Nepal Electricity Authority
DHUNCHE DISTRIBUTION CENTRE
RASUWA

BIDDING DOCUMENT

FOR

Construction of Store Building at dhunche, Rasuwa

Contract No: NEA/DDC/ 2073/074/CIVIL -01

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Invitation for Bids

(First date of Publication- 2074/02/22)

1. **Nepal Electricity Authority (NEA), Dhunche Distribution Centre, Rasuwa** invites wax sealed tenders from reputable contractors for following works:

Tender No.	Description	Fee for bid Document (NRS)	Bid bond		Estimated Amount (without VAT)(NRs)	Site Location
			Amount (NRs)	Validity period		
NEA/DDC/ 2073/74/CIVIL-01	Construction of Store Building	3,000.00	**50,000**	**120 days**	**17,94,155.02**	Dhunche, Rasuwa

2. A complete set of Bid Documents may be purchased during office hours on all working days by any interested Bidder from **first date of publication** onwards upon submission of a written application to the address given below accompanied by a bank voucher of mention above (nonrefundable) towards the cost of the Bid Documents deposited in ***NEA*, Dhunche Distribution Centre *A/c No. 020003591C at Nepal Bangladesh Bank Ltd., Dhunche, Rasuwa and Bid bond amount in A/c No. 02500600014600000053(Deposit) at NMB Bank Ltd., Dhunche, Rasuwa,*** Nepal or by an account payee bank draft of the same amount issued in favor of NEA . The Bid Documents shall be available for sale up to **30th day of first date of publication** at the office mentioned below.
   Nepal Electricity Authority, Kathmandu Regional Office
   Durbar Marg, Kathmandu,Tel no: 01-4153156
   Bidders must produce notarized copies of Company Registration Certificate, VAT Registration Certificate and PAN Registration Certificate and Tax Clearance or Submission of tax return up to 2072-73 at the time of purchase of the Bid Documents.
3. All Bids accompanied by a bid bond not less than **specified above** of bid price must be delivered in accordance with the instructions of Bidders at or before 12:00 hour's local time on or before **31st day of first date of publication** at **Nepal Electricity Authority, Kathmandu Regional Office, Durbarmarg, Kathmandu.** The Bids shall be opened at 14:00hour's local time on the same date in the presence of the authorized representatives of the Bidders (or without presence) who choose to be present. If the specified dates of Bid submission and opening fall on a public holiday, Bid submission and opening shall be done on the next working day.
4. Interested eligible Bidders may obtain further information on the Bids or inspect the Bid Documents at the office given below or information pertaining to Bid and e-bidding from NEA's website **http://www.e-nea.org.np**
5. Bidders are advised to visit the site and assess the actual site conditions before submitting their bid.
6. Any amendment in the tender notice shall be published in the NEA Web Portal and notice board of NEA, **Dhunche Distribution Centre, Rasuwa**.

Nepal Electricity Authority
Dhunche Distribution Centre,
Dhunche, Rasuwa
Tel: 010-540176
010-540076

Section II.Instructions to Bidders

A. General

1. Scope of Works

The Employer invites bids for the construction of works as detailed in attached specifications, drawings and the bill of quantities provided herein. The successful Bidder is expected to complete the works as mentioned in the Bidding Data.

2. Eligible Bidder

This Invitation for Bids is open to all registered Bidders with qualifications as described in the Bidding Data.

3.One Bid per Bidder

Each Bidder shall submit only one bid, either individually or as a partner in a joint venture. A Bidder who submits or participates in more than one bid shall cause all the proposals with the Bidder's participation to be disqualified. A firm may participate in more than one bid only as a subcontractor.

4. Cost of Bidding

The Bidder shall bear all costs associated with the preparation and submission of his bid and the Employer shall in no case be liable for those costs.

5. Site Visit

The Bidder at his own cost, responsibility and risk may visit the site of the works and acquire all necessary information for preparing the bid and entering into a contract for construction of the works.

B. Bidding Documents

6. Content of Bidding Documents

The Bidding Documents comprise the documents listed below:
Section

I. Invitation for Bids
II. Instructions to Bidders
III. Sample Forms of Bid, Letter of Acceptance and Agreement
IV. General Conditions of Contract (GCC)
V. Special Conditions of Contract (SCC)

VI. Technical Specifications
VII. Drawings
VIII. Bill of Quantities
IX. Sample Forms of Securities

7. Clarification of Bidding Documents

A prospective Bidder may request clarification on the bidding documents in writing and the Employer shall respond to such request. Copies of the response shall be forwarded to all the purchasers of the bidding documents.

C. Preparation of Bids

8. Language of Bid

All documents relating to the bid shall be in English or in Nepali.

9. Documents Comprising Bid

The bid by the Bidder shall comprise the following:

a. Bid and Qualification/ Eligibility Information
b. Bid Security
c. Priced Bill of Quantities
d. Rate Analysis (optional at request of Employer)

10. Bid Prices

The contract shall be for the whole works described in scope of works based on the priced Bill of Quantities submitted by the Bidder. The Bidder shall fill in rates and prices for all items of the works in Nepali Rupees. Items for which no rate or price is entered shall be deemed covered by the other rates and prices in the Bill of Quantities and shall not be paid by the Employer.

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

11. Bid Validity

The bid shall remain valid for the period specified in the Bidding Data.

12. Bid Security

The Bidder shall furnish a Bid Security in Nepali Rupees in the amount specified in the Bidding Data. The Bid Security shall remain valid for a period of 30 days beyond the original validity period for bid and any period of extension subsequently requested by the employer.

The Bid Security shall be in the form of a bank guarantee from

a bank acceptable to the Employer or a cash voucher deposited in the Bank Account of the Employer specified in the Bidding Data.

13. Format and Signing of Bids

D. Submission of Bids

14. Sealing and Marking of Bids

15. Pre-Bid Meeting

16. Deadline for Submission of Bids

Bids shall be delivered to the Employer at the address no later than the time and date specified in the Bidding Data.

17. Late Bids

Any bid received by the Employer after the deadline shall not be accepted and shall be returned unopened to the Bidder.

18. Modification and Withdrawal of Bids

18.1 Bidders may modify or withdraw their Bids after it has been submitted by giving a written notice, duly signed by an authorized representative and shall include a copy of the authorization in accordance with Clause 13 before the deadline prescribed in Clause 16. The corresponding modification of the bid must accompany the respective written notice.

18.2 Each Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with Clauses 16 with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL," as appropriate.

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

E. Bid Opening and Evaluation

19. Bid Opening

The Employer shall open the bids in the presence of the Bidders' representatives who choose to attend at the time and in the place specified in the Bidding Data.

The Bidders' names, the Bid Prices, the total amount of each bid, any discounts, bid modifications and withdrawals, the

presence or absence of Bid Security,difference of rate in words and figures, quoted price for alternate technical specification if proposed, whether the Bid Form has signature of the bidder or authorized representative, corrections/effacement or obliteration in bidding document, any remarks made by the bidder in the Bid Form, detailsof rates if requested and such other details as the Employer may consider appropriate shall be announced by the Employer at the opening.
The Employer shall prepare and provide minutes of the bid opening including the information disclosed to those present.

20. Process to be Confidential

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.

21. Clarification of Bids and Contacting the Employer

21.1 To assist in the examination, evaluation and comparison of Bids, the Employer may, at the Employer's discretion, ask any Bidder for clarification of the Bidder's bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by facsimile, 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 23.

21.2 Subject to Sub-Clause 21.1, no Bidder shall contact the Employer on any matter relating to his 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, he should do so in writing.

21.3 Any efforts by the Bidder to influence the Employer in theEmployer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidder's bid.

22. Examination of Bids and Determination of Responsiveness

22.1 Prior to the detailed evaluation of Bids, the Employer shall determine whether each bid (a) meets the eligibility criteria defined in Clause 2; (b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the Bidding documents.

22.2 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.

22.3 If a bid is not substantially responsive, it shall be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

23. Correction of Errors

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

a) where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern; and

b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted shall govern, unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted shall govern, and the unit rate shall be corrected.

23.2 The amount stated in the bid shall be adjusted by the Employerin 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 shall be rejected and the Bid Security may be forfeited.

24. Evaluation and Comparison of Bids

24.1 The Employer shall evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause 23.

24.2 Further the employer shall evaluate :

a) Whether the construction work plan, work

performance schedule and mobilization period is consistent with the requirement of the bidding document or not,

b) Whether the quoted item unit rates in the Bill of quantities are reliable or not,

c) Whether or not the quoted price is unbalanced due tounnaturally high rates quoted by the bidder for work items to be completed in the initial stages of the contract or for work items whose quantities are assumed by the bidder to be underestimated.

24.3 In evaluating the Bids, the Employer shall determine for each bid the evaluated Bid Price by adjusting any corrections for errors pursuant to Clause 23;

24.4 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 will not be taken into account in bid evaluation.

24.5 If the bid, which results in the lowest Evaluated Bid price, is unbalanced or frontloaded in relation to the Employer's estimate of the items of Work to be performed under the contract pursuant to Sub - Clause 24.2 ,the Employer shall ask the bidder to give clarification with detailed rate analysis for any or all items of the Bill of Quantities. If the clarification is found satisfactory then the Employer shall increase at the expense of the bidder the performance security set forth in clause 28 by additional 8% of the quoted amount to protect the Employer against financial loss in the event of default of the successful bidder under the contract and if the clarification is found unsatisfactory then the Employer may reject such bid.

