured correct to one centimeter and area shall be worked out to nearest 0.01 sqm. No deduction in measurements shall be made for either openings or recesses for chimneys, stacks, roof lights and the like for areas up to 0.40 sqm. nothing extra shall be paid for forming such openings. For silimar areas exceeding 0.40 sqm. deductions will be made in measurements for full openings and nothing extra shall be paid for making such openings.

5.1.10 **RATES**

The rate shall include the cost of all labour and materials involved in all the operations described above.

6.1 SUNKEN FLOOR SLAB, ITS TREATMENT ETC.

6.1.1 The surface shall be thoroughly cleaned with wire brush. All loose scales shall be removed and dusted off.

6.1.2 While the water proofing treatment is done, it shall be ensured that the outlet pipes shall be properly fixed and the gaps between the wall and pipes are properly filled with cement mortar admixed with proprietary water proofing compound and grouted with cement slurry admixed with proprietary water proofing compound.

6.1.3 Water proofing treatment shall be cured for two weeks.

6.1.4 **RATE**

6.1.5 The rate shall include the cost of all labour and materials involved in the operations described above.

7.0 CUT BRICK (MARUKONA)

7.1 "Where cut brick (Marukona) as required under para 6.2.4.7 of CPWD Specifications 1996 Vol.II is not feasible on account of available quality of bricks the same shall be replaced by cement concrete 1:2:4 and no extra payment for the provisions of C.C. 1:2:4 shall be made nor would the quantity of C.C. 1:2:4 thus provided be deducted from measurements of brick work."

8.0 SPECIFICATIONS FOR MOORUM

8.1. The contractor has to bring hard soil required for filling under floors, from sources, approved by the Engineer-in-charge. The filling material shall be hard soil obtained from pits of weather disintegrated rocks free from organic matters and should preferably contain siliceous material and natural mixture of clay of calcareous origin. The size of hard soil shall not be more than 20mm.

8.2. The hard soil brought to site shall be directly used for filling and no claim for double handing shall be entertained. Filling shall be done in regular horizontal layers, each not exceeding 20cm. in depth. The hard soil shall be free from all roots, grass and rubbish and all lumps and clods, if any, shall be broken. Each layer shall be consolidated by breaking clods, watering and ramming with steel rammers. The top surface or finally finished area shall be dressed.

8.3.1 Before filling is started in the area (under floors) contractor shall remove rank vegetation, grass, brushwood, shrubs and building rubbish etc. and nothing extra shall be paid for on this account.

PARTICULAR SPECIFICATIONS (ALUMINIUM WORK)

1.0 GENERAL

The following particular specifications are applicable to Aluminium work as contained in this tender documents.

1.1 **MATERIAL**

1.1.1 Inspection of materials and works. All materials brought to the site by the contractor for use in the work, as well as fabricated components shall be subject to inspection and approval by Engineer-in-Charge. The contractor shall be required to get necessary tests carried out on materials components at his own cost from the laboratories / test houses, as directed by the Engineer-in-Charge.

1.1.2 MANUFACTURER'S TEST CERTIFICATE

T**h**e contractor shall, if required by the Engineer-in-Charge, produce manufacturer's test certificates for any material or particular batch of materials supplied by him. The test carried out shall be as per relevant specifications/Indian standard codes.

1.1.3 APPROVAL OF SAMPLES

The contractor shall submit to the Engineer-in-Charge, samples of all materials for approval and no work shall commence before such samples are approved. Samples of unanodised as well as anodized and electro coloured aluminium sections, neoprene gaskets, Thermal Barrier sections, glass, screws, hardware and any other material components requiring approval of samples, in opinion of Engineer-in-Charge shall be submitted for approval. The above samples will be retained as standards of materials and workmanship. The cost of the above samples shall be borne by the contractor.

2.0 ALUMINIUM SECTIONS

2.1.1 Aluminium sections to be used for doors, windows, ventilators and fixed glazing etc. shall be manufactured by reputed companies & shall be appropriate to meet architectural designs of relevant components and shall be subject to approval of the Engineer-in-Charge, who is required to be satisfied about their being appropriate on technical, structural, functional and aesthetic considerations.

2.1.2 The aluminium extruded sections shall conform to I.S. Designations HEIWP/HVIWP alloy, with chemical composition and technical properties as per I.S. 733 and I.S. 1285.

2.1.3 The aluminium sections shall conform to the following parameters also:

(a) The maximum tensile strength shall be 185 MPa.

(b) The maximum allowable deviation in length from a straight line shall be 0.5 mm/mtr.

(c) The maximum allowable deviation from straight shall be one degree.

(d) The maximum permissible twist shall be 0.5 mm/metre.

(e) The maximum variation in flatness shall not be more than 0.125 x width/25.

2.1.4 For sectional weight, tolerance limits shall be (-) 0.5 %. However payment in respect of items payable on weight basis shall be as per para's 8.1.1, 8.1.1.1 and 8.1.1.2.

3.0 FABRICATION

3.1.1 All joints shall be accurately fabricated and be hairline in appearance. The finished surface shall be free from visible defects.

3.1.2 (a) Taking into consideration varying profiles of aluminium sections being extruded by approved manufacturers, the contractor shall prepare detailed shop drawings of his proposal using suitable sections based on architectural design/drawings, adequate to meet the requirement/specifications laid down in this tender documents and as proposed by the manufacturers and these detailed shop drawings shall be subject to approval of the Engineer-in-Charge.

(b) All hardware used shall conform to the relevant specifications and as per samples approved by the Engineer-in-Charge. Design, quality, type, number and fixing of hardware shall be generally in accordance with architectural drawings and as approved by the Engineer-in-Charge before use.

3.1.3 All doors, windows, ventilators and glazings etc. shall be completely teak proof against water and air with neoprene gaskets and silicon sealants to the satisfaction of the Engineer-in-Charge, for which no extra payment shall be made.

3.1.4 The frames shall be strictly as per Architectural drawings, the corners of the frame being fabricated to the true right angles. Both the fixed frames and openable shutter frames shall be fabricated out of sections which have been cut to length, mitered and mechanically jointed for satisfactory performance. All members shall be accurately machine milled and fitted to form hairline joints. The jointing accessories such as cleats, brackets, screws etc. shall be of such materials as not to cause any bimetallic action. Nothing extra shall be paid for jointing accessories.

3.1.5 Mitred joints of the doors, windows, ventilators shutters and frames shall be either corner crimped or fixed with self tapping stainless steel screws of approved make and quality of heavy duty extruded aluminium cleats and sealed with silicon sealant, for which nothing extra shall be paid.

3.1.6 Vertical of the frame shall be embedded in the floors, wherever required, by 50mm by cutting and making good the floor. Nothing extra shall be paid for the same.

4 FIXING

4.1.1 The screws used for fixing aluminium frames to masonry walls/RCC members and aluminium member to another aluminium members shall be of stainless steel of approved make and quality. Threads of machine screws used shall conform to requirement of I.S. 4218.

4.1.2 The gap between frames and supports and any gap in the various sections shall be filled with approved silicon sealant to ensure complete water tightness. The sealant shall be of such approved colour and composition that it would not stain the masonry/RCC work. It should not sag or flow and shall not set hard or dry out under any conditions of weather. The SILICON sealant shall be used as required and shall match the colour of the aluminium sections. Any excess sealant shall be removed/cleared. Nothing extra shall be paid for the above.

5 ANODISING / ELECTRO COLOURING

5.1.1 Aluminium sections shall be anodized as per I.S. 7088-1973 Anodising to be as per grade AC 15 and not less than 15 microns thick when measured as per I.S.6012, in matt bronze electro colour with colour fastness rating No. 8 of I.S. 1868-1982. Colour anodizing would be done only by electro colour process. No visual variation in colour shall be permitted.

5.1.2 The anodic coating shall be properly sealed by steam or by boiling in deiodized water as per I.S. 1868 and / or I.S 6057. Sealing quality shall be tested in accordance with the relevant standards. Nothing extra shall be paid for above.

5.1.3 The contractor should satisfy himself by 100% checking in the factory that the thickness of the anodic coating is found to be minimum 15 microns and sealing quality appropriate everywhere. The testing shall be done by EDDY CURRENT METHOD as per I.S. 6012 for thickness. If any material is found substandard, this shall be totally rejected. Requisite tests shall also be required to be carried out at site as instructed by the Engineer-in-Charge and the contractor shall arrange all the equipments required for these tests at site. Nothing extra shall be paid for above.

5.1.4 All anodized aluminium works shall conform to relevant ISI standards relating to material, workmanship, fabrications, finishing, erection, installations, etc. In this connection B.I.S. codes including I.S. 1868-1982, I.S. 733-1983, I.S. 1948-1961 I.S. 7088-1973, I.S. 6012-1970, I.S. 1285-1975, I.S. 740-1975 are considered relevant and applicable.

5.1.5 A thick layer of clear transparent lacquer based on methacrylates or cellulose sutyrate shall be applied on the anodized sections, before they are brought at site. This lacquer shall be removed after installations are complete or as an alternative, the exposed surface of the aluminium sections shall be provided with gummed paper tape protective. After fixing and assuring of proper functioning of doors, windows etc. such protective layer shall be cleaned out / removed. Nothing extra shall be paid for above to the contractor.

6 GLAZING

6.1.1 All glazing panes shall be retained within aluminium framing by use of exterior grade neoprene gaskets. No water leakage shall occur on the interior even if water penetrates exterior neoprene gaskets. Use of glazing or caulking compounds around the perimeter of glass will not be permitted. All fixed glass panes shall be supported by setting blocks. There shall be no whistling or rutting. Before installation of glass, contractors shall ensure the following.

(a) All glazing rebates shall be square to plumb, true to plane, dry and free from dust.
(b) Glass edge shall be clean and cut to exact size.
(c) Glazing shall provide such thermal expansion and contraction of components, as will be caused by the temperature variations inside and outside without causing bucking stress on glass, detrimental effect on structural elements and components.

6.1.2 Samples of typical glazing shall be made and got approved by the Engineer-in-Charge before mass installation is taken in hand.

6.1.3 Sheet glass in doors, windows, ventilators and fixed glazings etc. shall be of approved make and standard quality conforming to CPWD specification 1996 Vol.I to VI with correction slips Nos. 1 to 18.

6.1.4 4 mm (10.00 kg/sqm) thick glass panes shall be provided for openings no exceeding 0.5sqm. Openings exceeding 0.50 sqm in size should be provided with 5.50 mm thick (13.75 kg/sqm) glass panes unless specified otherwise.

7 PROTECTION AND CLEANING

7.1.1 After erection and removal of protective layer, all aluminium works including glass panes shall be washed with a suitable thinner and water to give a uniform clear appearance free from all marks and blemishes.

8 MEASUREMENT AND RATES

8.1.1 For aluminium frame work the length of each member of the frame shall be measured correct to half a centimeter. The weight shall then be calculated on the basis of unit weight specified in the manufacturer's catalogue.

8.1.1.1 The weight shall also be calculated on the basis of unit weight specified in respective drawings attached to this tender documents on the basis of lengths mentioned in para 8.1.1.

8.1.1.2 For purpose payment, the least of the above weights calculated on the basis of paras 8.1.1. and 8.1.1.1. shall be considered, subject to the condition that actual weight per metre of the respective sections is not less than the weights calculated in accordance with paras 8.1.1. and 8.1.1.1 above. In case the actual weight per metre is less as stated, the payment shall be made as per actual weight in accordance with the procedure prescribed by Engineer-in-charge.

8.1.2 For fixed glazing and fixed laminated inserts, length and breadth of the area where glass panes etc. are to be seated shall be measured correct to half a centimeter and area to be calculated in square metres correct to two places of decimal.

8.1.3 For openable shutters portion for all types payable on the area basis, clear openings of shutter shall be measured at its closed position correct to half a centimeter and its area calculated correct to two places of decimal.

8.1.4 For the purpose of measurement of item and sub-items, the out to out dimensions of various types of fabricated windows shall be measured correct to half a centimeter and its area calculated correct to two places of decimal.

8.1.5 Prefabricated anodized aluminium decorative protective grill (including frame work) shall be measured correct to half a centimeter in both the directions and area worked out correct to two places of decimal.

8.1.6 For fabrication of aluminium work, measurements of actual openings at site shall be measured for fabrication and erection, as per this tender document.

8.1.7 It is made clear that items such as cleats/angles, other fixtures, nuts, bolts, screws etc. which shall be required for fabrication and erection of aluminium work as per this tender document shall not be considered for the purpose of measurements and payment of various items. The rate of various items as per schedule of quantities is however inclusive of above elements and nothing extra shall be paid for the same.

SPECIAL CONDITIONS FOR CIVIL WORKS

1.0 The contractor will have to work according to the program of work decided by the Engineer-in-Charge, for which purpose, the contractor should submit a tentative program of the work within 15 days from the date of start of the work.

2.0 The contractor shall take instructions from the Engineer-in-charge for staking of materials in any place. No excavated earth or building material shall be stacked on areas where other buildings, roads, services or compound walls are to be constructed.

3.0 The work on item of internal finishing must be started as soon as the structure is completed.

4.0 Unless otherwise provided in the Schedule of quantities the rate tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths to the building and nothings extra shall be payable to him on this account.

5.0 The work shall be carried out in accordance with the architectural drawings and structural drawings. The structural and architectural drawings, shall have to be properly co-related before executing the work. In case of any difference noticed between architectural and structural drawings, final decision, in writing of the Engineer-in-charge shall be obtained by the contractor. So also in case of any discrepancy in the item given in the schedule of quantities appended with the tender and architectural drawings related to the relevant items, the former shall prevail unless and otherwise given in writing by the Engineer-in-charge. Samples shall be prepared before starting particular items of work for prior approval of the Engineer-in-charge and nothing extra will be payable on this account.

6.0 All the materials to be used on works shall bear BIS certification mark unless otherwise the make is specified in the item or special conditions appended with this tender document. In case BIS mark materials or the materials mentioned in the tender documents are not available, as per opinion of Engineer-in-charge, which shall be final, the material to be used shall conform to CPWD specifications applicable in the tender or BIS Code. In such case Engineer-in-charge shall satisfy himself about the quality of such material and give his approval in writing. Only articles classified as first quality by the manufacturers shall be used unless otherwise specified. All material not having ISI mark shall be used as per relevant BIS specifications. The Engineer-in-charge may relax the condition regarding testing of the quality of the materials required for the work, if small. In all cases of use of ISI marked materials proper proof of procurement of materials from authentic manufacturers shall be provided by the contractor to the entire satisfaction of Engineer-in-charge.

7.0 All materials equivalent to the one specified should be got approved by the Engineer-in-charge before using the said materials in the work.

8.0 For form work use of solid timber and products involving solid timber shall not be permitted.

9.0 The contractor shall be responsible for the protection of sanitary and water supply fittings and fixtures against pilferage and breakage during the period of installation and thereafter until the building is handed over.

10.0 Any damage to work resulting from rains or from any other cause until the work is taken over by Department after completion of work shall be made good by the contractor at his own cost.

11.0 Some restrictions may be imposed by the security staff etc. on the working and for movement of labour, materials etc. the contractor shall be bound to follow all such restriction/instructions and nothing extra shall be payable on this account.

12.0 The contractor shall comply with provision any Government acts which relate to the work and to the regulations and laws of any local authorities. The contractor shall give all notices required by the said acts, laws etc., and pay all fees payable to such authorities and allow for those contingencies, cost of restorations etc. and all other fees payable to the local authorities.

13.0 Tendered rates are inclusive of all taxes and levies payable under the respective statutes.

13.1 The quoted rates shall be inclusive of all the taxes i.e sale tax/VAT etc. (Except service tax), purchase tax, Turnover Tax/VAT/Contract Tax leviable if any by Central/State Government of Maharashtra Act No. XXXVI-89, an act to levy and collect the tax on the transfer of property in goods involved in the execution of works contract in the State of Maharashtra and nothing extra will be payable on that account. However in respect of service tax, same shall be paid by the contractor to the concerned department on demand and it will be reimbursed to him by the Engineer in charge after satisfying that it has been actually and genuinely paid by the contractor.

14.0 Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to Bye-laws and specifications of the Municipal Body/ Corporation where CPWD Specifications are not available. The work of water supply, internal sanitary installation and drainage etc. shall be carried out as per local Municipal Corporation or such local body bye-laws. The contractor shall get the materials (fixtures/fittings) tested by the Municipal body / Corporation authorities wherever required at his own cost and after completion of work shall produce necessary completion certificates from such authorities.

14.1 The contractor shall comply with proper and legal orders and directions of the local or public authority of municipality and abide by the rules and regulations and pay all fees and charges, which he may be liable.

15.0 The contractor shall give a performance test of the entire installation (S) as per standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

16.0 The tenderer should not quote unnecessary conditions contradicting the general conditions and particular specifications given in this tender, as such conditions apart from being not agreed to, can lead to rejection of the tender. Tenders with any condition including that of Conditional Rebate shall be rejected forthwith.

17.0 **BRIEF WORDING OF ITEMS**

17.1 For the purpose of recording measurements and preparing running account bills, the underlined portions of the nomenclature of items included in the schedule of quantities shall be adopted as the abbreviated nomenclature of the particular item. The abbreviated nomenclature shall be taken to cover all the materials and operations as per the complete nomenclature of the relevant item in the agreement and relevant specifications. In the case of items for which abbreviated nomenclature is not indicated in the schedule of quantities, the full nomenclature shall be reproduced while recording measurements and preparing the bills. Also following abbreviations may be adopted.

(A) P/L for : Providing and Laying.
(B) P/F for : Providing and fixing.
(C) C.C. for : Cement Concrete.
(D) C.M. for : Cement Mortar.

17.2 In case of extra/substituted items of work for which brief wording is not provided in the agreement, the full nomenclature of the item shall be reproduced in the measurement books and bills forms of running account bills.

17.3 The full nomenclature of the items shall be adopted in preparing abstract of final bill in the measurement books and also in the forms for final bills.

18.0 **WATER PROOFING TREATMENT**

18.1 The water proofing items should be got done through the firms approved by the Chief Engineer, WZ-II, CPWD, Nagpur.

18.2 GUARANTEE FOR WATER PROOFING TREATMENT

Five years guarantee in prescribed proforma attached must be given by the contractor for the water proofing treatment. In addition 10% (Ten percent) of the cost of these items would be retained as guarantee to watch the performance of the work executed. However, half of this amount (withheld) would be released after two monsoon seasons after the completion of the work, if the performance of the work done is satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days and, if not attended to, the same shall be got done by other agency at the risk and cost of the contractor. In any case

the guaranteeing firms during the guarantee period should inspect and examine the treatment once in every year and make good any defect observed. However, the security deposit can be released in full, if bank guarantee of equivalent amount for 5 (five) years is produced and deposited with the department.

CONDITIONS FOR ARRANGING CEMENT/STEEL BY CONTRACTOR

19.0 **CONDITIONS FOR CEMENT**

19.1 The contractor shall procure 43 grade (conforming to IS:8112) ordinary Portland cement /PPC, as required in the work, from reputed manufacturers of cement, having a production-capacity of one million tones or more, per annum such as A.C.C., Ultra tech, J.P.Rewa, Vikram, Shri Cement, Birla Jute and Cement Corporation of India etc. i.e. agencies as approved by Ministry of Industry, Government of India, and holding licence to use ISI Certification mark for their product. The tenderer may also submit a list of names of cement manufacturers which they proposed to use in the work. The tender accepting authority reserves right to accept or reject name (S) of cement manufacturers (s) which the tenderers proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially. Supply of cement shall be taken in 50 kg bags bearing manufacturer's name and ISI marking Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the Contractor at his own cost within a week's time of written order from the Engineer-in-charge.

19.2 The cement shall be brought at site in bulk supply of approximately 50 tonnes or as decided by the Engineer-in-charge.

19.3 The cement godown of the capacity to store a minimum of 2000 bags of cement shall be constructed by the contractor at site of work for which no extra payment shall be made. Double lock provision shall be made to the door of the cement go-down. The keys of one lock shall remain with the Engineer-in-charge or his authorized representative Junior Engineer or Assistant Engineer and the key of the other lock shall remain with the Contractor or his authorized Agent. The Contractor shall be responsible for the watch and ward and safety of the cement go-down. The contractor shall facilitate the inspection of the cement go-down by the Engineer-in-charge at any time.

19.4 The Contractor shall supply free of charge the cement required for testing. The cost of tests shall be borne by the Contractor/ Department in the manner indicated below.

(i) By the Contractor, if the results show that the cement does not conform to relevant BIS codes.

(ii) By the Department, if the results show that the cement conforms to relevant BIS codes.

19.5 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained in cement register. The theoretical consumption of cement shall be worked out as per procedure followed by CPWD on the basis of standard co-efficients as provided/ laid in DSR 2007 with up to date correction slips.

19.6 Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-charge.