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F. Award of Contract

25. Award of Contract

The Employer shall award the contract to the Bidder who has offered the lowest evaluated Bid Price, provided that such Bidder has been determined to be eligible in accordance with the provisions of Clause2.

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

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 the contract, without assigning any reasonswhatsoever and without thereby incurring any liability to the affected Bidder or Bidders.

27. Notification of Award and Signing of Agreement

27.1The Employer shall notify its intention to award the Contract to the successful bidder in accordance with Clause 25 prior to the expiration of the bid validity period and within 7 days of selection of the bid. The employer shall also provide information regarding the name, address and the contract amount of the successful bidder to all bidders who participated in the bid.

27.2 Any Bidder who is not satisfied with the procurement process or Employer's decision as per Sub - Clause 27.1 and believes that the Employer has committed an error or breach of dutywhich has or will result in loss to the bidder then the bidder may give an application for review of the decision to the Employer with reference to the error or breach of duty committed by the Employer. The review application should be given within 7 days of receipt of information regarding the issue of letter, by the Employer notifying it's intention to award the contract to the successful bidder.

27.3If the review application is not received by the Employer as per clause 27.2 then the bid of the Bidder selected as per clause 25 shall be accepted by the Employer and the successful bidder shall be notified through "Letter of Acceptance" by the Employer to submit Performance security as per clause 28 and sign the contract within 15 days.

27.4 If the successful bidder fails to deliver the Performance Security and sign the Agreement pursuant to Sub - Clause 27.3 then the Employer shall forfeit the Bid Security of the bidder and accept the bid of immediately next lowest evaluated substantially responsive bidder.

28. Performance Security

Within 15 days after receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in acceptable format to the Employer as specified in Section IX and equal to five percent (5% Or as according to Public Procurement Act Nepal) of the contract Agreement Amount.

29.Advance Payment

The Employer may provide an Advance Payment on the Initial Contract Price as stipulated in the conditions of contract subject to a maximum amount[1] as stated in the Bidding Data.

30.Additional Securities

The Contractor shall provide additional Performance Security pursuant to Sub -Cause 24.5

31.Adjudicator

The Employer proposes the person named in the Bidding Data to be appointed as Adjudicator under the Contract, at the hourly fee specified in the Bidding Data, plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in his Bid. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the Contract Data at the request of either party.

32.Conduct of Bidders

32.1 The Bidder shall be responsible to fulfil his obligations as per the requirement of the Contract Agreement, Bidding documents, GON/NEA's Procurement Act and Regulations.

32.2 The Bidder shall not carry out or cause to carry out the following acts with an intention to influence the implementation of the procurement process or the procurement agreement :

a) give or propose improper inducement directly or indirectly,

b) distortion or misrepresentation of facts

c) engaging or being involved in corrupt or fraudulent practice

d) Interference in participation of other prospective bidders.

e) coercion or threatening directly or indirectly to cause harm to the person or the property of any person to be involved in the procurement proceedings,

f) collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Employer the benefit of open competitive bid price..

g) contacting the Employer with an intention to influence the Employer with regards to the bid or interference of

[1] *This amount is normally 20 percent of the Contract Price. The amount should be adequate to minimize the needs of the Contractor to borrow for the Contract.*

any kind in examination and evaluation of the bids during the period after opening of bids up to the notification of award of contract

33. Blacklisting Bidder

33.1 Without prejudice to any other right of the Employer under this Contract, GON/NEA, Public Procurement Monitoring Officemay blacklist a bidder for his conduct up to three years on the following grounds and seriousness of the act committed by the bidder:

a) if it is proved that the bidder committed acts pursuant to the Sub - Clause 32.2,
b) if the bidder fails to sign an agreement pursuant to Sub - Clause 27.4,
c) if it is proved later that the bidder/contractor had committed substantial defect in implementation of the contract or had not substantially fulfilled his obligations under the contract or the completed work is not of the specified quality as per the contract ,
d) if convicted by a court of law in a criminal offence which disqualifies the bidder from participating in the contract.
e) if it is proved that the contract agreement signed by the bidder was based on false or misrepresentation of bidder's qualification information,
f) other acts mentioned in the Bidding Data

33.2 A firm declared blacklisted and ineligible by the GON/NEA shall be ineligible to bid for a contract during the period of time determined by the PPMO.

G. Bidding Data

Instruction to Bidders Clause References

A. General

ITB 1	The Employer is: NEA, DHUNCHE DISTRIBUTION CENTRE, DHUNCHE, RASUWA The Scope of Work: Construction of Store building at Dhunche, Rasuwa.

ITB 2	Bidder's Eligibility Requirement: a) Registration Certificate b) Business Registration Licence c) VAT and PAN Registration Certificates d) Tax Clearance Certificate or Submissions of Tax Returns up to fiscal year 2072/73 e) A written declaration made by the Bidder stating that the Bidder is not ineligible to participate in the Bid; has no conflict of interest in the proposed bid procurement proceedings and has not been punished for the profession or businesses related offence. f) Joint Venture Authorization/ Agreement (if any) g) Power of Attorney(Original)

B. Bidding Documents

ITB 7	Employer's address for **clarification purposes** is**:** NEA, DHUNCHE DISTRIBUTION CENTRE, DHUNCHE, RASUWA

C. Preparation of Bids

ITB 8	The language of the bid is: ***English/Nepali***
ITB 11	The bid validity period shall be**:** ***90 days from last date of bid submission***
ITB 12	Amount of Bid Security shall be:***NRs 50,000*** The bid security validity period shall be**:** ***120 days from last date of bid submission*** The Bank Account of the Employer: ***A/c No. 02500600014600000053(Deposit) at NMB Bank Ltd., Dhunche, Rasuwa,***, Nepal or by an account payee bank draft of the same amount issued in favour of NEA.
ITB 13	The written confirmation of authorization to sign on behalf of the Bidder shall indicate: (a) The name and description of the documentation required to demonstrate the authority of the signatory to sign the Bid such as a Power of Attorney; and (b) In the case of Bids submitted by an existing or intended JV an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of

	any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.

D. Submission of Bids

ITB 15	A Pre-Bid meeting is not required
ITB 16	The Employer's address for **bid submission purposes**is: NEA, **Dhunche Distribution Centre, Dhunche, Rasuwa.** **The deadline for bid submission is:** Date: **31st day of date of first publication** Time: 12:00 noon

E. Bid Opening and Evaluation

ITB 19	The bid opening shall take place at: NEA, **Dhunche Distribution Centre, Dhunche, Rasuwa.** Date: **31st day of date of first publication** Time: 14:00 PM

F. Award of Contract

ITB 29	The Advance Payment amount shall be: ***N/A***
ITB 31	The Adjudicator proposed by the Employer is***: As agreed by the Contractor and Employer*** The hourly fee for this proposed Adjudicator shall be:Nrs***2000/hr.*** Brief biographical data of the proposed Adjudicator is as follows: Should be legally registered.

Special Instruction to Bidders for e-Bidding

General procedures for electronic bid submission (e-submission) is described below.

Bid preparation

A Bidder who wish to submit the bid electronically may purchase the Bid Document directly from the Employer office or may download the bid document from the website and deposit the equivalent amount in the Revenue account of the employer as specified in the notice or/and Bid Document.

Description of bid submission procedure through electronically (e-submission) only:

i) Interested bidders shall, either purchase the Bid Document directly from the Employer office or may download the bid document from the website and deposit the equivalent amount in the Revenue account of the employer as specified in the notice or/and Bid Document.

ii) The Bidder shall fill the following documents and forms (in hard copy of issued bid documents), signed by the authorized representative with seal of the company

a) Bill of Quantity (BOQ) with rate, amount

b) Forms of Bid, Qualification Information

iii) The Bidder shall then scan the completed original documents, forms in PDF files with appropriate filename shown in the table below.

S No	Document	PDF File Name	Requirement	Remarks
1	Letter of Bid	Letter of Bid-1	Mandatory	
2	Bid Security (Bank Guarantee)	Bid Security-2	Mandatory	
3	Company Registration	Company Reg-3	Mandatory	All firms of JV
4	VAT Registration	VAT Reg-4	Mandatory for National firms	All firms of JV
5	Tax clearances certificate for F/Y 072/73	Tax-5	Mandatory for National firms	All firms of JV
6	Power of Attorney of Bid Signatory	Power of Att-6	Mandatory	
7	Business Registration (License) Certificate	License-7	Mandatory	
8	Bank Voucher for Cost of Bidding document	Voucher-8	Mandatory	
9	Joint Venture Agreement	JV-Doc-9	Mandatory for JV Firm	In case of JV
10	Qualification Information	Qualifications-10	Mandatory	
11	Applicable Price Adjustment Table	Price adjust-11	Mandatory if applicable	
12	Complete BOQ	BOQ-12	Mandatory	
13	Eligibility Information	Eligibility-13	Mandatory	Additional Documents
14	Schedule of Requirement	Sch. Of Req.-14	Mandatory	
15	Manufacturers Authorization	Auth-15	Not Mandatory	
16	Technical Data Sheet	TDS-16	Mandatory	
17	Catalogues mentioned in Technical Specification	Catalogues-17	Mandatory	
18	Type Test Certificate	Certificate-18	Not Mandatory	
19	ISO certificates	ISO-19	Not Mandatory	

Note; Mandatory means the mentioned files shall be in e-submission and non-submission of such file shall be considered as non-responsive.

iv) For e-submission purpose the Bidder shall, at first, register in the e-procurement section of NEA Web site http://www.nea.org.np

v) After preparing all the required bidding documents in PDF scan files as specified in (ii) and (iii), the Bidder shall upload the PDF bid files and submit his complete bid online through e-procurement section of NEA website http://www.nea.org.np within the specified date and time.

The Employers address for the purpose of e-submission of bid:
The Employers address for the purpose of electronic Bid submission is e-procurement section of http://www.nea.org.np.
In case of e-submission of bid, the bidder shall submit his bid electronically in PDF files in the manner as specified above and additional submission of hard copy of "Original plus one copy of bid" is not mandatory.
In case both the electronic bid and original bid in hard copy are submitted to the Employer within the specified time period, the Bidder's electronic bid and original bid in hard copy will be accepted for evaluation provided the Bid price in Bill of Quantity Sheet is same. If there is any discrepancy in Bid price in Bill of Quantity between the electronic and original bid in hard copy it will be treated as two separate bids from one Bidder and hence, both the electronic bid and original bid in hard copy shall be disqualified, as per ITB Clause.
However, for electronically submitted bid in PDF files, the bidder shall be required to submit documents/clarifications as specified in ITB Clause.
The deadline for e-submission of bids shall be;

- Bidders shall be also explained about the details of e-submission procedures in the pre-bid meeting.
- The e-procurement system will accept the e-submission of bid during office hours from the date after publishing the notice and will automatically not allow the e-submission of bid after the deadline for submission of bid, as specified above.
- The standard time for e-submission is Nepalese standard time as set out in the server of NEA.
- In case of e-submission of bid, the Bidder shall submit his bid electronically in PDF files in the manner as specified in ITB Clause only, and submission of "original plus one copy" shall not be required before deadline for submission time as per ITB Clause.

Provision for Substitution or Modification or Withdrawal of Bid
When a bidder submits his bid in hard copy the e-procurement section does not allow the Bidder to submit his Substitution, or Modification, or Withdrawal through e-procurement section of NEA's Web site.
In case of e-submitted bid;

- Bidders may submit his Substitution or Modification or Withdrawal either in hard copy or through e-submission.
- For Substitution of Bid the Bidder shall follow similar steps as specified in ITB - Clause with a Substitution letter in PDF file.
- For Modification or Withdrawal of bid the Bidder is required to submit PDF scan copy of their Modification or Withdrawal letter and a written Power of Attorney of the signatory for Modification/ Withdrawal, duly signed by Authorized Representative/s of the Firm / all authorized Joint Venture partners.

Bid opening for e-submitted bid;

- Electronically submitted bid shall be opened first at the same time and date as specified in the ITB and IFB notice.

- The e-procurement system allows the Employer to download and open the e-submitted bid files from bidders only after the time for opening the bids.
- The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files (not complying the ITB Clauses) shall be considered incomplete and rejected for further bid evaluation.
- After opening of e-submitted bids files, all files shall be printed and recorded at the time of bid opening.

In case of "WITHDRAWAL" or "MODIFICATION" or "SUBSTITUTION" by the Bidder through e-submission, the e-submitted PDF files under "WITHDRAWAL" or "MODIFICATION" or "SUBSTITUTION" shall be opened and read out first. Bids for which acceptable notice of "WITHDRAWAL" or "SUBSTITUTION" has been submitted pursuant to ITB Clause shall not be opened.

Clarification of Bid

In case of e-submission of bid, the Bidder shall be required to submit the original completed Bid consisting of Forms of Bid, Qualification Information, Special Conditions of Contract, Bill of Quantities, Supplementary Information and other clarifications for verification purpose upon notification to do so from the Employer.

Examination of e-submitted Bids and Determination of Responsiveness

For a e-submitted bid to be substantially responsive the requirement as specified in the ITB Clauses shall be fulfilled.

Evaluation and Comparison of e-submitted Bids

In case of e-submitted bids, the Employer evaluates the bid based on the information as per electronically submitted bid files. For clarification/ verification purpose, the Employer may request the Bidder to submit documents/ clarifications as specified in ITB Clause.

In case, the Bidder could not substantiate or provide evidence to prove the information provided in e-submitted bid through documents/ clarifications as per ITB Clause, the bid shall not be considered for further evaluation and respective ITB Clause for forfeiture of bid security shall be applicable.

Steps to be followed by a Bidder to submit the electronic bid submission

1. Prepare the paper bid document
   - Either purchase the Bid Document directly from the Employer office or may download the bid document from the website and deposit the equivalent amount in the Revenue account of the employer as specified in the notice or/and Bid Document.
   - Fill the rates and amount in BOQ,
   - Fill the Bid Form,
   - Prepare the necessary copy of Company registration, VAT/PAN registration, Tax clearance certificate,
   - Prepare the necessary specific papers like Power of Attorney for bid signatory, Joint Venture agreement, if bidding in JV,

- Prepare summary of qualification information sheet (Financial turnover, Experience, Manpower, Equipment, Credit line, Litigation etc) in the specified format,
- Prepare the bid guarantee letter for the specified bid security amount and in the specified format,

2. Prepare the Electronic bid files in pdf format

Once prepared the above paper documents the bidder shall prepare the electronic bid files in pdf format as follows;

- Scan the above documents in pdf format, give the specific file name for each document,
- Prepare all scanned bid files in pdf format and save them in a separate folder in own computer to ease bid uploading process.

3. Electronic bid submission

- Once the electronic bid files are ready the Bidder shall connect to internet,
- Open the NEAs website www.nea.org.np and open E-procurement section,
- Register in the Bidders name and get User name and Password for Login,
- Confirm the registration by clicking the specified link in auto generated e-mail from NEAs web site,
- After confirmation for bidder's registration click Bidder, fill User name, Password and Login,
- Choose and click the specific tender notice for which the electronic bid files has been prepared,
- Click the Bid now button to submit the electronic bid files,
- Upload each specified electronic bid files by clicking the Upload button and select the respective bid files by Browsing,
- Once all the electronic bid files are uploaded, click the Submit the Bid button for final e-submission of electronic Bid,
- Once the e-submission is successfully completed the Bidder shall receive a auto generated confirmation e-mail from the NEAs website,
- Bidder to keep the conventional paper bid document, qualification information, and other related documents safe as the Buyer may seek the supporting bid documents and clarifications, as necessary during bid evaluation process.
- The Bidder shall submit the necessary supporting documents and clarifications (conventional bid document)

Section III. Sample Forms of Bid, Qualification Information, Letter of Acceptance and Agreement

Sample forms of Bid

We have examined the documents and offer to execute the Works in conformity with the Contract for the sum of ……. …….. (in words) ……(in figures) or such other sum as may be ascertained under the contract.

This bid is submitted in one original and one duplicate copy.

We accept the appointment of ***[_____name proposed in Bidding Data]*** as the Adjudicator

[or]

We do not accept the appointment of ***[name proposed in Bidding Data]*** as the Adjudicator, and propose instead that [name] be appointed as Adjudicator, whose daily fees and biographical data are attached.

This bid shall remain binding until _____ *[date]*. This bid and your written acceptance of it shall constitute a binding contract between us.

We understand that the Employer is not bound to accept the lowest or any offer received for the Works.

Signature_____ Date:_____

Name : _____

Designation: _____

Authorised to sign on behalf of (organisation name): _____

Office Stamp of the Organisation: _____

Eligibility Information

1. Eligibility Requirements:

All Bidders shall submit following documents as pre- requisites for eligibility:

- Registration Certificate ***[attach notarized copy]***
- Place of Registration ***[insert]***
- Principal place of Business ***[insert address]***
- Business Registration Licence ***[attach notarized copy]***
- VAT and PAN Registration Certificates ***[attach notarized copy]***
- Tax Clearance Certificate or Submissions of
- Tax Returns as specified in Bidding Data ***[attach notarized copies]***
- A written declaration made by the Bidder stating that the Bidder is not ineligible to participate in the Bid; has no conflict of interest in the proposed bid procurement proceedings and has not been punished for the profession or businesses related offence.
- Joint Venture Authorization/ Agreement (if any).
- Power of Attorney(Original)

2. Joint Ventures Requirements (if any)

2.1 Attach the power of attorney of the signatory (ies) of the bid authorising signature of the bid on behalf of the joint venture.

2.2 Attach the Agreement among all partners of the joint venture (and which is legally binding on all partners), which shows that

(a) All partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;

(b) One of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all partners of the joint venture; and

(c) Execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

(d) Each joint venture partners shall provide details as per information listed in 1 above.

Letter of Intention to Award

Date:

To: *[name and address of the Contractor]*

This is to notify you in accordance with the Instruction to Bidders that it is our intention to award the contract *[name of the Contract and identification number, as given in the* Contract Data *and/or SCC]* to you as your Bid price of the equivalent,[2]of *[amount in numbers and words in Nepalese Rupees]*, as corrected and modified [3]in accordance with the Instructions to Bidders, is determined to be substantially responsive and lowest evaluated Bid price.