CONDITIONS FOR STEEL

20.1 The contractor shall procure TMT bars of Fe 500 grade from primary producers such as SAIL or TISCO or RINL as approved by Ministry of Steel.

In case of non-availability of steel from primary producers the NIT approving authority may permit use of TMT reinforcement bars procured from secondary producers subject to following.

a. The grade of the steel shall be Fe 500 as per BIS 1786-2008.
b. The secondary producers must have valid BIS licence to produce HSD bars conforming to IS 1786 : 2008. In addition to BIS licence, the secondary producer must have valid licence from either of the firms Tempcore, Thermex, Evcon Turbo & Turbo Quench to produce TMT Bars.
c. The TMT bars procured from primary producers shall conform to manufacture's specifications.
d. The TMT bars procured from secondary producers shall conform to the specifications as laid by Tempcore, Thermex, Evcon Turbo & Turbo Quench as the case may be.
e. TMT bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008 pertaining to Fe 500 grade of steel as specified in the tender.

20.2Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the Contractor does not conform to the specifications as defined under para (1) (d) & (1)(e) above, the same shall stand rejected and it shall be removed from the site of work by the Contractor at his cost within a week's time of written orders from the Engineer-in-Charge to do so.

Size of bar	For consignment below 100 tonnes	For consignment over 100 tonnes
Under 10 mm dia	One sample for each 25 tonnes or part thereof	One sample for each 40 tonnes or part thereof.
10 mm to 16 mm dia tonnes	One sample for each 35 tonnes or part thereof	One sample for each 45 tonnes or part thereof.
Over 16 mm dia tonnes	One sample for each 45 tonnes or part thereof	One sample for each 50 tonnes or part thereof.

20.3.The Contractor shall supply free of charge the steel required for testing. The cost of tests shall be borne by the Contractor / Department in the manner indicated below :

(i) By the Contractor, if the results show that the steel does not conform to relevant BIS codes.
(ii) By the Department, if the results show that the steel conforms to relevant BIS codes.

20.4 The quantity payment of steel reinforcement for the purpose of payment shall be worked out by multiplying the measured length by standard co- efficient weight as given in Table IV in CPWD Specification 1996 Vol.II.

20.5 Steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

21.0 **MATERIALS OBTAINED FROM DISMANTLEMENT**

21.1 The contractors in course of their work, should understand that all materials (e.g. stone and other materials) obtained in the work of dismantling, excavation etc. will be considered Government's property and may be issued to the contractor if required for use in this work at rates approved by the S.E.

22.0 MATERIAL BROUGHT BY THE CONTRACTOR

22.1. The contractors shall have to deposit, the approved paints of required colour and shade as per actual requirement of the work to be done, with the Engineer-in-charge at his departmental stores at the site of work.

22.1.1 The paint will be issued to the contractor from time to time according to his requirements for the work in the same manner as the issue of materials stipulated to be issued departmentally.

Similar procedure shall be followed for water proofing compound.

22.1.2 The day-to-day receipt and issue quantity account of water proofing compound, paint etc. shall be maintained by the Junior Engineer and signed daily by the contractor or his authorized agent.

22.3 Empty containers should not be removed without the written permission of the Engineer-in-charge

23.0 TESTING OF MATERIALS

23.1 The contractor shall procure all the materials in advance so that there is sufficient time for testing and approving of the material and clearance of the same before use in work.

23.2 Samples of various materials required for testing shall be provided free of charge by the contractor. Testing charges, if any for the first sample shall be borne by the department. All other expenditure required to be incurred for taking the samples, conveyance, packing etc. shall be borne by the contractor himself. In case the sample does not satisfy the provision specified, the cost of testing of subsequent samples shall also be borne by the contractor.

23.3 With a view to avoid controversy about quality of cement concrete as revealed in the test results of 7 days cubes falling short of the prescribed standards by over 10% to 20% and pending testing of balance 3 cubes for 28 days as final confirmatory acceptance test, crushed samples of cement concrete from the failed 7 days cubes should be preserved in a sealed bag.

23.4 In case of concrete and reinforced concrete work, the contractor shall be required to make arrangement for carrying out compressive strength tests at his own cost. He shall render all assistance for the preparation of cubes, safe custody of the same, proper curing and carriage up to the laboratory where the test is to be performed, the cube tests can be performed at any laboratory approved by the Engineer-in-Charge.

24.0 The contractor shall make his own arrangements for obtaining electric connections, if required and make necessary payments directly to the department concerned.

25.0. Other agencies will also be executing simultaneously the works like electrification, horticulture of external services and other building works for the same project along with his work in particular, the contractor shall afford necessary facilities for the same no claim in this respect shall be entertained. The contractor shall leave such necessary holes, opening etc. for laying/burying in the work, pipes, cables, conduits, clamps, boxes and hooks for fan fitting, P.A. system, telephone system, C.C.T.V., system etc. and nothing shall be paid for the same. Conduits for electrical wiring / cables will be laid in such a way that they leave enough space for the concreting and do not adversely affect the structural members. Nothing extra over the agreement rate shall be paid for the same.

26.0 The contractor for this work shall plan his work in such a manner so that the work(s) of other contractor(s) is /are not affected in any way. A proper co-ordination with other contractors working at site has to be maintained.

27.0.Any cement slurry added over base surface (or for continuation of concreting) for bond, if added, its cost shall be deemed to have been included in the respective items, unless otherwise, specifically stated, and nothing extra shall be payable nor extra cement considered in the cement consumption on this account.

28.0.The intending tenderers are requested to go through architectural drawings. These drawings are available in the O/o Executive Engineer, Pune Central Division-I, CPWD, Pune-37. The architectural drawings show the type of building to be constructed, number of storeys and other architectural features. No claim whatsoever shall be entertained for the same and also for lack of information on this account, which the tenderer is expected to have.

29.0 The contractor for this work shall plan his work in such a manner so that the work(S) of other contractor(S) is /are not affected in any way. A proper co-ordination with other contractors working at site has to be maintained.

30.0 Steel windows/ ventilators to be provided in the work shall be from BIS approved manufacturers or from the firms approved by the tender accepting authority.

Additional Terms and conditions:

1. All the works shall be executed as per DSR specification and rules amended up to date. The quality of work and measurement shall confirm to these specifications. Relevant BIS standards and specifications are also incorporated in these specifications. The contractor shall execute the whole and every part of the work in workmanship manner both regards the materials and in every respect in strict accordance with these specifications and BIS standards.

2.The contractor shall comply with the provision of the contract and with care and diligence execution and to maintain the work and provide all the labour and materials, tools and plants including for measurements and supervision of all works, structural plan and other things of temporary or permanent nature required for the such execution and maintenance in so far as the necessity for providing those, is specified or is reasonably inferred from these documents. The contractor shall take full responsibility for adequacy, suitability and safety of all the works and method of construction.

3. The several documents forming the bid are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to the small scale drawings. Special Conditions of contract explains the additional provisions of the some of the General Conditions of Contract. In case of any discrepancy between the Bill of Quantities, the technical Specifications and /or the drawings, the following order of preferences shall be observed.

1. Description in Bill of Quantity
2. Special Conditions of Contract
3. Drawings
4. Technical Specifications
5. Bureau of Indian Standard Specifications

ADDITIONAL, SPECIFICATION AND CONDITIONS (INTERNAL E.I.)	
1	1.The work shall be carried out strictly in accordance with the CPWD specifications for electrical works Part-I Internal and Part II External 2008 and as amended up to date and in accordance with Indian Electricity Rules, 1956, Indian Electricity Act, 1910 as amended up to date and as per instructions of the Engineer-in-charge including as below and nothing will be paid extra.
2	2.The contractor is advised to visit the site before quoting the rates for determining the site
	condition. No claim shall be entertained at later stage.
3	3.All materirals to be used on this work by the contractor shall be got approved from the Engineer-in-charge/his representative before installation at site.
4	4.The work shall be carried out accroding to approved drawings/details which shall be subsequently issued to the successful tenderer for executive of work and as per instructions of the Engineer-in-charge who will have right to be change the layout as per requirement at site and the contractor shall not have any claim due to change in layout.
5	5.All damages done to the building during execution of electrical work shall be the responsibility of the contractor and the same will be made good immediately at his own cost to the satisfaction of the Engineer-in-charge. Any expenditure incurred by the department in this condition shall be recovered from the contractor and decision of the Engineer-in-charge about recovery shall be final.
6	6.The bad workmanship will not be accepted and defects shall be rectified at contractor's cost of the satisfaction of the Engineer-in-charge. The programme of electrical works are to be co-ordinated in accordance with the building work and no claim for idle labour will be entertained.

7	7.All the debris of the electrical works should be removed and the site should be cleared by the contractor immediately after the accruing of debris. Similarly any rejected material should be immediately cleared off from the site by the contractor.
8	8.Cement for this bonafide work is to be arranged and used by the contractor himself and nothing extra will be paid on this account.
9	9.The contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-charge and to comply with the remarks therein.
10	10.The size & route of conduit and wiring shall be got approved from the Engineer-in-charge/his representative before taking up the execution.
11	11.The contractor shall make his own arrangement at his own cost for electrical/general tools and plants required for the work.
12	12.The work shall be carried out according to the drawings/details as approved by the Engineer-in-charge. The make of DB & MCB/MCCB shall be same.
13	13.No Central/State sales tax/VAT/Contract tax/Excise duty/octroi etc. except service tax shall be separately paid by the department. Deduction of contract tax at source shall be made while releasing payment through running/ final bills @4% of such sum or as appilicable. A certifiacate specifying the rate and amount of deduction shall however be issued. No Form-D, 31/32 (Road permit) etc. shall be issued by the department. The road permit shall be arranged by the tenderer on his own.
14	14.The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department. However if there is any delay in construction from the department side, the installation may be taken over in parts, but the decision on the same shall rest with Engineer-in-Charge which shall be binding on the contractor.
15	15.The connection, inter connections, earthing and loop-earthing shall be done by the contractor, wherever required and nothing extra shall be paid on this account.
16	16.In case of equivalent, prior approval of Engineer-in-charge has to be taken before bringing the material to site.
17	17.The chase cutting in the walls(if reqd.) is to be done by using electrical chase-cutter, for which the contractor has to arrange electric supply at his own level.
18	18.Nothing extra shall be paid for installing the fittings in the false ceiling.
19	19.Nothing extra shall be paid for :-
	a) Inter connections with thimbles/wires/taps/strips/connector etc.

TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS

1	All hardware items such as screws, thimbles, G.I. wires etc. which are essentially requried for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.
2	All hardware materials such as nuts/bolts/screws/washers etc. to be used in the work shall be zinc/cadmium plated iron.
3	Any conduit which is not be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.
4	While laying conduit, suitable junction boxes shall be left for pulling the wire.
5	Material to be used in the work shall be ISI marked. The makes of material have been indicated in the list of acceptable makes. No other make will be acceptable. The material to be used in the work shall be got approved from the Engineer-in-charge/his representative before its use at site. The Engineer-in-Charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.
6	Where switches/sockets/telephone/T.V./regulator/internet outlets are to be provided, the same shall be of only one make.
7	The MCB distribution boards shall be factory fabricated in the works of the manufactuer of the MCB's of any of the makes specified and the same shall be duly pre-wired in the works. The board shall be brought to site in ready for installation condition. The MCB's and the MCB distribution board shall be of the same make.
8	The earthing shall be carried out in the presence of the Engineer-in-Charge or his authorized representative.
9	All fittings/fans will be earthed as per specifications.
10	After completion of the installation, testing shall be carried out as provided in CPWD specifications. The contractor will have to furnished completion plans and completion certificate as per specifications.

INTERIOR WORKS:

GENERAL:

This specification is for work to be done, items to be supplied and materials to be used in the works as shown and defined on the drawings and described herein, all under the supervision and to the satisfaction of the client/consultants.

1. The workmanship is to be the best available and of a high standard. Use of special tradesmen should be made in all aspects of the work and allowance must be made in the rates for doing so.
2. Templates, boxes and moulds shall be accurately set out and rigidly constructed so as to remain accurate during the time they are in use.
3. The contractor shall be responsible for providing and maintaining and boxing or other temporary convenes required for the protection of dresses or finished work if left unprotected. He is also to clean out all shelves, out ends and other waste from all parts of the works before coverings.
4. All unexposed surfaces of timber e.g. partition/paneling frames, false ceiling, backing fillets, backs of door frames, cupboard framing, grounds, etc., are to be treated with two coats of approved timber preservative ad anti-termite paints before fixing or converging.
5. Only first class workmanship will be accepted. The contractor shall maintain uniform quality and consistency in workmanship throughout.

JOINERY:

1. Joinery is to be prepared immediately after preparing the work order, framed up, bonded and tied up. Any portions that are wrapped or found with other defects are to be replaced before welding up. The whole of the work is to be framed and finished in a workmanlike manner in accordance with the detailed drawings, specifications and wherever necessary, fitted with metal ties, straps, belts, screws, glue etc. Running beaded joints are to be cross-tongued with Teak tongues wherever 1 or 1.5 thick double cross-tongued. Joinery work is to be generally finished with fine sand or glass paper.
2. Joints: All joints shall be standard Mortise and Tenon, dowel, dove tailed and cross-halved. Nailed or glued joints will not be permitted. Screws, nails etc., shall be standard Iron or wire of oxidized metal. Fold tenons should fit the mortises exactly.
3. Nailed or glued butt joints will not be permitted, but in exceptional cases approval of client/consultants has to be taken.
4. Where screws are shown on a finished surface, they will be sunk and the hole plugged with a wood plug of the same wood and grain. The finished surfaces shall be neatly punched and the hole filled with wood filler to match the colour.
5. If joints in joinery work open, or other defects arise within the period stated for defects liability in the contract, then such defective joinery shall be taken down, refilled, redecorated and/or replaced. The defective work, and any work disturbed shall be made good at the contractor's expense.
6. Nails, spikes and bolts shall be of length and weight as approved by the client/consultant. Nails shall comply with IS: 1959-1960 or equivalent approved sample. Brass headed nails are to comply BIS: 1210. Wire staples shall comply with BIS: 1494 or equivalent.
7. The contact surface of dowels, tenons, wedges etc., shall be glued with an approved adhesive.
8. Where glued joinery and carpentry work is likely to come into contact with moisture, the glue shall be water proof.

HARDWARE & METALS:

The hardware, throughout, shall be of approved manufacture or supplier, well made and equal to, in every respect, to the samples to be deposited with the client/consultants. The contractor may be required to produce and provide samples from many different sources before the client/consultant take a decision and he should allow his rates for doing so.

1. Fittings generally shall be brass oxidized unless otherwise specified and shall be suitable for their intended purpose. In any case, it will have to be approved by client/consultants before the contractor procures it for execution at site.
2. Screws are to match the finish of the article to be fixed and to be round or flat headed or counter sunk as required.
3. The contractor shall cover up and protect the brass and bronze surfaces with thick grease or other protective material, renewed as necessary and subsequently clean off on connection.

4. Aluminium and Stainless Steel shall be of approved manufacture and suitable for its particular application. Generally the surface of Al shall have an oxidized finish and both shall comply with the samples approved by the client/consultant. All SS sheets shall be 304 S.S, Japan or equivalent, with gauge as specified but not thinner than 16 G.
5. All steel, bronze, brass and aluminium and SS articles shall be subjected to a reasonable test for strength, if so required by the client/consultant at the contractor's expense.
6. All brazing and welds are to be executed in clean smooth manner, rubbed down and left in the flattest and tidiest way, particularly where exposed.
7. Chromium plating shall be in accordance with IS or as per approved specification for normal outdoor conditions and shall be on a base material of Cu or brass.

GLAZIER:

1. All glass to be of approved manufacturer complying with IS: 3548-1966 as per approved quality and sample to be of the selective qualities specified and free from bubbles, smoke, air holes and other defects.
2. Polished plate glass shall be 'glazing glass' (GG) quality and that for mirror shall be silver quality (SG) confirming to IS: 3438-1965 as per approved sample and quality.
3. The compound for glazing to metal to be special non-hardening compound manufactured for the purpose and of a brand and quality approved by the client/consultants.
4. While cutting glass, proper allowances to be made for expansion. Each square or rectangle of glazing to be of one whole sheet. On completion of work contractor shall clean all glass inside and cut/replace all cracked, scratched and broken panes and leave in good condition.

PAINT & POLISHES:

1. All material required for the works shall be of specified and approved manufacturer, delivered to the site in manufacturer's containers with the seals etc., unbroken and clearly marked with the manufacturer's name or trade mark with a description of the contents and colour. All materials are to be stored on the site of the work.
2. Spray painting with approved machines will be permitted only if written approval has been obtained from the client/consultant prior to painting. No spraying will be permitted in the case of priming coats or where the soiling of adjacent surface is likely to occur. The nozzle and pressure to be so operated as to give an even coating throughout to the satisfaction of the client/consultant. The paint used for spraying is to comply generally with the specification concerned and is to be specially prepared by the manufacturer for spraying. Thinning of paint by brushing will not be allowed.
3. Wood preservation shall be Solignum or other equal and approved impregnating wood preservative and all concealed woodwork shall be treated with wood preservative and anti-termite treatment with Termiseal or equivalent chemical.
4. All brushes, tools, pots, kettles etc., used in carrying out the work shall be clean and free from foreign matter and are to be thoroughly washed out before being used with a different class of materials.
5. All iron or steel surfaces shall be thoroughly scraped and rubbed with wire brushes and shall be entirely free from rust, mill scale, etc., before applying the primary coat.
6. Surfaces of new woodwork to be painted are to be rubbed down and cleaned to the approval of the client/consultant.

UPHOLSTERY:

1. This will be of first class standard workmanship with webbing, no sag springs, coil springs, padding and filling as specified on drawings. Covering fabrics will be sewn, tufted and chorded as shown in the drawing and as approved by the client/consultant.
2. Cushion Vents: Brass cushion vents should be installed at the back or underside of seat cushions (Specially those that are covered in leather, vinyl plastic or very tightly woven fabric) to allow air to escape easily and to prevent tearing.
3. Materials: Finished timber shall be of the type specified. Furnishing fabrics, colour, and pattern, substance to be specified and manufactured or supplied by the company specified. No variation of this will be permitted unless with prior approval of the client/consultant.

POLISH:

French Polish: The basic material shall be shellac dissolved in methylated spirit.

Preparation: The timber should be well sanded and cleaned and the grain filled with grain filler. Any staining must be done before applying the polish.

Equipment: The polishing rubber, the most important implement in French polish, shall consist of a pad of cotton wool, which acts as a reservoir for the polish, and a cover of soft white liner or cotton fabric, similar to a well-worn handkerchief, which acts as a filler. The rubber must never be dipped into the polish. The rubber should be changed by pouring the polish on the pad with the cover removed.

Application: Work evenly over the surface with a slow figure-of-8 motion until the timber is coated with a thin layer of polish. The object is to apply a series of thin coats, allowing only a few minutes for drying between the coats. When a level and even bodied surface is obtained, the work is ready for the second stage i.e. spiriting off. Allow the work to stand for at least 8 hours, then take a fresh rubber with a double thickness of cover material and change it with methylated spirit. The object of spiriting off is to remove the rubber marks and to give the brilliance of finish. Finally, work in the direction of the grain and continue until the surface is free of smears and rubber marks. Then leave to harden off.

Wax Polish: Wax polish shall contain silicones and driers. A good silicon wax is to be used, not a creamy or spray. The timber shall be sealed, first with another finish such as Ronseal, before applying the wax.

Application: Apply a light coat of the sealer by brush or cloth direct to the unfilled timber, working well in and finishing evenly with the grain. Allow to dry thoroughly, then sand lightly with fine abrasive paper. Apply a heavy coat of wax by cloth on a flat surface with a stiff brush. Work it well into the timber and finish off by stroking with the grain before leaving to harden. Leave for several hours before rubbing up with a soft brush. Finally buff the grain with a soft cloth.

Transparent/Coloured Polyurethane (Melamine): This shall be applied where natural grain of the wood is required to be shown. Polyurethane gives tough surface which resists scraping, chipping and boiling water.

Application: Clean off the grease and wax with an abrasive and white spirit. This should not be applied in humid conditions. Apply the first coat preferably off clear hard glaze with a cotton pad. Leave this to dry for at least 6 hours, and then apply further coat with a paint brush. If you wait for longer than 24 hours between coats, rub down the previous coat with fine glass paper or medium grade of steel wool. Obtain a matte finish if require by giving a final coat of clear Ronseal matte coat.

TIMBER:

1. Only seasoned and chemically treated BTC / CPTW / Sal wood/matching wood to be used, as specified.
2. All the wood shall be properly seasoned, natural growth and shall be free from worm holes, loose or dead knots or other defects, saw die square and shall not suffer warping, splitting or other defects.
3. The moisture content shall not exceed 12%
4. All internal frameworks shall be treated with approved wood preservation and anti-termite chemical.
5. All wood brought to site should be cleaned, shall not have any preservative or other coating or covering.
6. All rejected, decayed, bad quality wood shall be immediately removed from site. All wood brought to site must be stack stored properly as per instructions.

PLYWOOD:

1. Marine plywood confirming to IS: 710-1976 as specified in the approved list of manufacturers shall only be used. (Block board/commercial plywood not to be used)
2. Only teak wood particle board shall be used. Particle board shall be phenol formaldehyde bonded and generally confirm to IS: 3087-1965
3. Only 3 mm – 4 mm thick straight-grained groove matching approved veneers shall be used.

MDF confirming to IS: 12406-1988 is a zero wood substitute finding a wide range pf applications in homes and offices. MDF should be of excellent finish. This should have advantage of homogenous construction, design flexibility, unbeatable machinability, no core voids and better value for money.

LIST OF APPROVED MANUFACTURERS/SUPPLIERS OF MATERIALS AND SUB-CONTRACTORS/INTERIOR WORKS

Note:

1. All materials to be used should be as per the list given below.
2. Use of equivalent make shall be only with prior approval from clients/consultants in writing. It must be at par with specified list below in all respects. Any additional expenditure/time due to this variation will be on contractors account and no claims shall be entertained.
3. Contractor shall make payment to all suppliers/sub-contractors proportionately as per the payment received from the client/consultant for the particular item of work; otherwise the client/consultant has full rights to make payment directly to the party to avoid hampering progress of work. Such amount paid out shall be deducted in whole against the account of the contractor.
4. Client/consultant reserves the right to select/prefer the material from the approved list.

Sl No.	Material	Approved make/sub-contractor/supplier	Remarks
A	**WOOD**		
1	Old Burma Teakwood	No specific supplier. Contractor to obtain approval for samples.	Open market material
2	BTC	No specific supplier. Contractor to obtain approval for samples.	Open market material
3	Cp – Teakwood	No specific supplier. Contractor to obtain approval for samples.	Open market material
4	Hardwood	No specific supplier. Contractor to obtain approval for samples.	Open market material
5	Wood to match the veneers to be used	Jalaram, Anchor, Ekbote	
B	**PLYWOOD**		
1	Marine ply (IS: 710)	Anchor, Kitply, Greenply, Uniply, Archidply.	
2	Soft Board	Jolly Board or approved equivalent	
3	Particle Board	Novopan, Egger, Duratuff, Archid	
4	MDF	Duratuff or approved equivalent (IS approved)	
5	Flush Door	Anchor, Kitply, Anchor, Green, Mayur	Marine grade
C	**DECORATIVE VENEERS/LAMINATES**		
1	Veneers	Jalaram, Anchor, Ekbote, Archid, Durian.	Group match and lot to be approved
2	Laminate	Kitlam, Greenlam, Merino, Durian, Archid.	

D	**GLASS**		
1	Glass	Asahi, Modiguard, Saint Gobain, Float Glass India	
2	Mirror	Asahi, Modiguard, Saint Gobain, Float Glass India	
3	Tempering or toughening of glass	Asahi, Modiguard, Saint Gobain, Float Glass India	
E	**ADHESIVE & PRESERVATIVES**		
1	Adhesive	Fevicol, Vamicol, Kitcol, Araldite, 3M	
2	Preservative	Termiseal, Bison, Solignum.	
F	**PAINTS & POLISHES**		
1	Interiors Paint: Acrylic, Luster, Enamel	ICI Dulux, Nerolac, Asian, Burger, Oikos.	
2	Fire Retardant paint	Fire Tard, Shalimar, Viper, Nobel	
3	Poly-coating	MRF, Solvosol, Asian	
4	Melamine	MRF, Solvosol, Asian	
G	**FALSE CEILING**		
1	Gypsum	India Gypsum or equivalent make (IS approved)	
2	Acoustical: 1. Gypsum 2. Fibrous 3. Metal	 India Gypsum or approved equivalent AMF, Armstrong or approved equivalent Hunter Douglous or approved equivalent.	Entire, including framework, supports, hanger etc., is to be used of the same make.
3	Calcium Silicate Board	Hilux, Aerolite or approved equivalent	
H	**HARDWARE**		
1	Screws	GKW, Nettle fold or approved equivalent	
2	Locks for cabinets	Godrej, Vijayan, Dorset, Acme.	
3	Floor Spring – for toughened glass	Dorma or approved equivalent	

4	Floor springs / door closers	Hyper, Everite, Garnish, Hamco or approved equivalent	
5	Handles	Nikki or approved equivalent.	
6	Hinges	Grass, Blum, Hafele	
7	Sliding drawer channels	Grass, Blum, Hafele	
8	Metal side drawer channels	Grass, Blum, Hafele	
9	Aluminium	Jindal or approved equivalent	
10	Lock	Dorset, Vijayan, Godrej, Acme.	
11	Patch fittings	Dorma	
12	Tower Bolt/Stopper	Magnum, Shalimar, Natraj, Ebco	
13	Mobile storage	Safeguard, Godrej or approved make.	
I	**SOFT FURNISHING**		
1	Carpet	Transasia, Interface, Miliken, Shaw	
2	Glass film for tint/safety/frosting etc	3M or approved equivalent.	
J	BLINDS		
1	Venetian, vertical blinds in fabric/hard wood/bamboo – Roman fold or roll up.	Mac, Aerolux, Vista, AD series, Technofab, Trend Italia	
2	False flooring	Kingspan, Tyco, DG false flooring	
3	Aluminium sections	Jindal, Hindalco	
K	PLUMBING & SANITARY		
1	CPVC Pipes & fittings	Ashirwad, Astral	
2	UPVC Pipes & fittings	Prince. Kisan	
3	Ball Valves	Zoloto, Hawa	
4	G.M Non return valves	Zoloto, Kirloskar	
5	Stoneware Pipes	M.S.L, T.S.L	ISI Marked
6	Sanitary Ware	Hindware/Parryware	
7	Plumbing Fixtures	Jaquar	
8	Toilet Accessories	Jaquar / Kimberly Clarke	
9	Hand driers	Nova-tech	

10	Urinal Sensors	Jaquar	
11	FRC Manhole frames & covers	Southern Concrete Industries/Approved equivalent	
12	CI Gratings & MH Frames & Covers	Neco	

PREAMBLE TO SCHEDULE OF QUANTITIES

1. **Abbreviations:**

Rmt	Running meter
Sqm	Square meter
Cum	Cubic Meter
L.S.	Lump sum
C/C	Centre to centre
C.P	Chrome Plated
No.	Numbers
Mm	Millimeter
G.I	Galvanized Iron
A.C	Asbestos cement
C.I	Cast Iron

2. All dimensions shown in drawings are in mm unless otherwise stated,
3. The quoted rate shall be all inclusive and cover the cost of materials, samples brought for approval, tools and tackles, plant and equipment, supervision, over heads, profit and any other expenditure incurred for completion of work as per drawings, specifications and to the full satisfaction of the client/consultant.
4. The rates quoted shall be valid for working at all heights, depths and on all floor levels. No extra payment shall be made for scaffolding, staging, ladders etc., for transportation of men and material at higher or lower levels.
5. The item rate specifications are indicative. The contractor will have to carry out the work in accordance with the drawings, technical specifications and/or other conditions laid down in tender document and to the full satisfaction of client/consultants.
6. Quantities mentioned against respective items are approximate and can vary to any extent. Payment shall be made on actual executed quantities.
7. No claims shall be entertained in case of increase or decrease in quantities. Client/consultants reserve the right to increase or decrease in quantities. Client/consultants reserve right to increase/decrease quantities of any item and also to add/delete any item in totality.
8. Client/consultants reserve right of operating any item for any work on any floor.
9. The rate for partition, paneling shall include necessary additional framework supports that may be required to suit site conditions or stability of the item. Decision of client/consultants in regards to the need for such additional supports shall be final. Vertical members or frames of full height partitions shall be fixed with R.C.C floor and roof slab/beam.
10. All wooden frame work/member sizes mentioned shall be full size with maximum plaining tolerance of 3mm both ways.

11. Size and type of door closer/floor spring shall be suitable for type of door. The contractor shall give guarantee for performance of door closer/floor spring from him as well as manufacturer.
12. Rate of pelmet fascias and soffits shall include heavy-duty aluminium curtain channels and nylon runners, stoppers, brass hooks fixtures wherever required.
13. Rates for painting and polishing shall include protection and cleaning of glass panels, fans floor etc.
14. After completion of the work, the site shall be handed over absolutely clean, after ensuring that all laminates, floors, walls etc., are spotless clean.
15. Care shall be taken during painting and polishing works to ensure that masking tapes are use and the paint/polish does not smear over neighboring surfaces, switch plates, partitions/paneling etc., and if there is any smearing in spite of care taken, the same shall be made good.
16. Rates of all items shall remain constant irrespective of floor level and no extra cost shall be paid for handling and stacking of material, removing debris etc., from site.
17. The contractor shall clean the site and mark out the lining on the floor with brown adhesive tape for approval. The same shall not be paid for separately.
18. Unless otherwise noted, the method of measurement will be as per IS 1200.
19. Client/consultants reserve the right of operating all **'Quote Rate Only'** items.
20. Construction in medium density particle board/low density particle board/MDF board/Gypsum board etc., shall be as per manufacturer's specifications and instructions including the use of specified screws, bolts, channels etc.
21. Wherever the contractor proposed to use 'equivalent' makes he shall obtain client/consultant's prior approval. Any additional cost and time lost due to this will be on contractor's account and no claims will be entertained.
22. Veneers to be used shall be following types as approved by the client/consultants: Teak, Sycamore, Beech, White Cedar, mahogany, Walnut, Padauk, African mahogany, Golden Cedar or approved by the client/consultant. Only group-matching veneers shall be used.
23. The specification for side unit or rear side credenza unit in any item shall be same as the specification of the table in that item.
24. All keyholes shall be fixed with metallic keyhole rings and adequate stickering with key numbers shall be done prior to hand over of the site.
25. Rates for all plumbing fixtures, pipes etc., should include cost of testing the same under required pressure as per relevant IS code.
26. The rate-concealed pipes should include cost of making good the wall or floor in which it has been concealed.
27. The back of marble slab should be applied with white cement paste before fixing. Granite must be checked for porosity before laying and due treatment should be carried out to avoid patches etc.
28. The contractor should take approval for make 7-manufacture form the client/consultant before using any material, which does not appear in the list of, approved manufacturers.

SCHEDULE OF QUANTITIES

Trade preamble – wood work

Notes:

1. Wherever wood is specified or mentioned, the same to be used shall be of following species for all items of work unless otherwise specified:
   For exposed woodwork: wood matching to veneer species cut to size as specified.

   For internal woodwork: Sal wood cut to size as specified, coated with wood preservative and fire retardant paint.

   Wherever MDF board is to be used, the same shall be of Exterior grade, confirming to IS: 12406 – 1288 or equivalent.

   All wooden beading mouldings to match with the veneer shall be used.

2. Rates quoted for all items shall include for cost of materials, labor, testing of materials at laboratory or site, tools & tackle, lift and lead charges, transportation charges, loading-unloading charges, insurance cover as per tender, all types of taxes & duties including Works Contract Tax, polishing & painting charges (wherever applicable), arranging in position, cleaning etc., and completing the item to the satisfaction of client/consultant.
3. Rates quoted for finishes all include for cost of exposed wood moldings or sizes mentioned in drawings and specifications together with 3 coats of Melamine polish. These members will be measured as part of respective finished items. Separate payment for wood moldings will not be made unless specified in the tender.

4. Rate quoted for framework/partitions paneling shall include the cost for cutting charges to accommodate electrical conduits, A/c ducts etc., as per markings given by respective contractors. Rate for frameworks shall also include charges for applying fire retardant and wood preservative.
5. All frameworks for partitions shall be constructed up to main ceiling (R.C.C floor slab). However in case any additional supports are necessary of any size required and as advised by the consultant, the same size shall be provided. Cost of these supports shall be included in the rate quoted for the framework. There will be no separate payment for the additional supports envisaged as above.
6. All drawers used in furniture shall have 'sliding drawer channels' of approved make.
7. Rates quoted for all storage units shall include for cost of shelves with sides made out of 18 mm thick marine ply board and back with 8 mm thick ply. Similarly rates quoted for storage units shall also include for finishing at back of unit wherever specified. Tenderers shall note that storage units with veneer finish will have veneer with melamine polish for rear side. Rates quoted shall include for such finishes.
8. The rates quoted for all items shall include for cost of (unless otherwise stated) fixing required wooden sleeves or supports & making openings for ducts, grills, light fixtures, speakers, all types of detectors, indicators, CCTV cameras, finishing of joints, making grooves in required profile as per details in the false ceiling or between the false ceiling and the wall /partition with required wooden strips, etc. There will be no separate payment on this account. No deductions for providing openings for fittings/fixtures shall be made for false ceiling. However no payment shall be made for column and trap door openings.
9. Rates quoted for fixing MDF/plywood of any thickness shall include for cost of skinning, boxing, paneling, fascia, ledges, etc. These rates shall be valid for all widths.
10. The rates quoted for all items shall include cost for providing & fixing edge binding strips or lipping of 6 mm thickness for exposed edges of plywood, internal framework etc., wherever these materials are used in completing the item.
11. All exposed veneered/wooden surfaces shall be finished with 3 coats of melamine polish o approved shade and color, unless otherwise specified.
12. All materials brought to site for incorporating in work shall be of approved make and manufacture. The material which will not be of approved make & manufacture will be rejected & it shall be removed from site immediately.

13. Colours, shades of laminate, veneer, paints, and polish shall be exclusively approved by consultants. No violation, deviation shall be permitted.
14. Rates for extra items shall be got approved from the Employer prior to executing such items. Payments for extra items will be made only after such approvals. For this purpose the contractor shall submit rate analysis with supporting quotations/invoices duly certified by the consultant.
15. Unless otherwise specified in the working drawings of items or specifications, laminates used in the work shall be 1.5 mm thick & veneer 3.5 mm thick.
16. Hardware such as locks, handles, tower bolts, ball catches etc., shall be as per approved list of makes & manufacturers. Specific separate approvals shall be obtained before using any other accessories in lieu of approved hardware as above.
17. All the drawers & trays of desk units & credenza units shall have telescopic drawer fittings, including stopper systems of approved make.
18. The colors of melamine polish shall be as approved by the consultants. No violation shall be permitted in any of the item. Three or more coats of melamine polish shall be applied for items with melamine polish.
19. Rates for items of doors, such as flush doors laminated or veneered finish and the teak wood frame glass doors shall include the cost of handles, locks, door holder, hinges, wooden door frames etc. Separate payment shall be made for floor springs/door closers.
20. Rates quoted for relevant items shall include for modifications required for running the electrical/telecom/data wire conduits inside partitions/paneling. There will be no separate payment for this purpose.
21. The rates quoted for storage units & credenza units shall include for the cost of hardware such as locks, handles, demountable hinges of approved make, tower bolts, ball catches etc.
22. The mode of measurement for storage units & credenza units shall be front elevation area only.
23. The similar design of glass doors & glass partitions should be adopted. Rates quoted for glass doors shall include the cost of hardware as mentioned in clause 19 above, however rates quoted for glass partitions will not include cost of any hardware as indicated in clause 19 above.
24. Rates quoted for the supple and arranging the tables, credenza units, loose furniture shall include cost of side unit, pedestal drawer unit, accompanying (if any) as shown in the drawings, foot rest, drawer units, pencil trays, tea trays keyboard tray, skirting etc., complete in all respects. The side units provided shall have top drawers, sliding shutters etc., as indicated in drawings. Skirting to be made out of matching wood to veneer and to be finished with minimum three coats of melamine polish or finished with laminate as specified. The exposed surfaces of tables, side units, desk units and other built-in furniture, is required to have finishes as specified. The exposed surfaces of drawers & inside surfaces of furniture shall have finish as shown in the drawing. Reduced rates as approved by the employer will be

paid for incomplete and substandard work. **Wherever MDF is used, the screws should be proper chipboard screws or Euroscrews of approved make.**

a] The drawers & trays shall be made out as follows unless otherwise specified:

Front/rear: 19 mm plywood for veneer finish/19mm plywood for laminate finish/18 mm thick MDF finished with post formed laminate externally and 1.5 mm thick laminate internally wherever specified.

Sides: drawer slides

Bottom: 6mm plywood to be finished with wax polish on outside.

Internal sides of the drawers shall be finished with 1mm laminate and trays also shall be finished with 1.5 mm thk laminate. All beadings/mouldings shall be finished with 3 coats of melamine polish. There will be no separate payment for this.

b] The sliding as well as open able shutters shall be made out as follows (All shutters to have post formed laminates/veneers as per drawings externally and 1.5 mm thk laminate internally):

Shutters: 19mm marine plywood for laminate finish/veneer finish.

Guide rails: wood cut to size finished with melamine polish.

Internal sides shall be finished with 1.5 mm thick laminate. All beading/mouldings shall be finished with three coats of melamine polish wherever specified.

All shutters of side unit/pedestal box/storage units etc., to have post formed laminate as per specified profile externally and 1.5 mm thick laminate internally.

c] The foot rest to be made of hard wood section with sizes as shown in the drawing.

25. The payment shall be made based on actual work measured on site by client/consultant's representative.
26. The jamb lining fascia, sill board fascia and skirting shall be made out of wood matching to veneer and to be finished with three coats of melamine polish.
27. The rates quoted for sofas (if any) and lounge chairs (if any) will be including the cost of the upholstery. The tenderer is required to fix the upholstery & the charges for the same shall be included in the rates quoted for items of sofa & lounge chairs.
28. The rates quoted for wire managers shall include the cost of cutting and making hole on the surfaces where the wire managers will be fixed.
29. The rates quoted for soft board item will be for fixing fabric finish on the exposed sides.
30. The rates quoted for veneer and melamine polish finish shall include for cost of providing and fixing inlays of various materials.
31. Desk units and built-in furniture shall be of sizes and finishes indicated in relevant drawings. The rates quoted will include for cost of all provisions made in the drawing and no separate payment will be made.
32. Measurements will be taken as per standard practices and relevant BIS codes for the actually executed quantities. Wastages will not be measure and paid for. Rates quoted shall include for wastages as anticipated.

1	Partition frame work, paneling	Sq.Mt area (actual executed) one side only but not above false ceiling level.
2	Finishing Items – laminate, veneer etc.	Actual executed area, including skirting moulding etc.
3	Storage units	Sq. mt area – front elevation for built in units. Per number for modular bought out units.
4	Staff desk units – open office workstations	Sq. mt area – front elevation for built in units. Per number for modular bought out units.
5	False ceiling	Sq. Mt area -- finished length X finished width. No deduction for A/c grills, lights, cutouts. Drops to be measured in separate Sq. mt.
6	Venetian/roller/roman blinds	Total Sq.mt area covered
7	Painting	Sq. Mt. finished area only
8	Carpet and other floor coverings	As laid Sq. Mt area. No wastage will be added.
9	Rounding off measurements	All measurements shall be rounded off to nearest second decimal point. E.g 21.465m will be recorded as 21.47 m.

TECHNICAL SPECIFICATION FOR INDOOR AND OUTDOOR TYPE LT SWITCH BOARDS.