Authorized Signature:_____

Name and Title of Signatory:_____

Name of Agency:_____

[2] *Delete "of the equivalent" if the Contract Price is expressed wholly in one currency.*
[3] *Delete "corrected and" or "and modified" if not applicable. See Note on Agreement, next page.*

Letter of Acceptance

[Letterhead of the Employer]

Date: _____

To: *[name and address of the contractor]*

This is to notify you that your bid dated *[date]* for execution of the *[name of the Contract and identification number, as given in the Invitation to Bid]* for the Contract Price of *[insert the amount in Nepalese Rupees in numbers and words]* as corrected and modified[4] in accordance with the Instructions to *Bidder*s is hereby accepted by our Agency.

You are hereby instructed to contact our office *[Office address]* to sign the formal agreement on *[date]* at *[time]*. *As per the Instructions to Bidders you are also required to submit Performance Security, as specified in the SCC, consisting of a Bank Guarantee in an approved format or cash deposit voucher in favour of the Employer in the Employer's Bank account as specified in the SCC.*

The Employer shall forfeit the bid security, in case you fail to furnish the Performance Security and to sign the contract.

Please convey your unconditional acceptance by signing on the original of this letter and submit the required Performance Security, at the time of formal agreement.

Authorised Signature: _____

Name: _____

Designation: _____

[4] *Delete "corrected and" or "and modified" if not applicable. See Notes on Standard Form of Agreement, next page.*

Agreement

This Agreement, made the *[day]* day of *[month]*, *[year]* between *[name and address of Employer]* (hereinafter called "the Employer") 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 for _____ *[insert the amount in Nepalese Rupees in numbers and words]*by the contractor for the execution and completion of such Works and the remedying of any defects therein.

Now this Agreement witnessed as follows:

1. In this Agreement, words and expressions 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 respects 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 of 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.

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 _____

[Addendum showing the corrections if any made during the bid evaluation should be attached with this agreement]

Section IV. General Conditions of Contract (GCC)

General Provisions

1.1 Definitions In the Contract as defined below, the words and expressions defined shall have the following meanings assigned to them, except where the context requires otherwise:

The Contract

1.1.1 "**Contract**" means the Agreement signed between the Employer and the contractor and the other documents listed in the Special Conditions of Contract (SCC).

1.1.2 "**Specification**" means the document as listed in the SCC, including Employer's requirements in respect of design to be carried out by the contractor, if any, and any variation to such document.

1.1.3 "**Drawings**" means the Employer's drawings of the Works as listed in the SCC, and any variation to such drawings.

1.1.4 "**Bill of Quantities**" means the priced and completed bill of quantities forming part of the Tender.

1.1.5 "**Bid or Tender**" means the contractor's priced offer to the Employer for the execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Acceptance.

1.1.6 "**Letter of Acceptance**" means the formal acceptance by the Employer of the **bid** or Tender.

Persons

1.1.7 "**Employer**" means the person named in the Agreement and the legal successors in title to this person, but not (except with the consent of the contractor) any assignee.

1.1.8 "**Contractor**" means the person named in the Agreement and the legal successors in title to this person, but not (except with the consent of the Employer) any assignee.

1.1.9 "**Party**" means either Employer or the contractor.

Date, Times and Periods

1.1.10 "**Commencement Date**" means the date 14 days after the date the Agreement comes into effect or any other date agreed between the Parties.

1.1.11 "**Day**" means a calendar day.

1.1.12 "**Time for Completion**" means the time for completing the Works as stated in the SCC (or as extended under Sub-Clause 7.3), calculated from the Commencement Date.

Money and Payments

1.1.13 "**Cost**" means all expenditure properly incurred (or to be incurred) by the contractor, whether on or off the Site, including overheads and similar charges, but does not include profit.

1.1.14 "**Contract Price**"is the price stated in the letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

1.1.15 "**Retention Money**" means the aggregate of all monies retained by the Employer pursuant to Sub-Clause 11.3.

Other Definitions

1.1.16 "**Contractor's Equipment**" means all apparatus, machinery, vehicles, facilities and other things required for the execution of the Works but does not include Materials or Plant.

1.1.17 "**Country**" means Nepal.

1.1.18 "**Employer's Liabilities**" means those matters listed in Sub-Clause 6.1.

1.1.19 "**Force Majeure**" means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.

1.1.20 "**Materials**" means things of all kinds (other than Plant) intended to form or forming part of the permanent work.

1.1.21 "**Plant**" means the machinery and apparatus intended to form or forming part of the Permanent Works.

1.1.22 "**Site**" means the places provided by the Employer where the Works are to be executed, and any other places specified in the Contract as forming part of the Site.

1.1.23 "**Variation**" is an instruction given by the Employer which varies the Works pursuant to Sub-Clause 10.1.

1.1.24 "**Works**" means all the work and design (if any) to be performed by the contractor including temporary work and any Variation.

1.1.25 "**Permanent Works**" means the permanent works to be executed (Including Plant) in accordance with the Contract.

1.1.26 "**Temporary Works**" means all temporary works of every kind (other than contractor's Equipment) required in or about the execution and completion of the Works and the remedying of any defects therein.

1.1.27 "**Adjudication**" means the procedure to be adopted by the contractor and the Employer in solving the dispute if it is not solved amicably pursuant to Sub-Clause 15.1.

1.2 Interpretation Words importing persons or parties shall include firms and organisations. Words importing singular or one gender shall include plural or the other gender where the context requires.

1.3 Priority of Documents The documents forming the Contract shall to be taken as mutually explanatory of one another. If an ambiguity or discrepancy is found in the documents, the Employer shall issue any necessary instructions to the contractor, and the priority of the documents shall be in accordance with the order as listed in the SCC.

1.4 Law The law of the Contract is stated in the SCC.

1.5 Communications Where provision is made for the giving or issue of any notice, instruction, or other communication by any person, unless otherwise specified such communication shall be written in the language stated in the SCC as shall not be unreasonably withheld or delayed.
If a notice given pursuant to Sub-Clause 1.5 fails to be

delivered due to failure to trace the address of the party then the notice shall be published as public notice in a National daily newspaper and when the notice is so published then the notice shall be considered to be delivered to the concerned party.

1.6 Statutory Obligations The contractor shall comply with the laws of the countries where activities are performed. The contractor shall give all notices and pay all fees and other charges in respect of the Works.

2. The Employer

2.1 Provision of Site The Employer shall provide the Site and right of access thereto at the times stated in the SCC.

2.2 Permits and Licenses The Employer shall, if requested by the contractor, assist him in applying for permits, licences or approvals which are required for the Works.

2.3 Employer's Instructions The contractor shall comply with all instructions given by the Employer in respect of the Works including the suspension of all or part of the Works.

2.4 Approvals No approval or consent or absence of comment by the Employer or the Employer's representative shall affect the contractor's obligations.

3. Employer's Representatives

3.1 Authorised Person One of the Employer's personnel shall have authority to act for him. This authorised person shall be as stated in the SCC, or as otherwise notified by the Employer to the contractor.

3.2 Employer's Representative The Employer may also appoint a firm or individual to carry out certain duties. The appointee may be named in the SCC, or notified by the Employer to the contractor from time to time. The Employer shall notify the contractor of the delegated duties and authority of this Employer's representative.

4. The Contractor

4.1 General Obligations The contractor shall carry out the Works properly and in accordance with the Contract. The contractor shall provide all supervision, labour, Materials, Plant and contractor's Equipment which may be required. All Materials and Plant on Site shall be deemed to be the property of the Employer.

During continuance of the of the contract, the contractor and his sub-contractors shall abide at all times by all labour laws, including child labour related enactments, and rules made there under.

A child who has not attained the age of fourteen (14) years shall not be employed in any work as a labourer.

4.2 Contractor's Representative

The contractor shall submit to the Employer for consent the name and particulars of the person authorised to receive instructions on behalf of the contractor.

4.3 Subcontracting

The contractor shall not subcontract the whole of the Works. The contractor shall not subcontract any part of the Works without the consent of the Employer.

4.4 Performance Security

As stated in the SCC, the Contractor shall deliver to the Employer no later than the date specified in the Letter of Acceptance.

5. Design by Contractor

5.1 Contractor's Design

The contractor shall carry out design to the extent specified, as referred to in the SCC. The contractor shall promptly submit to the Employer all designs prepared by him. Within 15 days of receipt, the Employer shall notify any comments or, if the design submitted is not in accordance with the Contract, shall reject it stating the reasons. The contractor shall not construct any element of the permanent work designed by him within 15 days after the design has been submitted to the Employer or where the design for that element has been rejected. Design that has been rejected shall be promptly amended and resubmitted. The contractor shall resubmit all designs commented on taking these comments into account as necessary.

5.2 Responsibility for Design

The contractor shall remain responsible for his tendered design and the design under this Clause, both of which shall be fit for the intended purposes defined in the Contract and he shall also remain responsible for any infringement of any patent or copyright in respect of the same. The Employer shall be responsible for the Specification and Drawings.

6. Employer's Liabilities

6.1 Employer's Liabilities

In this Contract, Employer's Liabilities mean:

a. war, hostilities (whether war be declared or not), invasion, act of foreign enemies, within the Country,

b. rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country,

c. riot, commotion or disorder by persons other than the contractor's personnel and other employees, affecting the Site and/or the Works,

d. ionising radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component of such an assembly, except to the extent to which the contractor may be responsible for the use of any radio-active material,

e. pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,

f. use or occupation by the Employer of any part of the Works, except as may be specified in the Contract,

g. design of any part of the Works by the Employer's personnel or by others for whom the Employer is responsible,

h. any operation of the forces of nature affecting the Site and/or the Works, which was unforeseeable or against which an experienced contractor could not reasonably have been expected to take precautions,

i. Force Majeure,

j. a suspension under Sub-Clause 2.3 unless it is attributable to the contractor's failure,

k. any failure of the Employer,

l. physical obstructions or physical conditions, other than climatic conditions, encountered on the Site during the performance of the Works, which obstructions or conditions were not reasonably foreseeable by an experienced contractor and which the contractor immediately notified to the Employer,

m. any delay or disruption caused by any Variation,

n. any change to the law of the Contract after the date of the contractor's offer as stated in the Agreement,

o. losses arising out of the Employer's right to have the permanent work executed on, over, under, in or through any land, and to occupy this land for the permanent work, and

p. damage which is an unavoidable result of the contractor's obligations to execute the Works and to remedy any defects.