1.0	**SCOPE OF WORK:**		
	This specification covers the requirements of design, manufacture, testing and delivery of 415V, 50 C/S, 3 Ph / 1 Ph, LT Switchboards required for the project.		
2.0	**SITE CONDITIONS:**		
a)	Temperature	:	Maximum 50 Deg. C.
		:	Minimum 10 Deg. C.
b)	Humidity	:	Not more than 80% at maximum temperature.
c)	Altitude	:	Less than 1000 meters above MSL.
3.0	**ELECTRICAL SUPPLY PARTICULARS:**		
a)	System voltage (Nominal)	:	415V
b)	Number of phases	:	3
c)	Frequency	:	50 c/s
d)	Neutral earthing	:	Solidly earthed.
e)	Fault level	:	Not exceeding 50 kA at 415V.
f)	Voltage variation limits	:	± 6%
g)	Frequency variation limits	:	+ 3%, -5%
h)	Control supply for Main Board	:	240V, 1 phase, A.C.
4.0	**STANDARDS :**		
a)	IS : 13947 (Part I & II) – 1993 IEC: 60947 (Part I & II)	:	Air Circuit Breakers (ACB).
b)	IS : 13947 (Part I & II) – 1993 IEC: 947 (Part I & II)	:	Moulded Case Circuit Breakers (MCCB).
c)	IEC: 947 –1 (General Rules), IEC: 947 -2 (For Circuit Breakers) IEC: 947 –4 (Motor Starter)	:	Motor Protection Circuit Breakers (MPCB).
d)	IS : 8828 – 1996 IEC: 898 - 1995	:	Miniature Circuit Breakers (MCB).
e)	IS : 12640 – 1998 IEC: 1008	:	Residual Current Circuit Breaker (RCCB).
f)	IS : 13947-4-1 – 1993	:	Air Break Contactors
g)	IS : 8623 – 1993	:	Low voltage switchgear assemblies
h)	IS : 2147 – 1962	:	Degree of protection provided by enclosure for switchgear
i)	IS : 1248	:	Electrical Indicating instruments
j)	IEC: 947–5-1	:	Electrical Indicating Lamps.
k)	IS : 2705	:	Current Transformers.

l)	IS : 3156	:	Potential Transformers
m)	IS : 375	:	Marking and arrangement of Busbars
n)	IS : 5578-1984	:	Guide for marking of insulated conductors
o)	IS : 11353-1985	:	Guide for uniform system of marking and identification of conductors and apparatus terminals.
p)	Statutory requirements:	:	The equipment offered shall further conform to the stipulations by supply authorities, statutory bodies and shall have TAC approval modifications if any suggested by the authorities during their inspection shall be carried out at site without any extra cost.
5.0	**CONSTRUCTIONAL FEATURES OF SWITCHBOARDS**		
5.1	**TYPE OF CONSTRUCTION:**		
a)	Cubicle compartmentalized totally enclosed, floor mounting, freestanding, dead front, Single / Double front, Single / Double front, Single bus suitable for non-draw type feeders.		
b)	Thickness of sheet steel	:	3.15mm for frame and cable gland plate
		:	2mm for body / door / equipment mounting frames
		:	1.6mm for barriers
c)	Degree of protection	:	Dust and Vermin proof – not less than IPAX of IS 8623. And IP 2X between compartments
d)	Type of assembly	:	Form 4 compartmentalization as per IS 8623
e)	Height of switchboards	:	Not more than 2400 mm
f)	Maximum operating height	:	Not more than 1800mm
g)	Minimum operating height	:	Not less than 350mm
h)	Type of doors/covers	:	Doors shall have concealed hinges
		:	Door locks shall be of the quick opening Industrial type
i)	Position of cable alley and cable entry.	:	From front side and cable entry shall be from top.
		:	Space provision should be available for 20% spare cables.
		:	Cable clamping facility should be provided.
		:	Cable entry shall be from the top.
		:	Gland plate shall be split into sections to facilitate cable terminations on top & bottom.
j)	Surface treatment	:	By seven-tank process
k)	Type & colour shade of paint finish	:	Powder coated (RAL 7032)
l)	Thickness of paint	:	Not less than 50 Microns
m)	No of feeders per vertical Panel	:	Up to 63A MCCBs - 8 Nos.
		:	100 to 200A MCCBs - 6 Nos.
n)	Maintenance of components	:	From the front side only.
o)	Safety features	:	All live parts/terminals to be totally shrouded.

		:	Finger touch proof wiring to be provided
		:	Busbars to be sleeved and Busbar joints to be provided with insulating shrouds.
		:	Switch operating handle shall be interlocked with door.
		:	Pad locking provision in OFF position for all Switches and MCCBs.
		:	Caution plate with inscription "Caution-Live Terminals" shall be provided at all points when terminals remain live unless isolation is done at remote ends.
p)	Other features	:	Shipping section length to be limited to 2.5 M.
		:	Lifting lugs to be provided.
		:	All hardware should be high tensile zinc passivated type.
		:	Spring washers to be provided at all Busbar and equipment fixing joints.
		:	Endless neoprene gaskets to be provided on all doors and covers.
		:	Danger boards to be provided on live part covers.
		:	Continuous earth bus.
		:	All doors having components mounted on them shall be earthed.
		:	Provision of a document pouch in the rear of the incoming door with 'as built' drawings pertaining to the panel.
6.0	**BUS BARS:**		
a)	Material of Main Busbars	:	Electrolytic grade aluminium complying with requirements of grade E9IE of IS 5082 –1982
b)	Size of bars	:	Busbar size shall be based on following maximum permissible current densities.
		:	Aluminium - 0.8 Amps / Sq.mm Copper - 1.25 Amps / Sq.mm
		:	The neutral bus shall be of the same size as the phase bus.
		:	The minimum size of the Busbars shall not be less than 25x6mm aluminium and 25x3mm for copper.
		:	Each feeder shall have independent tap off Provision on the Busbars.
		:	The Busbars shall be sleeved with 1.1kV grade heat shrinkable PVC sleeves
c)	Type of Busbar supports	:	SMC / FRP
d)	Short time rating	:	Refer Single Line Diagram. (If not mentioned Suitable kA rating breaker to be

			selected after calculation)
e)	Temperature	:	Not more than 40 Deg. C over 55 Deg C. ambient for main Busbar.
		:	Not more than 20 Deg. C over 55 Deg. C ambient for cable end connections
f)	Bus bars clearance	:	Not less than 50mm clear for main phase bus bars and not less than 25mm clear for neutral bus and main bus.
g)	Material of earth bus	:	Copper
h)	Size of earth bus	:	50x6mm for all switchboards rated 1000A and above 25x6mm for smaller DBs
i)	Material of control bus	:	Copper.
j)	Location of control bus	:	In bus bar compartment, completely segregated / screened from the main bus.
7.0	**COMPONENTS:**		
7.1	**AIR CIRCUIT BREAKERS (ACB)**		
a)	Type	:	Air Circuit Breakers shall be sheet metal enclosed flush front horizontal draw out type suitable for horizontal or vertical connections and line load reversible.
b)	Number of poles	: :	3 or 4 as specified in single line diagram. The 4th pole shall have the same rating as other poles.
c)	Operating Mechanism	:	Manual / motorized operating mechanism with stored energy feature with mechanical closing and electrical closing. The ACB shall have trip free mechanism and anti-pumping feature.
d)	Main contactor Assembly	:	Physical contact wear indicator shall be provided.
e)	Closing Coil & shunt trip coil with 100 % "ON' time.	:	230V A.C. with +10% to – 15% tolerance.
f)	No. of auxiliary contacts	:	6 No + 6 NC. Minimum 3 No + 3 NC spare contacts to be wired to external terminals for purchaser's use.
g)	Breaking capacity ICs & ICu	:	Not less than 50kA. The short time withstand capability shall not be less than 50kA for 1 sec.
h)	Operating duty	:	0-3 Min. – CO – 3 Min – CO
i)	Service temperature of the breaker.	:	55 Degree C, (Without derating)
j)	Standard applicable	:	IS 13947 (Part I & II) IEC 947 (1 and 2) Shall comply with the isolating function requirement of IEC 947-1.
k)	Trip time	:	Not more than 50 milli. secs.
l)	Protection	:	Microprocessor based releases with IDMT O/C, S/C, & E/F protections. The setting range available shall cover the following.
			I setting T setting

		:	Over load With rating plug to down size the ACB.	:	40-100% of rated current.
		:	Short circuit	:	125-1200% - 0-400mS
		:	Instantaneous	:	Adjustable from 150-1200%
		:	Earth fault	:	15% - 80%
m)	Additional feature for release.	:	The release shall be provided with rating plug to use ACB for lower rating without changing the CTs of ACB. Protection parameters shall be proportional to the rating plug used.		
		:	The ACB shall be suitable for incorporating communication capable releases (without changing the entire release) & should support open bus system (Profi-Bus).		
		:	The release shall be provided with display module with facility to shift by 180 Degree to read the parameters if the breakers are at the lower level of the panel.		
		:	The release shall have integral test facility to check heartiness of release and ACB even during "ON" condition with option to "TRIP".		
n)	Electrical endurance	:	Not less than 20000 operations with proper maintenance.		
o)	Utilization category	:	B		
p)	Accessories	:	Mechanical ON-OFF indicator.		
		:	Emergency red trip push button (shrouded).		
		:	Operation counter.		
		:	Safety shutters-lockable in closed position.		
		:	Door interlock with operating handle.		
		:	Withdrawing handle.		
		:	Provision for castle lock.		
		:	Padlocking provision on door.		
q)	Safety interlocks/features.	:	Double insulation on the front face (class-II) positive contact indication.		
		:	Mechanical indicator shall be provided to indicate "OFF' position when all the contacts are separated and ACB shall be suitable for isolation.		
		:	The breaker shall have "Mechanical Indicator", when all "TRIP" and "OFF" conditions are eliminated, and the ACB can be closed on "ON" signal.		
		:	ACB cannot be closed, if the doors are open.		
		:	ACB cannot be closed, if it is not in engaged/test/with-drawn position.		
		:	ACB cannot be withdrawn if it is in closed position.		
		:	Safety shutters should close automatically when ACB is		

			withdrawn.	
		:	It shall not be possible to insert breaker racking handle when outside door is open. Interlock defeat facility shall be available.	
		:	The transformer I/C ACB shall be interlocked with the H.V circuit breaker such that the L.T ACB can close only if the H.V CB is closed.	
		:	The I/C ACB controlling grid and captive supply shall be interlocked to avoid paralleling.	
		:	The bus coupler and I/C ACBs shall be interlocked to avoid paralleling of transformers & DG sets.	
		:	Caution plates to be provided for live terminals.	
r)	Cradle	:	The cradle shall be so designed and constructed as to permit smooth withdrawal and insertion of the breaker into it. The movements shall be free from jerks, easy to operate and shall be on steel balls / rollers and not on flat surfaces. There shall be 4 distinct and separate position of the circuit breaker on the cradle.	
		:	*Service Position* Main isolating contacts and control contacts of the breaker are engaged.	
		:	*Test Position* Main isolating contacts are isolated but control contacts are still engaged.	
		:	*Isolated Position* Both main isolating and control contacts are isolated.	
		:	*Maintenance* Circuit Breaker fully outside the panel ready for maintenance after the front facia is opened.	
			There shall be provision for locking the breaker in any or all of the first three positions.	
7.2	**MOULDED CASE CIRCUIT BREAKERS (MCCB)**			
a)	Type	:	Air break, current limiting type double break having a service fault interrupting capacity (ICS) shall be as follows:	
		:	Upto 100A	Not less than 25kA
		:	200A and above	Not less than 35 kA
b)	Number of poles	: :	3 or 4 as specified in single line diagram. The 4th pole shall have the same rating as other poles for 4 pole breaker.	
c)	Standard applicable	:	IS 13947 (Part I & II)	
		:	IEC 947 (1 & 2)	
d)	Duty category	:	$I_{CS} = I_{CU}$ at 415 Volts.	
e)	Type of operating mechanism	:	Front drive with manual closing mechanism with	

			provision for door interlock and pad locking position in 'OFF' position. The handle shall give positive indication of ON, OFF & trip conditions.	
f)	Type of protection for rating 250A & above.	:	Microprocessor based releases with IDMT O/C, S/C, E/F releases.	
		:	I setting	T setting
			(i) Over load	40-100%
			(ii) Short circuit	200-1000% fixed.
			(iii) Earth fault	40-100%
g)	Type of protection for rating below 250A.	:	Thermal overload adjustable at site between 80-100% of the rating.	
h)	Auxiliary contacts	:	1 No + 1 NC and 1 trip contact wired to terminals.	
i)	Tripping facility	:	Through shunt trip coil, suitable for 24V, D.C for all MCCBs on main LT board on others, only releases need be provided.	
j)	Others accessories	:	Terminal shrouds. • Barricading sheet to be provided between each terminals (Supplied by breaker supplier only) • Spreader links to be provided for all breakers. (Supplied by breaker supplier only)	
7.3	MINIATURE CIRCUIT BREAKERS.			
a)	Type	:	Current limiting, DIN rail mounting. With no line load restriction.	
b)	Standard applicable	:	IS 8828 – 1996	
		:	IEC 898 - 1995	
c)	Breaking capacity	:	10kA	
d)	Protections	:	Thermal overload magnetic short circuit.	
e)	Power loss/Pole	:	In accordance with is 8828 – 1996	
f)	Tripping characteristics	:	B, C and D as per application	
g)	Terminal size.	:	Suitable for both aluminium and copper cables up to 35 Sq.mm size.	
7.4	**RESIDUAL CURRENT CIRCUIT BREAKER (RCBo)**			
a)		:	Din rail mounting direct acting type with over current, short circuit and earth leakage protection.	
b)	Standard applicable	:	IS 12640 – 1988	
		:	IEC 1008 – 1996	
c)	Breaking capacity	:	10kA	
d)	Protections	:	Thermal overload, Magnetic short circuit and Earth leakage, Nuisance tripping due to transient over voltages should be eliminated by design.	
e)	Sensitivity	:	30 / 100 / 300mA as specified.	
f)	Tripping characteristics	:	B, C, D as specified.	

g)	Terminal size	:	Suitable for both aluminum and copper cables upto 16 Sq.mm.
h)	Testing provision	:	A push button shall be provided to check the integrity of earth leakage detection system.
7.5	**MOTOR PROTECTION CIRCUIT BREAKERS. (MPCBs)**		
a)	Type	:	Din rail mounting with magnetic releases for short circuit protection.
b)	Breaking capacity	:	35kA, current limiter to be provided if required.
c)	No. of Poles	:	3
d)	Auxiliary contacts	:	1 NO + 1 NC
e)	Terminal Size	:	Suitable for conductor size up to 16 Sq.mm
f)	Standard applicable	:	IEC – 947
7.6	SWITCH DISCONNECTOR		
a)	Type	:	Heavy duty
b)	Standard applicable	:	IS 13947 Part – 3
c)	No. of Poles	:	3 with possibility to add 4 pole
d)	Contacts	:	Double break silver plated copper roller spring assisted type
e)	Operating mechanism	:	Rotary handle interlocked with color.
f)	Other features	:	Front alive with door interlock with defeat facility.
		:	Padlocking facility on handle.
		:	Phase barriers.
		:	Bolted Neutral link to be provided.
	CURRENT TRANSFORMER:		
a)		:	Epoxy moulded ring type either bar or wound primary
b)	Standard applicable	:	IS 2705
c)	Secondary current	:	5A
d)	VA burden	:	5/10/15 VA as specified.
e)	Accuracy class	:	Class – 1 for metering
	POTENTIAL TRANSFORMER:		
a)		:	Epoxy molded.
b)	Standard applicable	:	IS 2705
c)	Ratio	:	415/110V
d)	No. of phases	:	3
e)	Accuracy class.	:	As specified in Drawing

f)	VA Burden	:	To suit the application
g)	Terminals	:	Fully shrouded
h)	Protection	:	By MPCB
i)	Primary side wiring.	:	By high fault withstand wires (35kA) of Lapp Make or approved equivalent
	INDICATING MEETERS:		
a)	Type	:	Solid state digital type
b)	Mounting	:	Flush mounting
c)	Range	:	To suit specific requirements.
d)	Size	:	96 x 96mm
e)	Accuracy class	:	1.5
f)	Additional features	:	P.T/C.T ratio shall suit the specific requirements. Shrouding of terminals.
	INDICATION LAMPS		
a)	Type	:	Panel mounting LED type
b)	Standard applicable	:	IS 6875
c)	Lamp voltage	:	240V A.C
d)	Lamp voltage	:	Less than 0.5 W.
e)	Terminals	:	Finger touch proof
g)	Degree of protection		IP54 (IEC 250)
12.0	**Multi Data Meter**		
	This shall be of the solid state type capable of measuring/recording following electrical parameters. And shall be suitable for BMS application.		
a)	Ampers		
b)	Voltage		
c)	KVA		
d)	KW		
e)	Power factor (PF)		
f)	KWH (Energy module attachment to be provided)		
	PROTECTIVE RELAYS		
a)	Earth Leakage Relay	:	Residual current type of Alstom make or equivalent.
b)	Setting	:	300-3000mA
c)	Time delay	:	1 – 3 Sec.
d)	Auxiliary supply	:	240V AC
e)		:	To be supplied with compatible CBCT. 1 NO/1 NC contact required.

14.0	**BUTTONS**		
a)			Manually operated spring return type
b)	Standard applicable		IS 6875
c)	Diameter		22 mm
d)	Type of mounting		Snap type
e)	Terminals		Finger touch proof
f)	Electric shock protection		Class –2 (IEC 536)
g)	Degree of protection		IP54 (IEC 259)
h)	Colour of actuator		Start Push Buttons – Green
			Stop Push Buttons – Red
			Test / Reset Push Buttons – Black
i)	Contact configuration		2 NO + 2 NC
	CONTACTORS		
a)	Type		Air break, load break, and fault-making type.
b)	Standard applicable		IS 2959
c)	Duty category		AC3
d)	No of poles		Three / Four as per drawing.
e)	Coil voltage and voltage		230V or 110V, 1 phase A.C. & suitable for voltage limits of 75% to 110%. Insulation class of operating coil shall be Class-H or better.
f)	Auxiliary contacts	:	2 No + 2 N.C
g)	Terminal arrangement	:	Finger touch proof shrouded type
h)	Mounting arrangement	:	Din rail mounting preferred up to 70A base mounted for higher rating
i)	Coordination with MCCBs	:	Type '2' co-ordination required (Test certificate to be furnished)
j)	Capacitor duty	:	Special contractors suitable for capacitor switching applications. These Contactors shall have inbuilt resistors to limit the inrush current.
	CAPACITORS:		
a)	The capacitors shall be of the dry type heavy duty metalized polypropylene naturally air cooled type with self-healing properties.		
b)	The active element shall be wound on an insulated metallic core, housed in an extruded metal container with a press rolled lid and vacuum dried.		
c)	The container may be preferably filled with inert gas and hermetically sealed.		
d)	The capacitors shall be suitable for operation on 415V, 3 phases, and 3 wires, 50 c/s A.C supply.		
e)	The capacitor shall be rated for continuous 10% over voltage, 30% over current and 15% over capacitance. Each unit shall have over pressure protection.		

f)	The capacitor shall withstand respective cycles of inrush currents up to 200 times the rated current without any damage.		
g)	External discharge resistors shall be provided to discharge the capacitor and bring the voltage to less than 50V within 1 minute of power disconnection.		
h)	The watt loss/KVAR shall not be more than 0.5 with discharge resistors connected.		
i)	Each unit shall have finger touch proof terminals of adequate capacity to which external supply can be connected.		
j)	It shall be possible to mount the capacitors in any position.		
k)	The capacitors shall withstand H.V test at 1.1KV for 1 minute.		
l)	The capacitors shall conform to BIS 2834 and IEC 831.		
m)	The capacitors shall be guaranteed for continuous operation without any deterioration for a period of 24 months.		
	INDUCTORS:		
	Air cored copper wound inductor coil designed to limit the inrush currents shall be provided if required. The inductor design shall ensure that resonance is avoided under all operating conditions.		
18.0	**MAIN AND AUXILIARY WIRING:**		
a)	Internal wiring of power circuits rated upto 63A shall be carried out using 1100V, FRLS grade PVC insulated, flexible copper conductor wires. Minimum size of wiring shall be 6 Sq.mm and maximum shall be 25 Sq.mm. For rating above 100A, bus bars of appropriate size shall be used. The bus bar sizes shall be selected as specified elsewhere.		
b)	The internal wiring for signaling, protection and instrumentation shall be carried out using 660V grade FRLS insulated, multistoried copper conductors. The sizes of wires shall be as follows:		
c)	For controls & Signaling	:	1.5 Sq.mm for internal wiring.
		:	2.5 Sq.mm for external cabling.
d)	For CTs	:	2.5 Sq.mm for internal wiring
		:	4.0 Sq.mm for external cabling
		:	Inter panel writing shall be carried out using PVC troughs.
e)	For P.T circuits.	:	High fault withstand (35kA) wires of 1.5 Sq.mm
f)	Provision shall be made in the writing for remote metering and status indication of all feeders.		
g)	Each wire shall preferably be terminated at a separate terminal. Termination of up to two outgoing wires at a single terminal will be acceptable. Wires shall not be joined between terminal points. Shorting links shall be provided for all C.T terminals. Wiring shall be neatly bunched		
h)	Each wire shall be identified at both ends by yellow colour PVC ferrules marked with black letters. Supporting facilities shall be provided for clamping the control cables. Inter panel writing shall be done by the switchgear manufacturer before dispatch with disconnection facility at the shipping section with plug in type multiway connector.		
i)	Rubber grommets shall be provided so that metal parts should not come in contact with any power or control wires/cables.		
j)	Minimum size of terminals for control wiring shall be 2.5 sq. mm or higher to suit the Wiring sizes stipulated. Terminals shall be of the screw less type. 20% spare terminals shall be provided on each terminal block. The terminal blocks for C.T connections shall have C.T disconnection and shorting facility.		