7. Time for Completion

7.1 Execution of the Works The contractor shall commence the Works on the Commencement Date and shall proceed expeditiously and without delay and shall complete the Works within the Time for Completion.

7.2 Programme The contractor shall submit to the Employer a programme for the Works within the time stated in the SCC

7.3 Extension of Time Subject to Sub-Clause 10.3, the contractor shall be entitled to an extension to the Time for Completion if he is or shall be delayed by any of the Employer's Liabilities.
The contractor shall submit an application to the Employer for extension of time, stating the causes for delay, 7 days before the expiry of the Contract completion date.On receipt of an application from the contractor, the Employer shall consider all supporting details provided by the contractor and shall extend the Time for Completion as appropriate.

7.4 Liquidated Damages for Delay If the contractor fails to complete the Works within the Time for Completion, the contractor's only liability to the Employer for such failure shall be to pay the amount stated in the SCC for each day for which he fails to complete the Works. The total amount of Liquidated damages shall not exceed the amount stated in theSCC.

7.5 Bonus The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in theSCC for each day that the Completion is earlier than the date for Time of Completion. The Employer shall certify that the Works are complete, although they may not be due to be complete. The total amount of Bonus shall not exceed the amount stated in the SCC.

8. Taking-Over

8.1 Completion The contractor may notify the Employer when he considers that the Works are complete.

8.2 Taking-Over Notice The Employer shall notify the contractor when he considers that the contractor has completed the Works stating the date accordingly. Alternatively, the Employer may notify the contractor that the Works, although not fully complete, are

ready for taking over, stating the date accordingly.

The Employer shall take over the Works upon the issue of this notice. The contractor shall promptly complete any outstanding work and, subject to Clause 9, clear the Site.

9. Remedying Defects

9.1 Remedying Defects

The Employer may at any time prior to the expiry of the period stated in the SCC, notify the contractor of any defects or outstanding work. The contractor shall remedy at no cost to the Employer any defects due to the contractor's design, materials, plant or workmanship not being in accordance with the Contract.

The cost of remedying defects attributable to any other cause shall be valued as a Variation. Failure to remedy any defects or complete outstanding work within a reasonable time of the Employer's notice shall entitle the Employer to carry out all necessary work at the contractor's cost.

9.2 Uncovering and Testing

The Employer may give instruction as to the uncovering and/or testing of any work. Unless as a result of any uncovering and/or testing it is established that the contractor's design, materials, plant or workmanship are not in accordance with the Contract, the Contractor shall be paid for such uncovering and/or testing as a Variation in accordance with Sub-Clause 10.2.

10. Variations and Claims

10.1 Right to Vary

The Employer may instruct Variations to increase or decrease the quantity of work or addition of new items or substitution of items included in the contract, if determined necessary due to technical reason during implementation of the contract.

10.2 Valuation of Variations

Variations shall be valued as follows:

a. where appropriate, at rates in the Contract, or

b. in the absence of appropriate rates, the rates in the Contract shall be used as the basis for valuation,

c. at appropriate new rates, as may be agreed or which the Employer considers appropriate, or

d. if the Employer so instructs, at day work rates set out in the SCC for which the contractor shall keep records of hours of labour and contractor's Equipment, and of Materials used.

10.3 Early Warning

A Party shall notify the other as soon as he is aware of any circumstance which may delay or disrupt the Works, or which may give rise to a claim for additional payment. The contractor shall take all reasonable steps to minimise these effects.

The contractor's entitlement to extension to Time for Completion or additional payment shall be limited to the time and payment which would have been due if he had given prompt notice and has taken all reasonable steps.

10.4 Right to Claim

If the contractor incurs cost as a result of any of the Employer's Liabilities, the contractor shall be entitled to the amount of such cost. If as a result of any of the Employer's Liabilities, it is necessary to change the Works, this shall be dealt with as a Variation.

10.5 Variation and Claim Procedure

The contractor shall submit the Employer an itemised make-up of the value of Variations and claims within 30 days of the instruction or of the event giving rise to the claim. The Employer shall check and if possible agree the value. In the absence of agreement, the Employer shall determine the value.

11. Contract Price and Payment

11.1 Valuation of the Works

The Works shall be valued as provided for in theSCC,subject to Clause 10.

11.2 Monthly Statements

The contractor shall be entitled to be paid at monthly intervals:

a. the value of the Works executed,

b. the percentage stated in the SCC of the value of Materials and Plant delivered to the Site at a reasonable time,

subject to any additions or deductions which may be due.

The contractor shall submit each month to the Employer a statement showing the amounts to which he considers himself entitled.

11.3Interim Payments

Within 30 days of acceptance of each statement, the Employer shall pay to the contractor the amount shown in the contractor's statement less retention at the rate stated in the SCC, and less any amount for which the Employer has

specified his reasons for disagreement. The Employer shall not be bound by any sum previously considered by him to be due to the contractor.

11.4 Payment of First Half of Retention

One half of the retention and any such other retention shall be paid by the Employer to the contractor within 15 days upon expiry of Defects Liability Period.

11.5 Payment of Second Half of Retention

The remainder of the retention shall be paid by the Employer to the contractor within 15 days after submission of evidence document from the concerned Internal Revenue Office that the contractor has submitted his Income Returns.

11.6 Final Payment

Within 45 days of the latest of the expiry of the defects liability period, the contractor shall submit a final account to the Employer together with any documentation reasonably required to enable the Employer to ascertain the final contract value.

Within 30 days after the submission of this final account, the Employer shall pay to the contractor any amount due. If the Employer disagrees with any part of the contractor's final account, he shall specify his reasons for disagreement when making payment

11.7 Currency

Payment shall be in the currency stated in the SCC.

11.8 Delayed Payment

The contractor shall be entitled to interest at the rate stated in the SCC for each day the Employer fails to pay beyond the prescribed payment period.

11.9 Advance Payment

a. The Employer may make advance payment to the contractor of the amounts stated in the SCC within 15 days, 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 shall not be charged on the advance payment.

b. The contractor is to use the advance payment only to pay for Equipment, Plant, Materials and mobilization expenses required specifically for execution of the Contract. The contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Employer/

Engineer.

c. Unless otherwise stated in the SCC, the advance payment shall be repaid through percentage deductions from the monthly certified statements in accordance with this clause. Deductions shall commence in the next monthly statement in which the value of work executed exceeds thirty (30%) percent of the initial Contract Amount less provisional sums, day works and VAT. Deduction shall be made at the amortization rate of thirty (30%) percent of the amount of each monthly statement until such time as the advance payment has been repaid completely, provided that the advance payment shall be completely repaid prior to the end of 90 % of the approved contract period.

11.10. Price Adjustment

a.The Contract is subject to price adjustment only for construction material in accordance with this clause. If the Contract Agreement is concluded following the Invitation for National Level Bidding and after the signing of the Contract Agreement if the price of the construction materials stated in the SCC increase or decrease in an unexpected manner in excess of ten (10%) percent in comparison to the base price stated in the SCC, then the price adjustment for the increase or decrease of price of the construction material beyond 10% shall be made by applying the following formulas:

For unexpected increase in price

$$P = [R_1 - (R_0 \times 1{,}10)] \times Q$$

For unexpected decrease in price

$$P = [R_1 - (R_0 \times 0.90)] \times Q$$

Where:

" P" is price adjustment amount

" R_1" is the present price of the construction material

" R_0" is the base price of the construction material

" Q " is quantity of the construction materialconsumed in construction during the period of price adjustment consideration

b. The Price Adjustment amount pursuant to the clause will be limited to a maximum of 25% of the initial Contract Amount unless otherwise is specified in the SCC

c. The Price Adjustment provision pursuant to Clause 11.10 (a) shall not be applicable if the contract is not completed in time due to the delay caused by the contractor or the

contract is a Lump sum Contract or a Fixed Budget Contract.

11.11 Local Taxation & Value Added Tax

a. The prices tendered by the Contractor shall include all taxes that may be levied in accordance to the laws and regulations in being in Nepal on the date 30 days prior to the closing date for submissions of Bids on the Contractor's equipment, plant and materials acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from his responsibility to pay any tax that may be levied in Nepal on profits made by him in respect of the Contract.

b. The Contract is not exempted from value added tax. An amount specified in the schedule of taxes shall be paid by the Contractor in the concerned VAT office within time frame specified in VAT regulation.

12. Termination of Contract

12.1 Default by Contractor

If the contractor abandons the Works, refuses or fails to comply with a valid instruction of the Employer or fails to proceed expeditiously and without delay or is, despite a written complaint, in breach of the Contract, the Employer may give notice referring to this Sub-Clause and stating the default.