k)	Standard conductors shall be terminated with insulated tinned copper lugs at both ends before connections are made		
l)	Wiring shall be finger touch proof at all places. Where the terminals of equipment's Meters/relay and accessories are not finger touch proof, insulating shrouds shall be provided.		
19.0	**EARTHING:**		
a)	All cubicles shall be connected to a common copper earth Busbar of specified size running throughout the length of the switchboard. All doors and movable parts shall be connected to the earth bus with flexible connections		
b)	Provision shall be made to connect the Busbar to the plant-earthing grid at two ends. All non-current carrying metallic parts of the mounted equipment shall be earthed.		
20.0	**DRAWINGS AND DOCUMENTATION:**		
a)	The manufacturer shall submit for approval a schedule of drawings, which shall include the single line diagram, general arrangement of switch board & bus duct indicating safe clearances, component list with all protective devices, their settings, rated current, foundation plan and control writing along with terminal chart. The approval of general arrangement should be obtained before the fabrications of cubicles are started. Approval of schematic drawings, single line and control wiring drawings shall be obtained before the manufacture process with the cubicle writing.		
b)	The approval of drawings shall not relieve the manufacturer of the responsibility of supplying equipment conforming to the relevant specifications and standards. Once manufacturers schematic diagram have been finally approved, the manufacturer shall prepare wiring connection diagram for each cubicle. These diagrams shall show all wiring inside the cubicle starting from the cubicle terminal strips. These diagrams which will be used for troubleshooting.		
c)	A detailed B.O.Q with component specifications and recommended spares with Unit rate there of shall be submitted one month before the delivery of the switchboards		
21.0	**PREFERRED MAKES:**		
a)	Air Circuit Breaker (ACB)	:	Siemens (3WL) / ABB / Schneider (MG).
b)	Moulded Case Circuit Breaker (MCCB)	:	Siemens/ABB/Schneider (MG)
c)	Contactors & O/L Relay	:	Siemens/ABB/Schneider
d)	Multi data meter	:	Electrex / Enercon /ABB
e)	Timer		BCH / Siemens / Merlin Gerin.
f)	MCBs	:	Schneider/MDS
g)	CTs & PTs.	:	Kappa / Kalpa
h)	Control switches	:	Kaycee / Salzer / Siemens
i)	Protective relays	:	Alstom / Siemens / ABB / L&T / Easun Reyrolle
j)	Push buttons	:	Siemens/ Teknic / Schneider /Raas controls
k)	Indicating lamps (LED type)	:	BCH / Siemens / Merlin Gerin
l)	Indicating meters		AE / Rishab / MECO
m)	Terminals	:	Elmax / Wago-Finger Touch Proof
n)	Ferules	:	Mayfair
o)	Bus bar supports	:	Power mat or approved equivalent
p)	Energy Meter	:	BHEL / Universal / HPL Socomec.

q)	Power factor meter		Krycard / Beluk / Fraco / Siemens
r)	ALL PP Capacitors (LT) & Harmonic Filters		Siemens - Epcos / Neptune Ducati
s)	Nameplates	:	Self eliminated type in dark (Fluorescent)
22.0	**INSTALLATION TESTING & COMMISSIONING:**		
	The installation will be carried out by other agencies. However the vendor shall depute representatives for testing and commissioning the switchboard at no extra cost		
23.0	**TRAINING:**		
	The vendor shall train the client's engineers in the first operation.		
24.0	**STATUTORY APPROVAL:**		
	The approvals will be arranged by other agencies (if the panel is supplied by the client directly). However it shall be the supplier's responsibility to ensure that the switchboard design & installation is carried out as per statute applicable. Further any changes/modifications suggested by the authorities shall be carried out at no extra cost to the complete satisfaction of the authority within the shortest time.		

TECHNICAL SPECIFICATION FOR 1.1kV / 660 V GRADE - LT CABLES

1.0	**SCOPE:**		
	This specification covers the requirements of design, manufacture, assembly, testing and delivery of LT cables required for project.		
2.0	**SITE CONDITIONS:**		
a)	Temperature	:	Maximum 50 Deg. C
		:	Minimum 10 Deg. C
b)	Humidity	:	Nor exceeding 80% at maximum temperature
c)	Rainfall	:	1500-2000mm per annum
d)	Attitude	:	Less than 1000 mtrs from MSL
3.0	**ELECTRICAL SUPPLY PARTICULARS:**		
a)	System Voltage	:	LT - 415 V +/-6%
b)	Frequency	:	50 c/s + 3%
c)	Fault level	:	Not exceeding 50KA at 415V
d)	Neutral earthing	:	Solidly earthed
4.0	**STANDARDS:**		
	The cables shall conform to the requirements of latest editions of following standards issued by BIS: -		
a)	IS 1554	:	Heavy duty PVC insulated cables
b)	IS 1753	:	Conductors for cables
c)	IS 7098 (Part-1)	:	XLPE Insulated cables.
	The cables shall bear ISI mark and shall have TAC approval		

	TECHNICAL SPECIFICATIONS:		
5.0	**L. T. CABLES:**		
a)	The L.T. Power and control cables shall be of the Aluminium / copper conductor, XLPE sheathed, galvanized steel strip armored and PVC served heavy duty type, conforming to IS: 1554.		
b)	All L.T. cables shall be of 1100V grade.		
c)	The design shall permit continuous operation of the cable at a conductor temperature upto 85 Deg. C under normal conditions an up to 160 Deg. C during faults without causing any permanent damage.		
	The cables shall be designed to allow a bending radius of not less than 12 times the diameter or lower as per manufacture's instructions.		
6.0	**CONDUCTOR:**		
a)	The aluminium conductor for the cables shall be of Electrolytic grade, 99 % purity & ¾ Hardness.		
b)	The copper conductor for control cables shall be of the Electrolytic grade and 99.9% purity.		
c)	The conductor shall be of circular/sector shaped type and insulation of phase and neutral shall be color coded.		
d)	All sizes aluminium of conductors specified shall be of the stranded type. The copper conductor upto 10 sq.mm may be of the single strand type.		
7.0	**GENERAL REQUIREMENTS:**		
a)	The cables shall be suitable for laying directly underground or in trenches or overhead in cable trays.		
b)	The cables shall be suitable for earthed system unless otherwise specified.		
8.0	**CORE IDENTIFICATION:**		
	Cores shall be provided with the following colour schemes of PVC insulation		
a)	Single Core	:	Green for earthing
b)	Two Core	:	Red and Black, Blue and Black, Yellow and Black
c)	Three Core	:	Red, Yellow and Blue
d)	Four Core	:	Red, Yellow, Blue and Black
9.0	**TESTING:**		
	All routine tests shall be carried out on the cables as per relevant BIS standards and Type and Routine Test certificates shall be furnished in six copies.		
10.0	**PACKING:**		
a)	All cables shall be supplied duly packed on non-returnable wooden drums unless otherwise specified; standard drum lengths as per manufacturer's standard can be supplied. However, in the case of cable sizes of 120 sq.mm. and above, such lengths as would be required to avoid / minimize straight through joints shall be supplied in consultation with Client/Consultant.		
b)	The manufacturers name or brand name with logo and the ISI mark shall be embossed at regular intervals on all sizes of cables. In addition to the above, the length to be marked on every meter of the cable.		
	The following information shall be provided on the flange of each cable drum: -		
	a)	Type of cable	
	b)	Size of cable	
	c)	Length	

	d)	ISI mark
	e)	Gross weight
	f)	Direction of rolling & Year of manufacture
	g)	Both ends of the cables wound on the drums shall be sealed to prevent ingress of water.
	h)	All cables shall have manufacturer's name/symbol and ISI mark shall be printed on all cables and wires at regular intervals.
11.0	**DOCUMENTATION:**	
	As a part of the supply, the contractor shall furnish Six copies of following documents.	
	a)	Technical literature giving constructional details and current ratings of cables.
	b)	Test Certificates.
	c)	Installation and testing instructions.

TECHNICAL SPECIFICATION FOR 660V GRADE, WIRING SYSTEM.

1.0	**SCOPE:**		
	The scope of work under this section generally covers internal wiring for lights, exhaust fans, Fan coil units, power sockets etc., The contractor shall provide all materials, labour, equipment's, scaffoldings, etc., as required for the completion of wiring installation called for. The wiring shall generally be done using PVC insulated copper conductor wires in PVC/M.S/G.I conduit as called for including providing modular switches, switch plates, shuttered sockets outlets, plug tops, metallic outlet boxes etc.		
2.0	**STANDARDS APPLICABLE:**		
	The applicable standards for above work shall be as listed below:		
a)	IS: 732	:	Code of practice for electrical wiring installation (system voltage not exceeding 650V)
b)	IS: 1646	:	Code of practice for fire safety of buildings (General Electrical installation)
f)	IS: 694	:	PVC insulated cables.
g)	IS: 2509	:	Rigid-non-metallic conduits for electrical wiring.
h)	IS: 6946	:	Flexible (Pliable) non-metallic conduits for electrical installation.
i)	IS: 1293	:	3 pin plugs and sockets.
j)	IS: 8130	:	Specifications for conduits for electrical installation.
k)	IS: 3854	:	Switches for domestic purpose.
l)	IS : 3415	:	Fittings for rigid non-metallic conduits.
n)	IS : 9537	:	Conduits for electrical installation.
p)	IS : 3043	:	Code of practice for earthing.
q)	IS : 5216	:	Guide for procedures and practices in electrical work.
3.0	**POINT WIRING FOR LIGHTS, EXHAUST FANS & 6A AND 16A SOCKET:**		

	A point wiring shall consist of the branch wiring using FRLS / FR grade copper conductor wires from the distribution board together with a switch/fan regulator as required, including providing conduit and accessories, the ceiling rose or pendant holder or a swan holder, or ceiling fan hook box or socket etc., with suitable termination. A point wiring shall include, in addition, the earth continuity conductor/wire from the
	Distribution board to the earth pin/stud of the outlets/switch box and to the outlet points. The point wiring shall be carried out in the under mentioned manner.
4.0	**CIRCUIT MAIN FOR LIGHT :**
	The circuit main for lights /6A sockets (where 6A sockets connected to light circuit) shall include the wiring from the MCB distribution boards up to the first switch/light point. This is measured in linear meter. The scope of work under this section shall include:
a)	Supply and wiring in concealed/surface conduit from DB's to first switch/light/fan point.
b)	Providing and installing copper conductor earth wire, as per BOQ.
c)	Providing and installing G.I fish wire (pull wire) in the conduit.
d)	Termination of wires in DB's and switches using proper tinned copper lugs of crimping type.
e)	Providing and installing necessary pull/junction boxes where necessary.
5.0	**POINT WIRING:**
a)	The rate for point shall include supply, installation, connection, testing and commissioning of point wiring in conduit. The points shall be measured in Nos/sets for the set/group of lights controlled as mentioned in BOQ. The exact scope of work included in the point wiring for the purposes of measurement is enumerated as stated below.
b)	Wiring starting from the first switch/light/fan point where the circuit main is terminated to the various lights/fans/sockets (where 6A sockets connected to light circuit loop), and then looping between the switches/lights/fans/6A sockets etc.
c)	Providing and installing all necessary switches, switch plates, sockets, pull/ junction/ fan hook boxes etc. as called for.
d)	Providing and installing insulated earth continuity wire in each conduit along with the wiring system.
e)	Providing and installing G.I fish wire (pull wire) in the conduits.
f)	Providing and installing ceiling roses, lamp holders where necessary.
g)	Providing and installing PVC insulated, PVC sheathed flexible three core 1.5 sq.mm extension cords including flexible conduits from light fan outlet points mounted at ceiling point to the light/fan outlet.
6.0	**MATERIALS:**
6.1	**CONDUITS:**
a)	All conduits shall be of G.I/M.S conduits as per Bill of quantity.
b)	Generally concealed electrical wiring installation shall be in PVC conduits and surface wiring in G.I/M.S conduits.
6.2	**METALIC CONDUITS:**

	➢ All conduit pipes shall confirm to IS 9537 PART-II 1981. ➢ Metal conduits shall be ERW black enameled of wall thickness of 1.6 mm, 20mm/25mm or medium Gauge Hot dipped GI Conduit whichever specify in BOQ items as the case may be depending upon the number of wires permitted as table-1. ➢ The conduits shall be fixed to walls/ceiling with M.S. saddles and spacers at an interval of 1 meter and on either side of bends. ➢ All pipes shall be cleaned for sharp burrs. Switch boxes shall be of G.I. 16G/14G. The switch boxes shall be concealed as per site requirement & as per Architect's/Consultant's Instructions. ➢ Point shall be controlled with 6A switch or directly from DB as specified in schedule of quantities.
6.3	**CONDUIT ACCESSORIES:**
a)	**Conduit bends & collars:** ➢ The conduit bends & collars shall be of heavy duty and preferably of the same make as of conduit. ➢ This shall conform to IS 9537/1983 (part 3) with ISI mark ➢ Where necessary bends or diversion may be achieved by means of using bends and or circular inspection boxes with adequate and suitable inlet and outlet termination. In case of recessed installation system the bends shall be properly secured & flush with the finished wall surface. Elbows shall not be used. ➢ No bends shall have radius less than 2 ½ times the outside diameter of the conduit.
b)	**Inspection/Junction/Pull boxes :**
	➢ The Inspection/pull box/ junction box where used, with relevant conduit installation shall be conform to IS specification and shall match with the conduit sizes. ➢ The box shall be round/squat rectangular with conduit stub projection for termination of conduit. ➢ The box shall be of minimum 50mm deep and the size of box shall be suitable to pull/ make necessary joints of wires inside the boxes. Extra deep boxes are preferred. ➢ The boxes shall have flush type cover. ➢ The colour of plate shall match the colour of paint of the surface where installed. ➢ The boxes shall have concealed screwed socket for fixing the ceiling rose.
7.0	**SWITCH OUTLET & SOCKET OUTLET BOXES:**
a)	**Concealed Type Outlet Boxes:**
	➢ The concealed outlet boxes for switches, sockets, power outlets, telephone outlet shall be of standard factory made and to match the exact requirement of combination of outlets. ➢ The boxes shall be fabricated out of heavy gauge (CRCA) cold rolled carbon alloy sheet steel with zinc plating (G.I). The size of boxes shall match the type of outlet/switch plate to be mounted on the box. ➢ Adequate number and size of knockout holes shall be provided to terminate the conduits in the box. These boxes shall be of standard factory made product and of same make as of switch plates and sockets. ➢ Separate screwed earth terminal shall be provided in the box for earthing. ➢ The outlet box shall be of minimum depth of 50mm. Boxes shall be suitable for grid mounting type of accessories. ➢ Long screw shall be provided to take care of the extra plaster thickness to mount the switch plates. ➢ Provision shall be made in the box and switch plate to have the minor adjustment of alignment of switch plate to plumb level.
b)	**Surface Type Boxes:**

	➢ The boxes for mounting switches, sockets and other wiring devices shall be heavy gauge CRCA sheet steel painted to match the colour of wall. ➢ The box shall be suitable to terminate the G.I / M.S / PVC surface conduit into the box. ➢ The size and shape of box shall match the exact type and combination of switch plates, receptacles and wiring devices. ➢ Deep boxes shall be used to facilitate easy termination of conduit and wires/cables. Separate screwed earth terminal shall be provided in the box for earthing.
c)	**Light Outlet boxes:**
	➢ For concealed PVC conduit installation the light outlet box shall be of PVC round/square with knock-out holes. ➢ Conduit projection shall be suitable to terminate the conduit to the box. The box shall be made of heavy gauge PVC and the sample to have the approval of Construction Manager before use. ➢ The boxes shall have concealed screwed socket to fix the ceiling rose. The boxes shall be minimum 50mm deep. For surface conduit installation the light outlet box shall be of G.I/black enameled M.S boxes.
	➢ The boxes shall have threaded stud projection having internal threading to terminate the conduits of different sizes. The boxes shall have concealed screwed socket for fixing the ceiling rose. The boxes shall be minimum 50mm deep.
8.0	**SWITCHES :**
	➢ Switches shall conform to IS: 3854 and IS: 4615. ➢ Switches shall be single pole, single or two ways as shown on the drawings. ➢ They shall be of the molded type rated for 250V, 6/16A. They shall be provided with insulated dollies and covers. ➢ The switches shall be rocker operated with a quiet operating mechanism with bounce free, snap acting mechanism in an arc resistant chamber. ➢ The switches shall have pure silver and silver cadmium contacts. ➢ The switches shall be of approved make as indicated in the 'List of Approved Makes'. ➢ Switches installed outdoors shall be industrial, metal clad type, and shall be provided in weatherproof enclosure, complete with weatherproof gasketed covers.
9.0	**COVER PLATES FOR SWITCHES & OUTLETS:**
	➢ Switches /sockets/ wiring devices plates shall be of the same make as of switches/ sockets/ wiring devices. These shall be of best quality. ➢ Molded plastic grid mounting type device plates/frames shall be used and these shall match with the type of switches/sockets and boxes.
10.0	**COVER PLATES FOR INSPECTION/JUNCTION /PULL BOXES :**
	➢ The cover plate for PVC boxes shall be with minimum 3mm thick Perspex /Formica sheet cover ➢ And for the G.I/M.S boxes, shall be of G.I/black enameled M.S plates. The shape of the plate shall match with that of the box.
11.0	**RECEPTACLES:**
	➢ The sockets shall conform to IS 1293. ➢ Each socket shall be provided with control switch of appropriate rating. The sockets shall be molded type rated for 250 volts and of 6A or 16A capacity as mentioned on the drawings. ➢ The 16A sockets shall be multipin (6 pin) automatic shutter type suitable for plugging 6/16A plugs. The shutter shall open when the earth pin of the plug is inserted in the socket.

	➢ Where called for, the 16A socket shall have indicating lamp. The socket outlets and switches shall be of grid mounting type. Where called for sockets shall be provided with three-pin plug top suitable to the socket and of the same make as of socket. ➢ The plug shall conform to IS 6538.			
12.0	**INDUSTRIAL TYPE SOCKETS:**			
	➢ The socket outlets single phase or three phase, three pin or 5 pin industrial type with MCB (1 phase or 3 phase) control. ➢ The socket and MCBs shall be mounted in a sheet steel enclosure and shall be standard factory made product.			
13.0	**CONDUCTORS :**			
	➢ All PVC insulated copper conductor wires shall conform in all respects to standards as listed under sub-head 'Regulations and Standards' and shall be of 1100V grade.			
14.0	**PVC INSULATED WIRES (for light & small power wiring)**			
a)	The PVC cables shall conform to IS: 696/1977. For all internal wiring PVC insulated cables of 1100V grade, single core shall be used. The wires should be tested as per relevant Indian Standards at CPRI.			
b)	The conductor shall be plan, circular stranded annealed copper conductors complying with BS: 6360.			
c)	The minimum number and diameter of wires for circular stranded conductor shall meet the requirements set out in the relevant British Standards.			
d)	The insulation shall be PVC compound complying with the requirement of BS : 6746. It shall be applied by an extrusion process and shall form a compact homogeneous body. The PVC compound shall comply, with the requirements of IS 5831-84.			
e)	The cores of all cables shall be identified by colors in accordance with the following sequence.			
	1.	Single phase	:	Red or Yellow or Blue
	2.	Three phase	:	Red, Yellow, Blue
	3.	Neutral	:	Black
	4.	Earth	:	Green
	A means of identifying the manufacturer shall be provided throughout the length of cable.			
	Unless otherwise specified in the drawings, the sizes of the cables/wires used for internal wiring shall be as follows:			
	In case of circuit wiring for lights, exhaust fans, convenience socket outlet points:			
	a) 2.5 Sq mm:		:	For lights / 6A socket wiring from DB's upto the outlet points including control wiring where the circuit length from the DB's to 1st outlet is less than 40mtr.
	In case of power socket outlet circuit.			
	a) 6.0 Sq.mm		:	From DB's 20/32 Amps Industrial type sockets.
	b) 4.0 Sq.mm		:	From DBs to 16 Amps sockets.
	The earth continuity conductor size as indicated in the drawing/BOQ shall be drawn through conduit along with other circuit cables/wires.			
15.0	**INSTALLATION OF CONDUIT:**			

a)	Wherever specifically called for surface conduit system shall be adopted. All conduits shall be of rigid M.S / PVC conduit. All conduits and their accessories shall be of threaded type for metallic conduit and for PVC conduit shall be of push fit type. Conduit shall run in square and symmetrical lines. Before the conduits are installed, the exact route shall be marked at the site and approval of the construction manager shall be obtained.
b)	Conduits shall be fixed by heavy gauge G.I saddles, secured by suitable rawl plugs, at intervals of not more than one meter. Wherever couplers, bends, or similar fittings are used saddles shall be provided at either side at a distance of 300mm from the center of such fittings. Conduits shall be joined by means of screwed couplers and screwed accessories only. In long distance straight runs of conduit, inspection type couplers/junction boxes shall be provided.
c)	Wherever conduits terminate into control boxes, outlet boxes, distribution boards etc., they shall be rigidly connected to the box with check nuts on either side of the entry.
d)	G.I fish wire shall be drawn in each conduit.
e)	Separate insulated earth wire shall be drawn in each conduit.
f)	Draw boxes shall be located at convenient locations for easy drawing of wires.
g)	Every main and sub main shall run in an independent conduit with an independent earth wire of specified capacity along the entire length of conduit.
h)	The conduit to be installed shall be of ample cross-section area to facilitate the drawing of wires. The diameter of the conduit shall be selected as per table specified in this specification. But no case it shall be less than 20mm diameter.
i)	Entire conduit layout shall be done so as to avoid additional junction boxes other than for outlet points. Conduits shall be free from sharp edges and burrs. Conduits shall be laid in a neat and organized manner as directed and approved by the construction manager. Conduit runs shall be planned so as not to conflict with any other services pipe, lines/duct.
j)	If required, connected between PVC and steel conduits shall be through a junction box. Direct connections between PVC and steel conduits are not allowed.
k)	Where exposed conduits are suspended from structure, they shall be clamped firmly and rigidly to hangers of design to be approved by the owner/consultant. Where hanger supports are to be anchored to reinforced concrete, appropriate inserts and necessary devices for their fixing shall be left in position at the time of concreting, making holes and opening in the concrete will generally not be allowed. Where inserts avoidable, prior permission of the owner/consultant shall be obtained to make any openings in the concrete surface.
15.2	**Conduit joints:**
	Conduits shall be joined by means of plain couplers. The conduits shall be thoroughly cleaned before making the joints. In case of plain coupler joints, proper jointing material like vinyl solvent cement (gray in color) or any material as recommended by the manufacturer shall be used.
15.3	**Bends in conduit:**
	Wherever necessary, long bends or diversions may be achieved by bending the conduits or by employing normal bends. No bends shall have radius less that 2.5 times outside diameter of the conduit. Heat may be used to soften the PVC conduit for bending, but while applying heat to the conduit, the conduit shall be filled with sand to avoid any damage to the conduit. Kinks in the conduit bends shall not be acceptable.
16.0	**BUNCHING OF CABLES:**
a)	Cables of AC supply of different phases shall be bunched in separate conduits. The number of insulated wires/cables that may be drawn into the conduits shall be as per the following table. In this table, the space factor does not exceed 40%. However, in any case conduits having less than 20mm diameter shall be used.
b)	Maximum permissible number of 650volt grade ingle core wires that may be drawn into rigid PVC conduits.
c)	Unless otherwise specified, insulated conductors of different phases shall be bunched in separate conduits.

d)	Wires carrying current shall be so bunched in the conduit that the outgoing and return wires are drawn in to the same conduit. Wires originating from two different phases shall not be run in the same conduit.
e)	The number of insulated wires/cables that be drawn into the conduits shall be as per the following table.

MAXIMUM PERMISSIBLE NUMBER OF 1.1KV GRADE SINGLE-CORE CABLES THAT MAY BE DRAWN INTO METALLIC CONDUITS.

Size of Cable	**Size of Conduit, mm**					
Nominal cross sectional area (Sq.mm)	**16**	**20**	**25**	**32**	**40**	**50**
1.0	4	6	12	19	--	--
1.5	3	5	9	13	--	--
2.5	2	4	9	13	--	--
4	1	2	5	9	13	--
6	--	1	4	8	10	--
10	--	--	3	6	8	--
16	--	--	1	3	4	10

17.0	**WIRING:**
a)	All final branch circuits for lighting and appliances shall be single conductor cables run inside conduits. Branch circuit conductor sizes shall be as shown in the load analysis of drawing and conforming to the requirements of the I.E Regulations and I.S Code.
b)	For each lot of wire supply, Contractor shall supply a certificate issued by the Manufacturer stating its origin, date of manufacture, constitution and standards to which it complies and the test certificates.
c)	Looping system of the wiring shall be used. Wires shall not be jointed inside the conduit or pull boxes. Where joints are unavoidable, they shall be made through approved mechanical connectors with prior permission of owner/consultant.
d)	Control switches shall be connected in the phase conductors only and shall be 'ON' when knob is down. Switches shall be fixed in galvanized steel boxes. Chromium plated screws shall be used.
e)	Power wiring shall be distinctly separate from lighting wiring.
f)	Each circuit phase wire from the distribution boards should be followed with a separate neutral wire of the same size as the circuit wire and earth continuity wire of ½ size of phase conductor.
18.0	**BUNCHING OF WIRES:**
	Wires carrying current shall be bunched so that the outgoing and the return wires are drawn in the same conduit. Wires originating from two different phases shall not run in the same conduit.
18.1	**Drawing conductors:**
i.	The drawing and jointing of PVC insulated copper conductor wires and cables shall be executed with due regard to the following precautions. While drawing wires through conduits, care shall be taken to avoid scratches and kinks, which cause breakage of conductors. There shall be no sharp bends.
ii.	Insulation shall be shaved off like sharpening of a pencil and it shall not be removed by cutting it square.
iii.	PVC insulated copper conductor wire ends shall be soldered (at least 20mm length). Strands of wires shall not be cut for connecting terminals. The terminals shall have sufficient cross sectional area to take all

	strands and shall be soldered. Connecting brass screws shall have flat ends. All looped joints shall be soldered and connected through block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductor of all sizes shall always be terminated using cable sockets. At all bolted terminals, brass flat washers of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connections.
iv.	Only certified wiremen and cable jointers shall be employed to do wiring work. All wires and cable shall bear the manufacturers label and shall be brought to site in original packing. For all internal wiring, PVC insulated wires of 650/1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in loop system and no joints shall be allowed in the length of the conductors. If the use of joint connections are unavoidable due to any specific reason, prior permission, in wiring, shall be obtained from the owner/consultant. No wire shall be drawn into any conduit, until all work of any nature, that may cause injury to wire, is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of wire. Before the wires are drawn into the conduits, the conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction by forcing compressed air through the conduits. The minimum size of PVC insulated conductor wires for all sub-circuit wiring for light points shall be 2.5Sq.mm.
18.2	Joints :
	All joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. No joints shall be made in conduits and in junction boxes. Conductors shall be continuous from outlet to outlet.
19.0	**MAINS AND SUB-MAINS:**
	Mains and sub-mains cables or wires where called for shall be of the rated capacity and approved make. Every main and sub-main wire shall be drawn through an independent adequate size conduit. An independent earth wire of the proper rating shall be provided for every single-phase sub main. For every 3-phase sub main, 2 nos. earth wires of proper rating shall be provided along with the sub main. The earth wires shall be drawn inside the conduits along with the circuit main. Where mains and sub-mains cables are connected to switchgear, sufficient extra lengths of cables shall be provided to facilitate easy connections and maintenance.
20.0	**LOAD BALANCING:**
	Load balancing of circuits in three-phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.
21.0	**COLOUR CODE OF CONDUCTORS:**
	Colour code shall be maintained for the entire wiring installation: red, yellow, blue for three phase, black for neutral, green for earthing. The control wire from light control switches to the light/fan points shall be the same colour as that of the phase/circuit wires feeding that particular loop.
22.0	**EARTHING:**
	All earthing system shall be in accordance with IS 3043 - 1985 code of practice for earthing. Each conduit originating from the DB to various outlets shall have one earth wire (PVC insulated green colour wire).
23.0	**TESTING OF INSTALLATION:** Before a completed installation is put into service, the following tests shall be complied with:
a)	Insulation Resistance:
b)	The insulation resistance shall be measured by applying 500-volt megger with all fuses in place, circuit breaker and all switches closed. The insulation resistance in mega ohms of an installation measured shall not be less than 50 mega ohms divided by the number of points in the circuit.
c)	The insulation resistance shall be measured between
	• Earth to Phase
	• Earth to Neutral
	• Phase to Neutral

d)	**Earth continuity path:**
	The earth continuity conductors shall be tested for electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit-breaker, measured from the connection, with the earth electrode to any point in the earth continuity conductor in the completed installation and shall not exceed one ohm.
e)	**Polarity of Single Pole Switches:**
	A test shall be made to verify that every non-linked, single pole switch is connected to one of the phases of the supply system.
24.0	**COMPLETION CERTIFICATES:**
a)	All the above tests shall be carried out in presence of Construction Manager and the results shall be recorded in prescribed forms. Any default during the testing shall be immediately rectified and that section of the installation shall be retested. The completed test results forms shall be submitted to the owner/consultant.
b)	On completion of an electric installation a certificate shall be furnished by the contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out. This certificate shall be in a prescribed form as required by the local electric supply authority.
25.0	**MEASUREMENTS**
	Mode of measurement is as follows:
25.1	**Point wiring:**
	For purposes of measurement the point wiring for lights/fans/6A sockets (where 6A sockets are connected to lighting circuit loop) is divided into two parts.
	• Point wiring • Circuit main
i.	**Point wiring:**
	The wiring for lights/fans/6A sockets (where 6A sockets are connected to lighting circuit loop) point starting from first light/switch/fan and looping between switches/ fans/ sockets etc., shall be measured either in 'Number' or 'Set'
	One light/fan point controlled by one switch is measured in number (No.) ➢ Set of two or more light points controlled by one switch is measured in 'Sets' ➢ Where set of light points wired and controlled directly from MCB DB shall be measured in 'Sets'. The rate for this item shall not include the cost of switch & switch box. ➢ 6A socket wiring where connected to the lighting circuit loop is measured in number (No.)
25.2	**Circuit Main:**
a)	The length of lighting circuit main including conduit starting from MCB DB to first switch/light/fan point shall be measured separately in 'Linear meters' (Rm). (Further wiring is measured in point wiring).
b)	Circuit main for wiring 6A sockets, 16A sockets and power outlets shall be measured as under.
c)	Length of power circuit wire including conduit starting from MCB DB to outlets and looping between outlets shall be measured in linear meters (Rm).
d)	The socket outlet with switch, outlet box, and cover plate shall be measured in numbers (No.).
e)	The industrial type socket outlet including MCB, plug top, outlet box, & cover plate shall be measured in numbers (No.)
f)	The plug tops where called for shall be measured in numbers (No.)

TECHNICAL SPECIFICATION FOR EARTHING SYSTEM

1.0 **SCOPE:**

2.0 The intent of this specification is to define the requirements for the supply, installation, testing and commissioning of the Earthing System.

3.0 **STANDARDS:**

The work shall be carried out in the best workman like manner in conformity with this specification, the relevant specifications, codes of practice of Indian Standards Institution, approved drawings and instructions of Engineer-in-charge or his authorized representative issued from time to time. In case of any conflict between the standards, the instructions of Engineer-in-charge shall be binding.

4.0 CONDUCTOR / ELECTRODE:

The main grid conductor shall be hot dip galvanized G.I. flat or PVC insulated aluminium conductor / copper conductor. Sizes for main conductors shall be marked on the drawings. Earth electrodes shall be as per DEC standard drawing thickness of hot dip galvanizing shall not be less than 75 microns for conventional type earth pit / Safe maintenance free type earth pit's standard as recommended by Manufacturer.

5.0 EARTHING NETWORK:

4.1 The earthing installation shall be done in accordance with the earthing drawings, specifications and the standard drawings of reference attached with this document. The entire earthing system shall fully comply with the Indian Electricity Act and Rules framed there under. The contractor shall carryout any changes desired by the Electrical Inspector or the owner. In order to make the installation conform to the Indian Electricity Rules at no extra cost. The exact location of earth conductors, earth electrodes and earthing points on the equipment shall be determined in field, in consultation with the Engineer-in-charge or his authorized representative. Any changes in the methods, routing, size of conductors etc. shall be subject to approval of the owner/engineer-in-charge before execution.

4.2 Excavation and refilling of earth, necessary for laying underground earth bus loops shall be the responsibility of the contractor.

4.3 The earth loop impedance to any point in the electrical system shall have a value, which ensures satisfactory operation of protective devices.

4.4 The main earth loop shall be laid at a depth of 500 mm below grade level. Wherever cable trenches are available, the earth lead shall be laid in the trenches and shall be firmly cleated to the walls of concrete lined trenches. The earthing strip shall be protected against mechanical damage.

4.5 Joints and tapings in the main earth loop shall be made in such a way that reliable and good electrical connections are permanently ensured. All joints below grade shall be welded and suitably protected by giving two coats of bitumen and covering with Hessian tape. All joints above ground shall be by means of connectors/lugs as far as practicable. The connectors shall be used for tapping; earth leads from the main earth loop wherever it is installed above ground. Earthing plates as shown in standard drawing shall be provided for earthing of two or more equipment at a place from earth grid. Where aluminum cable risers are to be connected to the underground GI earth bus, the aluminum cable riser shall be taken to the nearest earth pit and terminated through a bolted joint. If this is not practicable, then a GI riser shall be brought above grade and a bolted joint shall be provided for earthing of two or more equipment at a place from earth grid. Where aluminum cable risers are to be connected to the underground GI earth bus, the aluminum cable riser shall be taken to the nearest earth pit and terminated through a bolted joint. If this is not practicable, then a GI riser shall be brought above grade and a bolted joint shall be made between this GI riser and the aluminum cable riser, just above grade. Aluminum lugs shall be protected applying two coats of bituminous paint / bitumen on the exposed portion.

4.6 Conduits, in which cables have been installed, shall be effectively bonded and earthed. Cable armours shall be earthed at both ends.

6.0 EARTH ELECTRODES:

5.1 Earth pipe electrodes shall be installed as shown in the earthing layout drawings and in accordance with the standard drawings of reference and IS:3043. Their location shall be marked to enable accurate location by permanent markers.

5.2 All earth electrodes shall preferably be driven to a sufficient depth to reach permanently moist soil. Electrodes shall preferably be situated in a soil, which has a fine texture, and which is packed by watering and ramming is tightly as possible. Wherever practicable, the soil shall be dug up, all lumps broken and stones removed from the immediate vicinity of the electrodes.

5.3 All earth electrodes shall be tested for earth resistance by means of standard earth test meter. The tests shall take place in dry months, preferably after a protracted dry spell. If necessary, a number of electrodes shall be connected in parallel to reduce the earth resistance. The distance between two electrodes shall not be less than twice the length of electrode.

5.4 The electrodes shall have a clean surface, not covered by paint, enamel, grease or other materials of poor conductivity.

5.5 The disconnect facility shall be provided for the individual earth pits to check their earth resistance periodically. All the earth electrodes shall be suitably numbered and this should be indicated in as built drawings.

6.0 CONNECTION:

6.1 All electrical equipment is to be doubly earthed by connecting two points on equipment to a main earthing ring. The earthing ring will be connected via links to several electrodes. The earth grid formed shall be a closed loop as shown in the drawing with earth electrodes connected to the grid with double strip connection. The cable armour will be earthed through the cable glands.

6.2 All paint, scale and enamel shall be removed from the contact surface before the earthing connections are made.

6.3 All earthing connections for equipment earthing shall be preferably from the earth plate mounted above ground. In case of GI earth loop all underground "T" connections shall be of the same size as main loop however in case of PVC insulated aluminum conductor loops underground joints shall be completely avoided. Connections to motors from earth plate or main loop conductor brought above ground shall not be less than following:

(i) No. 8 SWG GI Wire upto 3.7 KW motors & for MCB DBs.

(ii) Proper size of earth strip as indicated in Bill of quantity shall be adopted for Panels and UPS earthing.

6.4 All hardware used for earthing installation shall be hot dip galvanized or zinc passivated. Spring washers shall be used for all earthing connections of equipment.

6.5 Lighting fixtures shall be earthed through the extra core provided in the lighting cable for this purpose.

7.0 TESTING:

Earthing systems / connections shall be tested as follows:

7.1 Resistance of individual electrodes shall be measured after disconnecting it from the grid.

7.2 Earthing resistance of the grid shall be measured after connecting all the electrodes to the grid. The resistance between any point on the metallic earth grid and the general mass of earth shall not exceed 1 ohm.

7.3 The resistance to earth shall be measured at the following:

a) At each electrical system earth or system neutral earth.

b) At one point on each earthing system used to earth electrical equipment enclosures.

c) At one point on each earthing system used to earth wiring system enclosures such as metal conduits and cable sheaths or armour.

Measurement shall be made before connection is made between the ground and the object to be grounded.

8.0 TEST PROFORMA:

(INSTALLATION TESTING REPORT EARTHING INSTALLATIONS)

1. Earth system data:
   Type of electrode :
   Total number of electrodes :
   Main grid size :
   Material :
2. General checks : Put tick ☐ if o.k.; otherwise give details.
   Construction of earth electrodes as per Manufacturer's recommendation. ☐
   Size of earth conductor for various equipment O.K. as per standard. : ☐
   Minimum distance kept between two electrodes. ☐ :
   Cleanliness and tightness of connectors. : ☐
   Inspect bolted & clamped connectors. : ☐

3.0 TESTS:

3.1 Measured earth resistance of each electrode in ohms.

No. 1. :

No. 2. :

No. 3. :

No. 4. :

3.2 Measurement of earth grid resistance
(with all electrodes connected to grid)

a) At each electrical system earth or system neutral earth :

b) At each point provided for structure lightning protection :

c) At one point on each earthing systems used to earth electrical Equipment enclosure. :

d) At one point one each earthing systems used to earth wiring system such as metal conduits etc. :

e) At one point on each fence enclosing electrical equipment. :

LIST OF APPROVED MAKES OF EQUIPMENT - ELECTRICAL SERVICES.

SL.NO.	DESCRIPTION	MAKE
1	Air Circuit Breaker	Siemens (3 WL) / ABB / Merlin Gerin
2	Moulded Case Circuit Breaker	ABB / Merlin Gerin / MDS
3	MCB Distribution Boards	Merlin Gerin / Moeller / MDS Clipsal - Outdoor type
4	Miniature Circuit Breaker	Merlin Gerin / Moeller / MDS
5	E.L.C.B & RCBOs	Merlin Gerin / Moeller / MDS
6	Contactors and starters.	ABB / Groupe Schneider (Telemechanic)
7	Current Transformer	Kappa / A.E.
8	Timers	BCH / Siemens / Merlin Gerin.
9	Push Buttons	BCH / Siemens / Technic / Tele mechanic.
10	Indicating lamps	BCH / Siemens / Merlin Gerin
11	KWH Meters	BHEL / Universal / HPL Socomec.
12	Selector Switches and Rotary Switches	EE / Kaycee/Salzar
13	Indicating Instruments (Digital type)	AE / Rishab / MECO
14	LT Cables (Power & Control)	Universal / Polycab / KEI / Havells / Rajinigandha
15	PVC Insulated Copper Wires FR/FRLS GRADE / Flexible cables	Finolex / Rajinigandha / Power-Flex / S-bee
16	Crimping type lugs	Dowells / SMI.
17	Cable Glands.	Dowells / HMI / SMI.

18	Terminals.	Wago / ELMAX
19	PVC rigid conduits. FRLS	VIP delux / Universal / Nelco plastic / Avon plast
20	Modular Switches, Sockets, Plugs, Plug tops etc. (White, grey, black)	MK / Legrand / Anchor
21	Industrial / Sockets in sheet steel enclosure with MCB.	MDS / Merlin Gerin / Shokomac
22	Light Fixtures.	Wipro / LD2 / Keselec
23	Lamps & Ballast	Osram - German
24	Exhaust fan	GEC / Crompton Greaves / Usha
25	Protective relays.	Alstom / Siemens / ABB / L&T / Easun Reyrolle
26	P.F. relay.	Krycard / Beluk.
27	ALL PP Capacitors (L.T) & Harmonic Filters	Siemens - Epcos / Naptune Ducati
28	Cable tray	Patney / Frobab / Site Fabricated
29	Hand drier	Nova tech - Bangalore.

SECTION 6: DRAWINGS

Drawings

As enclosed

Civil :- WD-01, WD-02, WS-01, WS-02, WS-03, DR-01, DR-02, DR-03
Electrical- EL-01, EL-02, EL-03, EL-04, EL-05, EL-06, EL-07A, EL-07B, EL-08, EL-16, EL-19

SECTION 7: BILL OF QUANTITIES

Note:

(1) Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the **Bill of Quantities** (refer: ITB Clause 13.2 and GCC Clause 43.3).

(2) Unit rates and prices shall be quoted by the bidder in Indian rupee [ITB Clause 14.1].

(3) Where there is a discrepancy between the rate in figures and words, the rates in words will govern. [ITB Clause 27.1**(a)**]

4) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern [ITB Clause 27.1 (b)].

5) The equipments shall comply with IS Standard or relevant International Standards.

6). Prices quoted by the Bidder shall be inclusive of all goods delivered and services performed and shall include all costs ,freight (packing & forwarding, transportation), insurance, if any.