If the contractor has not taken all practicable steps to remedy the default within 15 days after the contractor's receipt of the Employer's notice, the Employer may, by a second notice given within a further 22 days, terminate the Contract. The Contractor shall then demobilize from the Site leaving behind Materials and Plant and any contractor's Equipment which the Employer instructs in the second notice to be used until the completion of the Works.

12.2 Default by Employer

If the Employer fails to pay in accordance with the Contract, or is, despite a written complaint, in breach of the Contract, the contractor may give notice referring to this Sub-Clause and stating the default. If the default is not remedied within 7 days after the Employer's receipt of this notice, the contractor may suspend the execution of all or parts of the Works.

If the default is not remedied within 30 days after the Employer's receipt of the contractor's notice, the contractor

may, by a second notice given within a further 22 days, terminate the Contract. The contractor shall then demobilise from the Site.

12.3 Insolvency

If a Party is declared insolvent under any applicable law, the other Party may by notice terminate the Contract immediately. The contractor shall then demobilise from the Site leaving behind, in the case of the contractor's insolvency, any contractor's Equipment which the Employer instructs in the notice is to be used until the completion of the Works.

12.4 Termination by Convenience

Notwithstanding the above, the Employer shall be entitled to terminate the Contract in public interest, at any time at the Employer's convenience, by giving notice of such termination to the contractor.

12.5 Payment upon Termination

After termination, the contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

a. any sums to which the contractor is entitled under Sub-Clause 10.4,

b. any sums to which the Employer is entitled,

c. if the Employer has terminated under Sub-Clause 12.1 or 12.3, the Employer shall be entitled to a sum equivalent to 20% of the value of those parts of the Works not executed at the date of the termination,

d. if the contractor has terminated under Sub-Clause 12.2 or 12.3, the contractor shall be entitled to the Cost of his suspension and demobilisation together with a sum equivalent to 10% of the value of those parts of the Works not executed at the date of termination

The net balance due shall be paid or repaid within 30days of the notice of termination.

13. Risk and Responsibility

13.1 Contractor's Care of the Works

The contractor shall take full responsibility for the care of the Works from the Commencement Date until the date of the Employer's notice under Sub-Clause 8.2. Responsibility shall then pass to the Employer. If any loss or damage occurs to the Works during the above period, the contractor shall rectify such loss or damage so that the Works conform to the Contract.

Unless the loss or damage occurs as a result of an Employer's Liability, the contractor shall indemnify the Employer, the Employer's contractors, agents and employees against all loss or damage happening to the Works and against all claims or expense arising out of the Works caused by a breach of the Contract, by negligence or by other default of the contractor, his agents or employees.

13.2 Force Majeure

If a Party is or shall be prevented from performing any of its obligations by Force Majeure, the Party affected shall notify the other Party immediately. If necessary, the contractor shall suspend the execution of the Works and, to the extent agreed with the Employer, demobilise the contractor's Equipment.

If the event continues for a period of 90 days, either Party may then give notice of termination which shall take effect 30 days after the giving of the notice.

After termination, the contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

a. any sums to which the contractor is entitled under Sub-Clause 10.4,

b. the Cost of his suspension and demobilisation,

c. any sums to which the Employer is entitled.

The net balance due shall be paid or repaid within 30 days of the notice of termination.

14. Insurance

14.1 Extent of Cover

The contractor shall, prior to commencing the Works, effect and thereafter maintain insurances in the joint names of the Parties:

a. for loss and damage to the Works, Materials, Plant and the contractor's Equipment,

b. for liability of both Parties for loss, damage, death or injury to third parties or their property arising out of the contractor's performance of the Contract, including the contractor's liability for damage to the Employer's property other than the Works, and

c. for liability of both Parties and of any Employer's

representative for death or injury to the contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their employees.

14.2 Arrangements All insurances shall conform with any requirements detailed in the SCC. The policies shall be issued by insurers and in terms approved by the Employer. The contractor shall provide the Employer with evidence that any required policy is in force and that the premiums have been paid.

All payments received from insurers relating to loss or damage to the Works shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

14.3 Failure to Insure If the contractor fails to effect or keep in force any of the insurances referred to in the previous Sub-Clauses, or fails to provide satisfactory evidence, policies or receipts, the Employer may, without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the contractor.

15. Resolution of Disputes

15.1 Adjudication If any dispute shall arises out of or in connection with the Contract, including any valuation or other decision of theEmployer, then the parties shall attempt to settle such dispute amicably within 15 days of the notification of the Employer's decision. However if the dispute is not settled amicably or no attempt is made to settle the dispute amicably then the dispute shall be referred by either Party to adjudication in accordance with the attached Rules of Adjudication ("The Rules"). The adjudicator shall be any person agreed by the Parties. In the event of disagreement, the adjudicator shall be appointed in accordance with the Rules.

15.2 Notice of Dissatisfaction If a Party is dissatisfied with the decision of the adjudicator or if no decision is given within the time set out in the Rules, the Party may give notice of dissatisfaction referring to this Sub-Clause within 30 days of receipt of the decision or the expiry of the time for the decision. If no notice of dissatisfaction is given within the specified time, the decision shall be final and binding on the Parties.

15.3 Arbitration

A dispute which has been the subject of a notice of dissatisfaction, as per sub clause 15.2 shall be referred to a single arbitrator under the rules specified in the SCC. In the absence of agreement, the arbitrator shall be designated by the appointing authority specified in the SCC. Any hearing shall be held at the place specified in the SCC and in the language referred to in Sub-Clause 1.5.

16.Conduct of Bidders

16.1 The Bidder shall be responsible to fulfil his obligations as per the requirement of the Contract Agreement, Bidding documents, GON/NEA's Procurement Act and Regulations.

16.2 The Bidder shall not carry out or cause to carryout the following acts with an intention to influence the implementation of the procurement process or the procurement agreement :

a. give or propose improper inducement directly or indirectly,

b. distortion or misrepresentation of facts

c. engaging or being involved in corrupt or fraudulent practice

d. interference in participation of other prospective bidders.

e. coercion or threatening directly or indirectly to cause harm to the person or the property of any person to be involved in the procurement proceedings,

f. collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Employer the benefit of open competitive bid price..

g. contacting the Employer with an intention to influence the Employer with regards to the bid or interference of any kind in examination and evaluation of the bids during the period after opening of bids up to the notification of award of contract

17. **Blacklisting Bidder**

17.1 Without prejudice to any other right of the Employer under this Contract, GON/NEA, Public Procurement Monitoring Officemay blacklist a bidder for his conduct up to three years on the following grounds and seriousness of the act committed by the bidder:

a. if it is proved that the bidder committed acts pursuant to the Sub - Clause 16.2,
b. if the bidder fails to sign an agreement pursuant to ITB Sub – Clause 27.4,
c. if it is proved later that the bidder/contractor had committed substantial defect in implementation of the contract or had not substantially fulfilled his obligations under the contract or the completed work is not of the specified quality as per the contract ,
d. if convicted by a court of law in a criminal offence which disqualifies the bidder from participating in the contract.
e. if it is proved that the contract agreement signed by the bidder was based on false or misrepresentation of bidder's qualification information,
f. other acts mentioned in the Bidding Data

17.2 A firm declared blacklisted and ineligible by the GON/NEA shall be ineligible to bid for a contract during the period of time determined by the PPMO.

Section V Special Conditions of Contract (SCC)

This SCC forms part of the Agreement

Item	**Clause**	**Data**
Documents forming the Contract listed in the order of priority	1.1.1	**Document** a. The Agreement b. Special Conditions of Contract c. General Conditions of Contract d. The Technical Specifications e. The Drawings f. The contractor's tendered design (if any) g. The Bill of Quantities h. ……...(if any)
Time for Completion	1.1.12	***120 calendar days after receiving work order***
Law of Contract	1.4	Applicable Law of Nepal
Language	1.5	English or Nepali
Provision of Site	2.1	On the commencement date
Authorised person	3.1	***Chief of Dhunche DCS***
Name and address of Employer's representative (if known)	3.2	***Chief of Dhunche DCS***
Performance security : Amount	4.4	5% of the contract price (Or as according to Public

Item	**Clause**	**Data**
Form	4.4	Procurement act) Attached in section X
Requirements for contractor's design (if any)	5.1	NA
Time for the submission of programme(QAP & Work Schedule)	7.2	Within 7 days of receiving work order
Liquidated Damages for Delay	7.4	0.05% of Contract Price per day up to a maximum of 10% of sum stated in the Agreement
Bonus or early completion (if any)	7.4	NA
Period for notifying defects	9.1	365 days after final completion period
Daywork rates (if any)	10.2 (e)	Approved District Rate of Rasuwa

Percentage of retention	11.3	5% of each Payment made to the Contractor
Currency of payment	11.7	Nepalese Rupees
Rate of interest	11.8	NA
Advance Payment	11.9	NA
Price Adjustment Base Price	11.10.	Construction Base Source Material Price (Ex-factory) I. Cement As mention in district rate of Rasuwa ii. Steel Reinforcement:As mention in district rate of Rasuwa iii.Brick Chimney :As mention in district rate of Rasuwa iv. Others as mention in Rasuwa district rate The base prices of the construction materials shall be taken as of 30 days before the deadline for submission of the Bid. For the purpose of calculation of price adjustment, the Ex-factory price of the same source shall be taken into consideration.