7). Details of Sales Tax, Excise Duty and VAT /Service Taxes payable in case the contract is awarded shall be shown SEPARATELY>

BILL OF QUANTITIES

S N	Description of items – A-CIVIL WORKS	Unit	Qty	Rate		Amount
	Demolition and Dismantling works			**Fig**	**Words**	
1	Demolishing brick work including stacking of serviceable material and disposal of unserviceable material within 50 m lead in cement mortar.	Cum	60.00			
2	Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkats, architrave, holdfasts etc., complete and stacking within 50 Mts lead.					
	Of area 3 smt and below	Each	7.00			
	Of area beyond 3 sq. metres	Each	5.00			
3	Dismantling tile work in floors and on walls, laid in cement mortar including stacking material within 50 metres lead					
	For thickness of tile 10 mm to 25 mm	Sqm	90.00			
4	Dismantling old plaster or skirting, raking out joints and cleaning the surface for plaster including disposal of rubbish to the dumping ground within 50 Mts. Lead	Sqm	400.00			
5A	Demolishing of R.C.C work manually/by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - In - Charge.	Cum	13.00			
5B	Extra for cutting reinforcement bars manually/by mechanical means in R.C.C work (payment shall be made on the cross sectional area of R.C.C) as per direction of Engineer - In - Charge.	Sqm	90.00			
	Carriage of Materials					

6	Carriage of materials by mechanical transport including loading, unloading and stacking lead upto 1.0 kms. As per the directions of the Engineer-In-Charge. (The work for the item shall be measured based on stack measurements or based on loose stack on lorry loads. The quantity is worked out based on the stack measurement /loose stack on lorry loads shall be reduced by 20% for looseness in stacking to arrive at the net quantity for payment)					
	Lime, moorum, building rubbish					
	Dismantled brickwork etc.	Cum	125.00			
	Brick Masonry Works					
7	Brick work with FPS bricks of class designation 75 in superstructure above plinth level up to V level in all shapes and sizes					
	cement mortar 1:6 (1 cement : 6 coarse sand)	Cum				
8	Half brick masonry with bricks of class designation 75 above plinth level upto V level in FPS Bricks					
	cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	45.00			
b	Extra for providing and placing in positions 2 Nos 6mm dia M.S bars at every third course of half brick masonry (with F.P.S brick)	Sqm	45.00			
	Reinforced Concrete Works (Cast in Situ)					
9	Reinforced cement concrete work in beams, suspended floors, roofs having slope upto 15 degree, landings, balconies, shelves, chejjas, lintels, bands, plain windows sills, staircases and spiral staircases upto floor V level excluding cost of centring, shuttering, finishing and reinforcement with 1:1.5:3 (1cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size). RC Lintels	Cum	0.30			
a	Centering and shuttering including strutting, propping etc. and removal of form for					
	lintels, beams plinth beams, girders, bressumers and cantilevers	Sqm	5.00			
10	Reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete.					
	Cold Twisted bars	Kgs	45			
	Plastering & Finishing Works					
11	Cement Plaster					
a	12 mm cement plaster of mix:					
	b. 1:6 (1 cement : 6 fine sand)	Sqm	600			
12	**Painting works**					
a	Wall and ceiling painting with plastic emulsion paint of approved brand and manufacture to give an even shade:					
	Two or more coats on new work					
	Surface preparation shall consist of:					
	(i)Application of sand paper to smoothen out the surface					
	(ii) Application of one coat of cement primer					
	(iii) Making good of surfaces by using POP and sand paper					
	(iv) Application of 2 coats of putty (Asian)	Sqm	373			

b	One or more coats on old work	Sqm	775			
13	**Flooring Works**					
a1	Providing and laying polished vitrified floor tiles with rectified edges, in size 1000 X 1000 mm(thickness to be specified by the manufacturer) with water absorption less that 0.08% and conforming to IS:15622 of Johnson/Kajaria/Naveen/ Euro make in all colours and shades, laid with cement based high polymer modified quick-set adhesive (Water Based conforming to IS:15477, using 5 kg adhesive per sqm of tiles area, in average 3mm thickness, with 100 mm high skirting, including grouting the joints with white cement and matching pigments etc. complete.	Sqm	635			
a2	Providing and laying Polythene base and Plaster of Paris (POP) covering mixed with coconut fibre, on freshly laid vitrified flooring, to form a layer of adequate thickness to avoid scratching and cleaning the flooring before final hand over.	Sqm	610			
b1	Providing and fixing 18mm thick gang saw cut mirror polished (premoulded and prepolished) machine cut Grey Granite flooring of required size, laid over 20mm thick base cement mortar 1:4 (1 cement : 4 coarse sand) with joints treated with white cement, mixed with matching pigment, epoxy touch-ups, including rubbing, curing, moulding and polishing to edge to give high gloss finish etc., complete at all levels for HEAD - IFD's Chamber.					
	Area of slab over 0.50 sqm	Sqm	30			
b2	Providing and laying Polythene base and Plaster of Paris (POP) covering mixed with coconut fibre, on freshly laid vitrified flooring, to form a layer of adequate thickness to avoid scratching and cleaning the flooring before final hand over.	Sqm	30			
14	**False Ceiling Works**					
a	Gypsum Board False Ceiling					
	Providing & fixing false ceiling of 12.5mm thick tapered edge gypsum board (of India Gypsum make), confirming to IS:2095, including providing and fixing of framework made of special section, power pressed from MS. Sheet and galvanised in accordance with Zinc coating 600 as per IS:277 and consisting of angle cleats of size 25mm wide x 16mm thick with flanges of 22 mm and 37mm at 1200mm c/c. One flange is fixed to the ceiling with a dash fastner 12.5 mm x 40 mm long with 6 mm dia bolts to the angle hanger fixed with nut and bolts to the G.I channels 45 mm x 15 mm x 0.9 mm, running at 1200 mm c/c, to which the ceiling section 0.5mm thk, bottom wedge of 80mm with tapered flanges of 26mm each having clips of 10.5mm at 450mm c/c shall be fixed, in a direction perpendicular to the G.I channels, with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction including fixing the 27mm high section having flanges of					

	length 20 & 30 mm.					
	The perimeter of fixing false ceiling to the wall/partition with the help of rawl plugs at 450mm c/c with long drive screws. All screws at 230mm interval including pointing and fixing to a flush level to tapered and square edges of the Gypsum board with recommended filler, paper tapes, finish and two coats of primer suitable for gypsum board as per manufacturers specification and also including the coat of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, as per drawing and specification and direction of the Engineer-in-charge but excluding the cost of painting.	Sqm	215			
b	Providing and fixing false ceiling tiles of approved materials of size 595 X 59 mm in true horizontal level suspended on interlocking metal grid of hot dipped galvanised steel section (Galvanized at 170 gsm/sqm) consisting of main "T" runners suitably spaced at joints to get required length and of size 24 x 38 mm made from 0.30mm thk (min) sheets spaced at 1200 mm c/c and cross "T" of size 24 x 25mm made of 0,30 mm thick (min) sheet, 1200 mm long spaced between main "T" @ 600mm c/c to form a grid of 1200 x 600 mm and secondary crossed "T" of length 600mm and size 24 x 25mm made of 0.30 mm thk (min) sheet to be interlocked middle of the 1200 x 600 mm panel to form grids of 600 x 600 mm and laying false ceiling tiles of approved texture in the grid including, wherever required, cutting or making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc. Main "T" runners to be suspended from ceiling using GI slotted cleats fixed to ceiling with 6 mm dia and 50 mm long- fasteners, 4 mm GI adjustable rods with galvized level clips spaced at 1200 mm c/c	Sqm	67			
	long main T, bottom exposed width of 24mm of all T sections shall be prepainted with polyester paint, all complete at all heights as per secifications, drawings and as directed by the Engineer-In-charge. (The rate is excluding cost of tiles which will be paid for separately)					
c	Cost of tiles of 600 x 600mm	No.	184			
d	**Metal False Ceiling**					
	Providing and fixing of metal tile false ceiling system. This shall be made using metal tiles 0.5mm thick held in position using suitable steel sections fixed to the true slab using suitable GI suspension system.	Sqm	325			
	Tiles:					
	The tiles shall be of size 600mm x 600mm/550mmx550mm manufactured out of 0.5mm pre-coated hot dipped galvanized steel finished with powder coating of approved colour.					
	Installation and suspension system:					

	The metal tiles shall be fixed to each other using mild steel framework of size 25mm x 25mm made using 1mm thick MS sheet which is folded and bent to desired profile finished with powder coating.These MS framework/sections shall be inserted between two panels and fixed using self interlocking system. The mild steel framework in turn are fixed on to the true ceiling above using a suitable suspension system consisting of J bolts, nuts, hangers, 4mm GI rod and anchor fasteners.					
15	**Repairs to Windows**					
	Making repairs to existing windows including replacement of handles, sealant, beadings etc., complete wherever necessary and also providing and fixing tinted heat resistant film of 3M make etc., complete.	No.	27			
16	**Cladding on window sills**					
	Providing and fixing 18mm thick gang saw cut mirror polished Premium Black Granite (premoulded & prepolished) machine cut for window sills of required size of approved shade, colour and texture laid over 20mm thik base cement mortar 1:4 (1 cement : 4 coarse sand) with joints treated with white sement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edge to give high gloss finish etc., at all levels with area of slab over 0.50 sqm. (Basic rate of granite not to exceed Rs. 1615/sqm)	Sqm	55			
17	**Granite Shelves**					
	Providing and fixing 18mm thick gang saw cut mirror polished premium black granite slabs as shelves in boxing areas under all window sills, embedded in plaster including rubbing, curing, moulding and polishing to edge to give high gloss finish, etc., at all levels with area over 0.50 sqm. (Basic rate of granite not to exceed Rs.1615/sqm)	Sqm	55			
18	**Aluminium double glazed windows**					
	Providing and fixing double glazed hermetically sealed glazing in aluminium windows, with 6mm thick clear float glass both side having 12 mm air gap including providing EPDM Gasket, perforated aluminium spacers, desiccants, sealant (both primary and secondary) etc., as per specifications, drawings and direction of Engineer - In - Charge.	Sqm	11			
19.	Buying back and carting away all demolished items like doors, windows, reinforcement steel, plywood, wooden frames, steel/aluminium windows etc., complete.	L.S.	L.S.			
	B-FURNISHING WORKS					
1	**Wooden Paneling**					
	Providing and fixing **full height veneered wooden paneling** upto false ceiling height for walls and columns, as indicated in the drawing, for HEAD-IFD's Office, in TW framework of size 50mm X 50mm at maximum spacing of 600mm c/c both ways with 6mm thk BWP plywood	Sqm	45			

	finished with 3 mm thk veneer, finished with a bottom skirting of 100 mm height complete as directed. The veneer shall be fixed in alternating bands of dark and light shade and shall be finished with 3 coats of melamine polish of approved made and with necessary surface preparation as specified by the manufacturer.					
2	**Aluminum Internal Full Height Partitions**					
	Providing and fixing black powder coated aluminum work for partitions with extruded built up standard tubular and other sections of approved make conforming to IS: 733 and IS : 1285, anodised transparent or dyed to required shade according to IS : 1868, fixed with rawl plugs and screws or with fixing clips, or with expansion hold fastners including necessary filling up of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt etc. Aluminum sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminum snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing and paneling to be paid for separately.) The powder coating provided shall be of 45-50 microns and shall have adequate scratch hardness of 3Kgs.					
	Section to be used is 38.10mm X 63.50 mm with wall thickness of 1.95mm with weight not to be less than 1.094 Kg/M.	Kgs	925			
3	**Glazing & Pre-Lam boards in Partitions**					
	Providing and fixing glazing & Pre-Laminated board in partitions with PVC / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge . (Cost of aluminium snap beading shall be paid in basic item.)					
	8mm thick clear float glass of approved make.	Sqm	170			
	6mm thick pre-laminated board of approved make.	Sqm	126			
4	**Glazed shutters**					
a	Providing and fixing glazing in aluminium door, with PVC/Neoprene gasket etc., complete as per the architectural drawings and the directions of the Engineer - In - Charge. (Cost of the aluminium snap beading shall be paid in basec item)					
	With Float glass panes of 8mm thickness	Sqm	105			
b	Providing and fixing double action hydraulic floor spring of approved brand and manufacture IS: 6315, for doors, including cost of cutting floors as required, embedding in floors and stainless steel cover plates with brass pivot and single piece MS sheet outer box with slide plate etc., complete., as per the instructions of the Engineer - In - Charge.	No.	50			
5	**Flushed Shutters**					

	Providing and fixing flushed shutters of 19mm thk BWP grade solid plywood core, finished with 1.5mm thick laminate of approved colour/shade as directed. The shutter shall be provided with 4mm clear float glass fixed with wooden beading as indicated in the drawing. The cost shall include cost of all necessary hardware like SS handles, brushed steel tower bolts, door closers, hinges etc., complete.	Sqm	75			
6	**Notice Boards**					
	Providing and fixing soft board pin up board with 6mm thick BWP grade plywood backing, fixed with white cedar beading, finished with 3 coats of melamine polish with necessary surface preparation, complete etc., as per directions of the Engineer - In - Charge.	Sqm	2			
	C-WATER SUPPLY & DRAINAGE					
	SUPPLY, INSTALLATION, TESTING, COMMISSIONING & HANDING OVER OF THE FOLLOWINGS					
(a)	**DRAINAGE SYSTEM**					
1.0	Providing & fixing UPVC Soil & Waste pipes ISI marked,/SWR jointed with solvent cement/rubber ring joints and further protected with Fibreglass paste. including all specials such as bends, tees, clean out plugs, reducers with or without door as required, including any cutting & making good of floors/walls that may be necessary, clamps and stays as per requirements.					
a	32mm	m	50.00			
b	40mm	m	40.00			
c	50mm	m	80.00			
d	65mm	m	20.00			
e	75mm	m	180.00			
2.0	VENT PIPES					
a	32mm	m	50.00			
b	40mm	m	70.00			
c	50mm	m	80.00			
	HDPE U/G PIPES					
3.0	Providing and fixing to wall, ceiling and floor, high density polythylene pipes 6.00 kgf/sq.cm working pressure outside diameter with special flange, compression type fittings, wall clips, making good the wall, ceiling and floor including cost of all materials, labour charges, HOM of equipements and testing complete as per specifications.					
a	75mm	m	0.00			
b	110mm	m	12.00			
4.0	**Multy Traps for Lab drain (Sinks / working Benches)**					
	All traps shall be two piece tubular construction with minimum of 50 mm deep water seal. The joint between the waste outlet and the trap shall be made with PTFE tape and rubber sealing washer.Trap has provision of 32mm, 50mm					

	outlet					
a	100x75mm, with option of 32mm & 50mm drain outlet, In side Lab working bench	Nos	12.00			
b	100x75mm, with option of 32mm & 50mm drain outlet, for Shower	Nos	2.00			
c	100x75mm, with option of 32mm & 50mm drain outlet for Heat and instrumentation area	Nos	2.00			
5.0	**Vent cowl**					
	50mm	Nos	2.00			
	75mm	Nos	4.00			
(b)	**COLD & HOT WATER SUPPLY SYSTEM**					
1.0	PPR pipes (8077 or 8078) for cold water supply with Malleable Specials suchas tees, elbows,check nuts, unions, flanges,nipples, etc					
	cold water line to be extend upto 2nd floor level, with shutt off valve to be provided in the shaft, the additional T joint to be provided in the 5th floor & 2nd floor with shut off valve.					
a	15 mm dia	m	40			
b	20 mm dia	m	44			
c	25 mm dia	m	20			
d	32 mm dia	m	22			
e	40 mm dia	m	30			
1.1	PPR Fittings (Cold Water Supply)					
	40 mm dia Elbow	Nos	2			
	32 mm dia Elbow	Nos	2			
	25 mm dia Elbow	Nos	4			
	20 mm dia Elbow	Nos	8			
	15 mm dia Elbow	Nos	19			
	TEES					
	40 mm dia	Nos	2			
	32 mm dia	Nos	2			
	25 mm dia	Nos	5			
	20 mm dia	Nos	5			
	15 mm dia	Nos	4			
2.0	HOT WATER SUPPLY SYSTEM					
	PPR pipes (8077 or 8078) for Hot water supply with Malleable Specials suchas tees, elbows,check nuts, unions, flanges,nipples, etc					
	cold water line to be extend upto 2nd floor level, with shutt off valve to be provided in the shaft, the additional T joint to be provided in the 5th floor & 2nd floor with shut off valve.					
a	15 mm dia	m	40			
b	20 mm dia	m	44			
c	25 mm dia	m	30			
d	32 mm dia	m	12			
2.2	PPR Fittings (Hot Water Supply)					
	40 mm dia Elbow	Nos	2			
	32 mm dia Elbow	Nos	2			
	25 mm dia Elbow	Nos	4			
	20 mm dia Elbow	Nos	8			
	15 mm dia Elbow	Nos	19			
	TEES					
	40 mm dia	Nos	2			
	32 mm dia	Nos	2			
	25 mm dia	Nos	5			

	20 mm dia	Nos	5			
	15 mm dia	Nos	4			
3.0	VALVES					
	Providing & fixing cPVC Ball valves with Handle tested to 20 kg/sq.cm , with necessary unions etc complete.,					
a	15 mm dia	Nos	4			
b	20 mm dia	Nos	16			
c	25 mm dia	Nos	4			
d	32 mm dia	Nos	4			
e	40 mm dia	Nos	0			
4.0	Providing & fixing Non Return valves tested to 20 kg/sq.cm of approved make, with necessary					
a	15 mm dia	Nos	0			
b	20 mm dia	Nos	0			
c	25 mm dia	Nos	2			
d	32 mm dia	Nos	2			
5.0	Automatic air vents dia 25mm					
	15 mm dia	Nos	4			
	20 mm dia	Nos	4			
6.0	Water hammer arrester					
	Water hammer arrester, piston-type, L copper arrester body, Polypropylene piston with two EPDM o-rings, Dow-Corning, 111 FDA approved silicone compound. Water hammer arresters shall be ANSI/ASSE 1010 1996 certified. Arresters size will be match with 6-12 fixture units.	Nos	6			
7.0	150 LPD Solar water Heter, with 2kw heater backup, colllector, controller and storage tanks with complete accessoroes as per spec Common for All Labs)	Lot	1			
	D-ELECTRICAL WORKS					
	<u>I-Cabling Work</u> **<u>LT SWITCH BOARDS</u>**					
1.0	Installation, testing and commissioning of Client supplied, 415V, 3 phase, 4P, 50 Hz floor / wall mounting type, cubicle compartmentalized LT distribution boards as per enclosed Single line diagram No: **EL-01, Rev-R0** and Specification No: **DEC/LT-SB/E-S101**					
1.1	Third Floor - Raw Power & HVAC Panel [. LTSB - 1]	Nos	1			
1.2	Lighting & Critical Panel [drawing no LTSB - 4]	Nos	1			
1.3	UPS Outgoing Panel [drawing no LTSB - 3]	Nos	1			
1.4	Terrace Floor - HVAC Panel [Outdoor type] drawing no LTSB - 5	Nos	1			
1.5	Supply, Installation, testing & Commissioning of 400A, 4P, MCCB 16 SWG sheet steel enclouser with padlocking facility on door.. [To be fixed in Existing CPCB Panel at Ground Floor]	Nos	1			
1.6	Supply, Installation, testing & Commissioning of 100A, 4P, MCCB 16 SWG sheet steel enclouser with padlocking facility on door.	Nos	2			
2.0	**<u>MCB DB</u>**					

	Supplying & Fixing following way, Single Pole & Neutral, Sheet Steel, MCB Distribution board, 240V, on Surface/Recess,complete with tinned Copper Busbar,Earth bar,Din bar,Detachabke gland plate,interconnections,Phosphatized & Powder painted including Earthing etc. as required. (But without MCCB/RCCB/ISOLATOR)					
2.1	6 Way, Three Phase, MCB DB [for Emergency Lighting, Normal Lighting (TR Lab), HUB Room & AC Power DB]	Nos	6			
2.2	8 Way, Three Phase, MCB DB [for Normal Lighting & UPS Power]	Nos	4			
2.3	12 Way, Three Phase, MCB DB [for Raw Power]	Nos	3			
3.0	**ISOLATORs / ELCBs / MCBs.**					
3.1	**ISOLATORs as Incomer**					
a	40A, Four Pole Isolator for TPN MCB DB incomers	Nos	2			
b	63A, Triple pole Isolator for TPN MCB DB incomers	Nos	12			
3.2	**RCCBs for Phase segregation**					
a	40A, 300mA, 2 pole, RCCB [For Power]	Nos	10			
b	40A, 100mA, 2 pole, RCCB [For Lighting]	Nos	6			
3.3	**MCBs as outgoing**					
a	6 to 32A, SP, ' C ' curve MCB [for Normal & Emer. Ltg.]	Nos	42			
b	6 to 32A, SP, ' B ' curve MCB [for Raw Power,AC DB & UPS Power]	Nos	250			
4.0	**LT CABLES**					
A	1.1 kV/660V grade, Aluminum/copper conductor PVC insulated armoured PVC sheathed LT power/control cables placed at different locations and different lengths in cable trays, complete with all necessary consumables, fixing clamps, identification tags. Etc.					
	Aluminium conductor cables					
4.1	3.5C x 240 Sq.mm XLPE	Mtrs.	263			
4.2	3.5C x 150 Sq.mm XLPE	Mtrs.	158			
4.3	3.5 x 70 Sq.mm XLPE	Mtrs.	40			
4.4	3.5 x 50 Sq.mm XLPE	Mtrs.	91			
4.5	4C x 25 Sq.mm XLPE	Mtrs.	414			
B	**Copper conductor cables**					
4.6	1C x 25 Sq.mm copper conductor cable.	Mtrs.	554			