Insurances	14.2	**Type of Cover** The Works, Material, Plant And fees Contractor's Equipment Third Party injury or death to persons (including employer's personnel) Third party Damage to property(including employer's property) Workers	**Amount to Cover** The Sum stated in the Agreement plus 15% Full ReplacementCost Nrs. 1,000,000(one million) per person limited to 10 persons with unlimited no. of occurrences) Nrs. 1,000,000(one million) As per Labour Act of Nepal
Adjudication Arbitration	15.1 15.3	Appointing Authority: Nepal Council of Arbitration (NEPCA} Arbitration Rules : Nepal Council of Arbitration(NEPCA} Appointing Authority: Nepal Council of Arbitration (NEPCA} Place of Arbitration: Kathmandu Language: Nepali	

SECTION VI: TECHNICAL SPECIFICATION

A. SPECIFICATION FOR MATERIALS AND CIVIL WORKS

1. GENERAL NOTES FOR CONTRACTOR AND DEFINITIONS

1.1 The work shall be carried out according to the specifications whether specifically mentioned in it or not. No extra in any form shall be paid unless it is definitely stated as an item in the Bill of Quantities. Whenever the specifications are not given or ambiguous, the relevant Indian Standard and further amendments or decision of the Employer/Engineer shall be considered as final and binding.

1.2 The work shall be carried out simultaneously with the electrical, plumbing, sanitary and other services and in cooperation with the contractors of the above services. The work shall be carried on till it is completed satisfactorily along with the completion of essential portion of other services. The contractor shall keep the other contractors informed well in advance of the proposed program of the work so that the proposed work is not hindered. The contractor shall further cooperate with other contractors in respect of any facilities required by them e.g. making holes in shuttering for pipes, electric conduits, fan hooks etc. However, nothing extra shall be admissible to him for such reasonable assistance and facilities afforded to other contractors and the contractor shall be deemed to have taken factor into consideration while quoting his rates.

1.3 The work shall be related to the drawings which the contractor is presumed to have studied. Nothing extra will be paid for any item because of its shape, location or other difficult circumstances, even if the schedule makes no distinction as long as the item is shown in the drawing.

1.4 The source of materials stated in the specifications are those from which materials are generally available. However, materials not conforming to the specifications shall be rejected even if they come from the stated sources. The contractor should satisfy himself that sufficient quantity of material of acceptable specification is available from the stated or other sources.

Where terms "Resident Engineer/Employer", "Representative", "Contractor", "Works" etc. are used, they shall have the meaning defined in the Conditions of Contract or defined in the subsequent specification.

1.5 "Owner" shall mean,
NEA, Dhunche DCS, Rasuwa

1.6 The requirements of specifications for the materials shall be fulfilled by the Contractor without extra charge including transportation or any other taxes involved that are the item rates quoted shall be deemed to have taken these into account.

2. GENERAL OFFICIAL ACCESSORIES

2.1 OFFICE ACCOMMODATION

The contractor shall provide at his own expense adequate temporary accommodation and toilet facilities for his worker as well as working office space for his staffs and Employer/ Engineer on duty for construction supervision and keep the same in good order. This may be done to suit site conditions with the approval of the Employer / Engineer. The above mentioned temporary structures shall be removed on the completion of works at contractor's own cost.

2.2 BOARDS

A board of size of 1.5m x 1.0m shall be made and put at an approved place on the site. This board shall be painted in approved color with names of (a) The proposed construction and owner (b) The Contractor (c) The Engineer/Employer and (d) any other specialist consultant, as directed by the Employer/ Engineer. This shall be provided by the Employer/Engineer.

2.3 DRAWING, INSTRUCTION, MEASUREMENTS

All the work shall be done according to the drawings and instructions of the Employer/ Engineer and the Contractor shall arrange to test materials and/ or portions of the works at his own cost in order to prove their soundness and sufficiency. If after any such test and in the opinion of the Employer/ Engineer any work or portion of work is found to be defective or unsound, the Contractor shall pull down and re-execute the same at his own cost. Defective materials shall be removed from the site.

2.4 PREPARING AND CLEARING THE SITE

The site described and shown on the plans shall be cleared of all obstructions, loose stones and materials, rubbish of all kinds as well as brush-wood. All holes or hollows whether originally existing or produced shall be well rammed and leveled off as directed.

2.5 TREES

No trees shall be cut without prior permission. If any trees have to be cut, this shall form an extra item. For the purpose of the specification a tree shall be defined as girth whose circumference of the trunk at 300mm from the base is not less than 900mm.

2.6 MEASURING MATERIALS

Materials requiring measuring shall be measured separately in boxes of appropriate sizes before being mixed. They should be calibrated and marked with red if necessary in presence of the Employer/Engineer.

2.7 TEMPORARY PROTECTION

All trenches, walls, newly laid concrete or other work requiring protection from weather or accidental injury shall be protected by means of tarpaulin or in any other way so as to keep the work safe. Nothing extra shall be paid for this matter.

2.8 QUALITY OF WORK

Materials, tools and plants and workmanship shall be the best of several kinds obtainable in the market and as approved by the Employer/ Engineer.

2.9 LEAVE CLEAN

On completion, all works must be cleaned, rubbish removed and the works and land cleaned of surplus materials, debris and other accumulations and everything left in clean and orderly condition.

2.10 SAMPLES

Samples of each class of work required shall be submitted by the Contractor for the approval of the Employer/ Engineer and after such approval these samples shall be deposited at a place chosen by the Employer/ Engineer. The Contractor will be required to perform all works under the contract in accordance with these approved samples.

2.11 PROVISIONAL ITEMS

All provisional items in the schedule shall be carried out at the discretion of the Employer/Engineer, and may or may not form part of the contract. In case, the provisional items are carried out by the Contractor the rates shall be settled as for extra items as stated in the conditions of contract.

2.12 STORAGE

Safe, dry and proper storage shall be provided for all materials, particularly for cement. The capacity of the cement storage shall be equal to one-fourth of the total quantity to be used but may not exceed 200 tons at the site of work.

3. MATERIALS

3.1 GENERAL

The materials supplied and used in the works shall comply with the requirements of these Specifications. They shall be new, except as may be provided elsewhere in the Contract or permitted by the Employer/ Engineer in writing. The materials shall be manufactured, handled and used in a workmanlike manner to ensure completed work in accordance with the Contract. Where an Indian Standard is specified, the latest version of the standard quoted shall be considered to apply.

3.2 SOURCES

The source of materials should be selected and notified to the Employer/ Engineer and approved by him. The use of any one kind or class of material from more than one source is prohibited, except by written permission of the Employer/ Engineer. Such permission, if granted, will set forth the conditions under which the change may be made. The source or kind of materials shall not be changed at any time without written permission of the Employer/ Engineer. If the product from any source proves unacceptable at any time, the Contractor shall make such arrangements as may be necessary to assure acceptable material, either by alterations in plant operations or by a change of source. Claims for increased costs which may be occasioned by such alterations or changes will not be given consideration, unless the source of the unacceptable material was designated in the Contract as a source of material.

When any manufactured product, either new or used, is furnished by the owner, the location at which such material will be delivered to the Contractor will be designated in the contract. In such cases the contractor shall haul the materials

from the designated delivery point to point of use, and compensation for such hauling will be considered to be included in the Contract unit price for placing the materials in the finished work.

3.3 INSPECTION AND ACCEPTANCE OF MATERIALS

Final inspection and acceptance of materials will be made only at the site of the work. The Employer/ Engineer reserves the right to sample, inspect and test materials throughout the duration of the work, and to reject any materials which are found to be unsatisfactory at the time of use.

A preliminary inspection of materials may be made at the source for the convenience of the Contractor, but the presence of Employer/ Engineer at the source shall not relieve the Contractor of the responsibility of furnishing materials which comply with these specifications. The Employer/ Engineer shall have free entry at all times to those parts of any plant which concern the manufacture or production of the materials ordered.

3.4 SAMPLES AND TESTS

The Contractor shall submit sample of all materials for the approval of the Employer/ Engineer prior to commencement of work. The Contractor shall give immediate notification of the placing of orders for shipment of materials to permit testing. He shall furnish without charge all samples required and he shall afford such facilities as the Employer/ Engineer requires for collecting and forwarding such samples.

The Contractor shall not make use of or incorporate into the work the materials represented by the samples until the tests have been made and the materials are found to comply with the requirements of the specifications, except that any materials which have a satisfactory record of compliance with the Specifications may, at the discretion of the Employer/ Engineer, be used until the tests are completed. If the material fails to pass the tests, no further use thereof shall be made until the Contractor has taken steps satisfactory to the Employer/ Engineer to correct the deficiencies.

When required by the Employer/ Engineer preliminary samples of the character and quantity prescribed shall be submitted by the Contractor or producer for examination and shall be tested in accordance with the methods referred to in this Specification. The acceptance of a preliminary sample, however, shall not be construed as acceptance of materials from the same source delivered later. Only the materials actually delivered for the work will be considered, and their acceptance or rejection will be based on the results of the tests and inspections prescribed in these Specifications.

3.5 DEFECTIVE MATERIALS

All materials which do not conform to the requirements of the Contract will be rejected whether in place or not. They shall be removed immediately or taken away from the site immediately thereafter. No rejected material, the defects of which have been subsequently corrected, shall be used in the work unless approval in writing has been given by the Employer/ Engineer. Upon failure of the Contractor to comply promptly with any order of the Employer/ Engineer

given under this Clause, the Employer/ Engineer shall have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any monies due to the Contractor.