4.7	4C x 16 Sq.mm YWY	Mtrs.	216			
5	**CABLE TERMINATION**					
A	Copper conductor cables 1.1kV grade type YRY Cables termination using double compression brass cable glands with earth tags, crimping type tinned copper lugs, earthing clamps consumables for the following size of cables.					
	Aluminium conductor cables					
5.1	3.5C x 240 Sq.mm XLPE	Nos.	4			
5.2	3.5 x 150 Sq.mm XLPE	Nos.	7			
5.3	3.5 x 70 Sq.mm XLPE	Nos.	7			
5.4	3.5 x 50 Sq.mm XLPE	Nos.	7			
5.5	4C x 25 Sq.mm XLPE	Nos.	12			
5.6	1C x 25 Sq.mm copper conductor cable.	Nos.	45			
5.7	4C x 16 Sq.mm YWY	Nos.	13			
6.0	**POWER RECEPTICALS**					
	Supplying & Fixing following modular switch / socket on the existing modular plate & switch box including connections but excluding modular plate etc., as required.					
6.1	2 Nos, 5/15A, decorative Plate switch socket with safety shutters controlled by One 16A, Single pole switch. (for UPS sockets), Colour of the switch plate shall be gray.	Sets	71			
6.2	3 nos, 6A, decorative Plate switch socket with safety shutters controlled by One 16A, Single pole switch. (for UPS sockets), Colour of the switch plate shall be gray.	Sets	80			
6.3	2 nos, 6A, decorative Plate switch socket with safety shutters controlled by One 16A, Single pole switch. (for UPS sockets) Colour of the switch plate shall be gray.	Sets	20			
6.4	1 Nos, 6A, decorative Modular switch socket with safety shutters controlled by One 6A, Single pole switch.(for Raw power sockets)Colour of the switch plate shall be white.	Sets	45			
6.5	1 Nos, 6/16A, decorative Plate switch socket with safety shutters controlled by One 16A, Single pole switch.(for Raw sockets) Colour of the switch plate shall be white.	Sets	111			
	Metal clad socket outlets					
6.7	Supply and installation of following flush mounting type plug & socket outlets for AC units & lab equipments.					
A	1 No, 240V, 20A, 3 Pin and earth industrial type socket outlet with 2 pole& earth metal enclosured plug top along with 20A SP, MCB in sheet enclosure	Nos.	35			

7.0	**LUMINAIRES:**					
	Supply, installation, Testing and Commissioning of following Fluorescent Luminaires, complete with 1 / 2 x 36 Watts, truelite,higly efficient lamps and with electronic ballast. The rate shal linclude all necessary consumables.					
7.1	1 x 18W, Recess mounted Spot Lighting luminaries, The fitting shall be Similar to Philips make FBH 145/118 or LD Square make Equivalent, with 1 X 18W, CFL lamp.	Nos	115			
7.2	3 x 14W, Recess mounted luminaries suitable for Armstrong ceiling, The fitting shall be Similar to Philips Make TBS 669/314 MDGN HF or LD Square make Equivalent, with 3 X 14W, High Lumen output FTL (T5) lamp(600mm).	Nos	30			
7.3	3 x 14W, Recess mounted luminaries suitable for Armstrong ceiling, The fitting shall be Similar to Philips Make TBS 669/314 MDGN HF or LD Square make Equivalent, with 3 X 14W, High Lumen output FTL (T5) lamp(550mm).	Nos	90			
7.4	1 x 28W, Surface mounted Luminaries with Lamp and low loss 5.5W ballast. The fixture shall be similar to Philips Make WFC51 or LD Square make Equivalent	Nos	8			
8.0	**LIGHTING CONTROL SYSTEM**					
	Presence detector sensors for lighting control for cabins, The unit shall be similar to **Honeywell Make K4 015** or equivalent. The minimum coverage distance should not be less than 6meters (Diameter). The unit shall also have timer to control.	Nos	8			
	CIRCUIT WIRING					
8.1	Circuit wiring from MCB DB / LT Board to switchboxes / powersockets / MCB DBs with all wiring materials , P.V.C insulated FRLS grade fire retardant copper wires, necessary draw boxes and accessories.					
8.2	3 Core - 2.5 sq.mm flexible copper conductor cables for lighting circuit in already laid conduit / wire way trunking.	Mtrs.	1506			
8.3	3 Core - 4 sq.mm flexible copper conductor cables for lighting circuit in already laid conduit / wire way trunking. (For 16 Amps Power points and UPS sockets)	Mtrs.	7732			
8.4	3 Core - 4 sq.mm flexible copper conductor cables for IDF room circuits (Colour for cable Black & White for source 1 & 2 respectively)	Mtrs.	725			
8.5	1 Run of 6 sq.mm fire resistant FRLS wires in already laid conduit.	Mtrs.	50			
8.6	1 Run of 10 sq.mm fire resistant FRLS wires in already laid conduit.	Mtrs.	80			
9.0	**POINT WIRING**					

	Wiring for light point / exhaust fan point / call bell point with 1.5sq.mm FR PVC insulated copper conductor single core in surface/recessed steel conduit, with piano type switch, phenolic laminated sheet, suitable size MS box & earthing the point with 1.5sq.mm FR PVC nsulated copper conductor single core cable etc. as required.					
9.1	One light point controlled by one 6A decorative switch.	Nos.	30			
9.2	Two light point controlled by one 6A decorative switch.	Nos.	20			
9.3	Three light point controlled by one 6A decorative switch.	Nos.	8			
9.4	Four light point controlled by one 6A decorative switch.	Nos.	8			
9.5	Five light point controlled by one 6A decorative switch.	Nos.	4			
9.6	Six light point controlled by one 6A decorative switch.	Nos.	6			
10.0	**EARTHING**					
	EARTH PITS					
10.1	Supply, Preparation and testing of G.I pipe electrode type earth station as per IS:3043 complete with 40 mm Class`B' GI pipe, funnel, test link, brick masonry chamber with hinged cover etc.,for safety earthing and Panel earthing.	Nos	2			
10.2	Providing and fixing of earth electrode earth station complete with brick masonary chamber, GI cover, GI frame, GI watering funnel etc. The GI frame / chamber shall be of 300 x 300 x 300 size. The rate shall also include necessary back filling componds for each earth pit as per manufacturer's gidelines. The unit shall be similar to T39 of Ashlok earthpit of height 3000mm and outer dia of 80mm .	Nos	6			
10.3	**Earthing Conductors**					
A	40 x 6 mm GI earth strip.	Mtrs.	140			
B	25 x 6 mm GI earth strip.	Mtrs.	100			
C	25 x 6 mm Copper earth strip.	Mtrs.	130			
D	Antistatic floor earthing with 25 x 0.05mm thick copper film	Mtrs.	0			
E	Busbar of 0.5 Mtr length made out of 50x6 mm GI Strip with drill holes of M8 at 25mm interval mounted on Insulators.	Nos	5			
F	300mm long, 75 x 6 Copper, Earth bus suitable for terminating 8 SWG copper wire with holes at regular intervals connected to main bus. The same need to be mounted in MS box with transperent cover.	Nos	6			
10.4	**Copper conductor cables [Yellow color with Green strip]**					

A	1C x 50 Sq.mm copper conductor cable (Unarmoured)	Mtrs.	400			
B	1C x 16 Sq.mm copper conductor cable (Unarmoured)	Mtrs.	300			
C	1C x 10Sq.mm copper conductor cable (Unarmoured)	Mtrs.	280			
10.5	**Copper conductor cable terminations**					
A	1C x 50 Sq.mm copper conductor cable (Unarmoured)	Nos.	20			
B	1C x 16 Sq.mm copper conductor cable (Unarmoured)	Nos.	10			
C	1C x 10 Sq.mm copper conductor cable (Unarmoured)	Nos.	40			
11.0	**FLOOR RACEWAYS**					
11.1	Floor raceways of following sizes made out of 1.6 mm thick Pregalvanised sheet complete with screwed type cover of thickness as specified with counter sunk type screws. The dimension of the same shall be as follows. The cover should be of 2 mm thick.					
	Note : The rate quoted shall include providing earthing for the Wireway trunking. (Usage of jumper wire at joining is acceptable) & complete with necessary supports, bends, access boxes, Tap off boxes & Cross over as per specification and site requirement.					
A	100mm x 40mm GI raceway with 2mm thick cover	Mtrs.	180			
B	150mm x 40mm GI raceway with 2mm thick cover	Mtrs.	30			
C	200mm x 40mm GI raceway with 2mm thick cover	Mtrs.	45			
D	250mm x 40mm GI raceway with 2mm thick cover	Mtrs.	20			
E	300mm x 40mm GI raceway with 2mm thick cover	Mtrs.	5			
F	450mm x 40mm GI raceway with 2mm thick cover	Mtrs.	5			
G	600mm x 40mm GI raceway with 2mm thick cover	Mtrs.	20			
i	**POWDER COATED TRUNKING FOR DATA CENTER**					
	Providing and Fixing of 2mm thick steel sheet factory fabricated post galvanized raceways to be laid in the ceiling for Data center & IDF room area with cutouts for installation of MCB and Industrial socket outlets as indicted in Item No : 5.9 (f). The rate to include providing 2 mm thick GI cover fixing accessories, Earthing with 8SWG copper wire, complete with necessary supports, bends, access boxes, Tap off boxes & Cross over as per specification and site requirement.					
a	400 mm Wide x 75 mm Deep Raceways with 2 mm thick GI cover	Mtrs.	15			
b	200 mm Wide x 75 mm Deep Raceways with 2 mm thick GI cover	Mtrs.	15			
11.2	**JUNCTION BOXES**					

	Electrogalvanised junction boxes with 2mm cover withcounter sunk type screws for floor raceways of the following sizes.The dimension of the same shall be as follows. The dimension of the same shall be as follows.					
a	110 x 110 x 40mm GI floor junction box with 2 mm thick cover.	Nos	34			
b	160 x 160 x 40mm GI floor junction box with 2 mm thick cover.	Nos	3			
c	220 x 220 x 40mm GI floor junction box with 2 mm thick cover.	Nos	9			
d	260 x 260 x 40mm GI floor junction box with 2 mm thick cover.	Nos	2			
e	310 x 330 x 40mm GI floor junction box with 2 mm thick cover.	Nos	2			
f	440 x 440 x 40mm GI floor junction box with 2 mm thick cover.	Nos	2			
g	550 x 550 x 40mm GI floor junction box with 2 mm thick cover.	Nos	5			
11.3	**FLOOR CHIPPING FOR REACEWAYS**					
	Cutting of floor screeding for accomadating the floor raceways / conduits for the above size of raceways / conduits, The rate shall include closing of extra gap with cement, machine cutting and making good to the original level & also cleaning the debris.	Rmt	55			
12.0	**EMPTY PVC CONDUITS**					
A	2 mm thick PVC conduits of followingsizes for open / enclosed wiring complete with all necessary accessories (Tentative qty)					
B	25 mm Dia, 2 mm thick, FRLS type PVC conduit	Mtrs.	5200			
C	40 mm Dia, 2 mm thick, FRLS type PVC conduit	Mtrs.	50			
13.0	**CABLE TRAYS**					
	Ladder type cable tray					
	Fabricating and installing following size of galvanised ladder type cable tray made of suitable type of angles / sheets, including horizontal and vertical bends, reducers, tees, cross members and other accessories as required and suspended from the ceiling.					
	Note: The rate shall include all necessary supporting structure / supports as required.					
A	150 mm wide cable tray	Mtrs.	20			
B	300 mm wide cable tray	Mtrs.	20			
C	450 mm wide cable tray **E - Safety & Temporary Power**	Mtrs.	20			
1.0	**SAFETY ACCESSORIES AND MISCELLANIOUS ITEMS**					

A	415V enameled type danger boards 150 x 150mm. Size	Nos.	1			
b	Supplying Electrical rubber mat 1.82x0.91x0.012 meter size, tested to 22KV grooved ISI mark with all lead and lift and as directed by the Engineer in charge.	Nos.	1			
c	Shock treatment chart duly framed and laminated	Nos.	1			
d	Laminated drawing board suitable (A1) size drawing	Nos.	1			
e	Preparation of As-Built drawings (Minimum 6 Sets + CD)	Nos	1			
f	4.5 Kg class CO2 Type portable fire extinguishers with fixing brackets & hardware.	Nos	2			
	CEIG approval for the installation					
1.1	Obtaining CEIG approval for the installations as required by statutory norms. The offered price shall include preparation of required docuements, followups etc.	Ls	1			
2.0	**TEMPORARY POWER**					
2.1	Providing temporary power supply for Construction work. The required power will be made available at one point. [From DG set area] The vendor shall draw necessary wire in Conduit / Armored cable required for the same with proper fixing and safety.	Ls	1			
a)	The rate quoted shall include providing suitable Distribution board with ELCB for Incomer and suitable ratings of MCB for Outgoings for following equipments.					
b)	The rate quoted shall include providing Minimum 4 Nos, of 6/16A, Socket outlet with individual switch at every column. (Max : 15Nos / floor)					
c)	Providing separate circuits with suitable socket for 2 Nos, Single phase Welding Machines in each floor					
d)	Providing separate circuits with suitable socket for 2 Nos, Two phase Welding Machines in each floor					
e)	Providing adequate lighting for Interior work with 2 feet Flourecent fixtures. (The lux level should not be less than 150 Lux)					
f)	Providing 4 Nos, of self contained battery Emergency Light fixtures.					
g)	Providing earthing for the system, by either by 8SWG GI wire or wires.					
h)	Supplying & providing of 50 Nos, 5 A, Plug tops.					
I)	UP-Keeping and maintaining the entire system till end of the project.					
j)	Providing (separate) man power to maintain the temporary power system.					
k)	Removing of all material used for temporary setup out of site.					
l)	Supplying of 2 No, 5kG, CO2 and 2 No. ABC type fire extinguishers					

m)	Providing 4 Sets of Spike buster with suitable protection for desk top PCs (For site office)					
	F-Data & Net Working					
S .N	**Item Description**					
	CAT6 Copper Components for DATA					
1	4-pair, Cat6 UTP Cable, roll of 305m,Grey	Box	9			
2	CAT6 UTP Jack with Strain relief and bend limiting boot (SL Series), Blue, The rate to include testing and Documentation.	Nos	43			
3	4-port 110-style faceplate, White	Nos	8			
4	2-port 110-style faceplate, White	Nos	32			
5	Blank insert for 110-style faceplate	Nos	45			
6	Cat6 24port Jackpanel **Straight Unloaded**	Nos	6			
7	CAT6 UTP Jack (SL Series), Blue for JP	Nos	63			
8	Cat6 RJ45 UTP Patch Cords, with snagless boots, color matched, Blue - 7 ft, Equipment & Rack End and Work location end	Nos	86			
9	CAT6 RJ45 UTP Patch Cords, with snagless boots, color matched,ORANGE, 10 Ft (Server Connectivity)	Nos	5			
	AMP CAT6 Copper Components for VOICE					
10	4-pair, Cat6 UTP Cable, roll of 305m,Grey	Nos	6			
11	Cat6 UTP Jack with Strain relief and bend limiting boot (SL Series), YELLOW	Nos	38			
12	Cat6 24port Jackpanel **Straight Unloaded**	Nos	5			
13	Cat6 UTP Jack (SL Series), YELLOW for JP	Nos	120			
14	Cat6 RJ45 UTP Patch Cords, with snagless boots, color matched, YELLOW 7 ft	Nos	38			
	VOICE RESOURCE					
15	24-port Cat5e loaded Jack Panel, 1U, Voice Resource	Nos	5			
16	100 Pair riser cable	Mtrs	50			
17	100 Pair Krone Module with MDF Box	Nos	1			
	RACKS & ACCESSORIES					
18	1 x Basic OPEN RACK/45U/Powder Coated (OP-45-PC), 2 x High Density Vertical Cable Organiser/6 inch (HDVCO-6), 1 x Run-Way Kit-16Inch (RWK-16),10 x Mounting Hardware/ OR/ Pk-20 (ORA0001), 2 x Power Dist.Unit/ Horz/5Soc/5-15A/3KVA 9PDU-H-5-5-15-3)	Set	1			
19	Horz. Cable Organiser/1U/ CHL ON FR	Nos	16			
20	Outstation Rack Delivery Charges	Nos	1			
	ACTIVE COMPONENTS					
21	HP Procurve 48 Port Switch - 2510-48, Layer 2	Nos	1			
	GRAND TOTAL (Total of A+B+C+D+E+F)					

Note:-

(a) In case of discrepancy between unit price and total Price, the unit price shall prevail.

(b) The detailed operation & maintenance manual for each unit of supplied Equipment shall be provided.

(c) Rates quoted should be inclusive of all taxes.

(d) The equipments shall comply with IS Standard or relevant International Standards.

SUMMARY OF COST

Sl No	Appendix		Cost in Rupees
A	CIVIL WORKS		
B	FURNISHING WORKS		
C	WATER SUPPLY & DRAINAGE		
D	ELECTRICAL WORKS		
E	SAFETY & TEMPORARY POWER		
F	DATA AND NETWORKING		
	Total	In Figures	
		In Words	

SECTION 8: FORMS OF SECURITIES

Forms of Securities

Acceptable forms of securities are annexed. Bidders should not complete the Performance and Advance Payment Security forms at this time. Only the successful Bidder will be required to provide Performance and Advance Payment Securities in accordance with one of the forms, or in a similar form acceptable to the Employer.

Annex A: Bid Security (Bank Guarantee)

Annex B: Performance Bank Guarantee

Annex C: **PERFORMANCE BANK GUARANTEE (for unbalanced items)**

Annex D: **BANK GUARANTEE FOR ADVANCE PAYMENT**

Annex A

BID SECURITY (BANK GUARANTEE)

WHEREAS, _____ *[name of Bidder]* (hereinafter called "the Bidder") has submitted his Bid dated _____ *[date]* for the construction of _____ *[name of Contract]* (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that We _____ *[name of bank]* of _____ *[name of country]* having our registered office at _____ (hereinafter called "the Bank") are bound unto _____*[name of Employer]* (hereinafter called "the Employer") in the sum of _____[1] for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 19___.

THE CONDITIONS of this obligation are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;

or

(2) If the Bidder having been notified of the acceptance of his bid by the Employer during the period of Bid validity:

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

(b) fails or refuses to furnish the Performance Security, in accordance with the Instruction to Bidders; or

(c) does not accept the correction of the Bid Price pursuant to Clause 27;

we undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____[2] days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, 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 _____

WITNESS _____ SEAL _____

_____

[signature, name, and address]

_____

1 The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16.1 of the Instructions to Bidders.

2 45 days after the end of the validity period of the Bid.

PERFORMANCE BANK GUARANTEE **Annex B**

To: _____ *[name of Employer]*
_____ *[address of Employer]*

WHEREAS _____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of guarantee]* [1]_____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]*[1] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until …… (i.e.) 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

_____

1 An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.

PERFORMANCE BANK GUARANTEE (for unbalanced items) **Annex C**

To: _____ *[name of Employer]*

_____ *[address of Employer]*

WHEREAS _____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of guarantee]* [1] _____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]*[1] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until …….. (i.e.) 28 days from the date of issue of the certificate of completion of works.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____

BANK GUARANTEE FOR ADVANCE PAYMENT **Annex D**

To: _____ *[name of Employer]*

_____ *[address of Employer]*

_____*[name of Contract]*

Gentlemen:

In accordance with the provisions of the Conditions of Contract, subclause 51.1 ("Advance Payment") of the above-mentioned Contract, _____ *[name and address of Contractor]* (hereinafter called "the Contractor") shall deposit with _____ *[name of Employer]* a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of _____ *[amount of guarantee]* [1]_____ *[in words]*.

We, the _____ *[bank or financial institution]*, as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ *[name of Employer]* on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding _____ [amount of guarantee][1] _____ *[in words]*.

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed thereunder or of any of the Contract documents which may be made between _____ *[name of Employer]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ *[name of Employer]* receives full repayment of the same amount from the Contractor.

Yours truly,

Signature and seal: _____

Name of Bank/Financial Institution: _____

Address: _____

Date: _____