3.6 TRADE NAMES AND ALTERNATIVES

For convenience in designation in the Contract, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and his catalogue information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

a) The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and he shall furnish all information as required by the Employer/ Engineer. The Employer/ Engineer shall be the sole judge as to the quality and suitability of all alternative articles or materials and his decision shall be final.

b) Whenever the specifications permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the quality of the material or article proposed. Such request shall be made in ample time to permit approval without delaying the work.

3.7 FOREIGN MATERIALS

Materials which are manufactured, produced or fabricated outside Nepal shall be delivered to a distribution point in Nepal, unless otherwise required in these specifications or the special provisions, where they shall be retained for a sufficient period of time to permit inspection, sampling, and testing. The Contractor shall not be entitled to an extension of time for acts or events occurring outside Nepal and it shall be the Contractor's responsibility to deliver materials obtained from outside Nepal to the point of entry into Nepal in sufficient time to permit timely delivery to the job site. The Contractor shall provide the facilities and arrange for any testing required at his own cost. All testing by the Contractor shall be subject to witnessing by the Employer/ Engineer. The manufacturer, producer or fabricator of foreign material shall furnish to the Employer/Engineer a "Certificate of Compliance" with the specifications where required. In addition, certified mill test reports clearly identifiable to the lot of material shall be furnished where required in these specifications or otherwise requested by the Employer/ Engineer. Where structural materials requiring mill test reports are obtained from foreign manufacturers, such materials shall be furnished only from those foreign manufacturers who have previously established, to the satisfaction of the Employer/ Engineer, the sufficiency of their in-plant quality control, as deemed necessary by the Employer/ Engineer, to give satisfactory assurance of their ability to furnish material uniformly and consistently in conformance with these specifications. At the option of the Employer/Engineer, such sufficiency shall be established whether by submission of detailed written proof thereof or through in-plant inspection by the Employer/ Engineer.

3.8 CONTRACT DOCUMENTS

The Contractor is bound to execute and realize the Project works covered under these contract documents.

These contract documents to cover the said work shall along with that is normally understood therein comprise of

a) These Tender Documents.

b) All Tender and Working Drawings issued by the owner prepared by this Employer/ Engineer.

c) All site instructions made in the site order book or log book by the Employer/ Engineer.

d) All instructions given to the contractor by the Employer/ Engineer are in the form of sketches, directions along with requests for additional data, shop drawings, measurements details etc. from the contractor related of this work.

e) All shop drawings and samples approved by the Employer/ Engineer.

f) All manufacturers' specifications, data brochures information etc. approved by the Employer/ Engineer.

g) All aspects of work checked and approved by the Employer/ Engineer either on, or off, the project site.

h) All samples and guidelines that the Employer/ Engineer shall instruct the Contractor to follow. In particular covering all works where the contractor shall follow the existing designs, decoration, methods of construction, finishes proportions, elevations etc. of the existing building.

4. EXCAVATION OF EARTH FOR FOUNDATION AND OTHERS

4.1 LAYOUT AND SITE CLEARANCE

Laying and setting out of building, road, drains, retaining structures, pipe lines and septic tank and soak pit including site clearance by removal of grass, shrubs etc. maximum depth of excavation and filling 0.30m including dressing and levelling.

The Contractor is required to accurately lay out each infrastructure and other facilities as per the instructions and guidance of the Employer/Engineer and his representative at site. For this, the Contractor has to establish points for foundations of the structures as shown in the drawings by establishing reference points fairly permanent to enable regular confirmations by the Employer/Engineer for their accuracy. Ground levels have to be established near to each structure as well for common height control of the structures as per the specific instructions of the Employer/ Engineer.

The site described in plan shall be cleared of all grass, shrubs etc. The maximum depth of excavation or filling shall be 0.3m. The surplus excavated material shall be disposed within a lead of 200m as directed.

No payment shall be made separately for site clearance. The unit price of layout and site clearance shall be incorporated in the unit bid price of earthwork in excavation and filling..

4.2 EARTH WORK

Earthwork in excavation in trenches, foundation rafts etc. in soil including dressing of sides, ramming of bottom, lift up to 3.00m stacking of excavated materials at least 2m clear from the edge of excavation and then returning the stacked soil in 0.15m layer when required in plinth, under floors, sides of foundations, laying and depositing the layer by watering and ramming and then disposing of all surplus excavated soil as directed within a lead of 200m.

4.2.1 EXCAVATIONS

The foundation rafts etc. shall be excavated to the dimensions shown on the drawings and to depth, at which in the opinion of the Employer/ Engineer stratum of good hard soil is observed.

The excavation shall be carefully carried out to the levels, shapes and dimensions as shown in the drawings or as directed by the Employer/ Engineer to receive the concrete work. Should any of the excavation be taken down below the specified levels, the Contractor shall fill in such excavation at his own expense with concrete well rammed in position until it is brought up to the proper levels. Filling in with excavated materials will not be allowed for this purpose. No extra charge will be given for the lift of the excavated materials up to 2.0m. The excavated earth shall be placed at least 4.00m from the edge of foundation. The Contractor, at his own cost, shall dispose of all surplus excavated soil as directed by the Employer/ Engineer within a lead of 200m.

If foundations are made broader or longer than directed, the extra length and breadth shall be filled in after the foundations are built with earth rammed hard, by the Contractor at his own cost. The Contractor shall at his own expense and without extra charge, make provision for all extra excavation in slope, pumping, dredging or bailing out water and these trenches shall be kept free from water while the foundation work is in progress. The Contractor shall also at his own cost remove such portions of boulders or rocks, as are required to make the bottom of the trench horizontal and level. Nothing extra shall be admissible for pumping and/or bailing out water unless otherwise taken separately in the Bill of Quantities.

The trenches, rafts shall be inspected by the Employer/ Engineer before the concrete is laid therein, when the trench level shall be recorded. The filling in of side of trench excavations can be done in not more than 0.15m layers. Each layer shall be well watered and rammed hard before adding the next layer. Such fillings shall be brought up to the ground level without extra charge and shall form part of the item of excavation.

4.2.2 TIMBERING OF TRENCHES FOR FOUNDATION AND OTHER WORK

When foundations are to be taken deep, the sides of the trenches shall be protected by erecting timber shoring and strutting. Timbering shall be close or open depending on the nature of the soil and work. The arrangement of timbering, sizes and spacing of members shall be as directed by the Employer/ Engineer. Nothing extra on this account shall be admissible unless otherwise taken separately in the Bill of Quantities.

4.2.3 TRIMMING AND LEVELING

The bottom of all foundation should be trimmed and leveled in accordance with the drawings.

4.2.4 DISPOSAL

Disposal of the surplus excavated material shall be done within the site as directed by the Employer/ Engineer. Nothing extra shall be paid for such disposal within the lead of 200m. The excavated material shall be used for filling and terracing, if appropriate.

4.2.5 MEASUREMENT

Measurement shall be the product of the exact length and width of the lowest step of the footings according to the drawing or the Employer/ Engineer's instructions and the depth measured vertically. Where the ground is not level, average depth shall be taken. Rate shall be inclusive of all the works described above.

4.3 PLINTH FILLING/BACK FILLING

Filling in plinth with materials brought from outside in 0.15m layers under floors including watering, ramming consolidation and dressing complete.

a) Sand
b) Earth
c) Random rubble filling

The earth for filling shall be brought from within the site within a lead of 300m, to be approved by the Employer/Engineer, prior to filling. If the earth from within the site be of unsuitable quality, earth shall be brought from outside the site. The sand shall be either a pit sand or river sand as approved.

The work shall be done with earth/sand in 0.15m layers, each layer being well watered and rammed thoroughly.

4.3.1 MEASUREMENT

The measurement shall be taken for the consolidated thickness of earth/sand and paid in cubic meter. Pit or stack measurement shall not be done for payment. Quantity of earth fill under this item shall be calculated as the sum total of earth filling required in trenches around foundations, over raft, under floors or any other filling less the total quantity involved in foundation excavation. It shall

include excavation of earth/sand, transportation, screening if necessary, filling and the cost of labor etc. all complete.

5. CONCRETE WORK

5.1 Plain Cement Concrete (P.C.C.) WORKS

Providing and laying plain cement concrete excluding cost of formwork all complete as required

i) PCC 1:2:4 (1 cement: 2 sand: 4 stone aggregate)

5.1.1 MATERIALS

Cement, sand and stone aggregate shall conform to the specifications as under plain Cement Concrete work for RCC works.

5.1.2 MIXING

All proportions shall be by volume except cement which shall be proportioned by weight and as specified. Mixing shall be done in a mechanical mixer as per specifications of reinforced cement concrete work. However, in special cases, hand mixing may be allowed by the Employer/ Engineer when the following procedure shall be adopted. The several materials shall be accurately gauged in boxes and thoroughly mixed on a water tight platform of adequate size, being turned over at least thrice till the color is uniform and then twice wet. Water shall be added gradually and not more than necessary or specified by Employer/ Engineer that much concrete shall be mixed which can be used within half an hour. Each stack shall however be not larger than consuming one bag of cement. All such stacks shall be placed distinct from each other.

5.1.3 LAYING

Concrete shall be laid in horizontal layers of not more than 0.15m thick and gently rammed.

5.1.4 CURING

After laying, the concrete shall be kept wet for seven days constantly by ponding. If cast in hot weather, it shall be covered with gunny bags which shall be kept constantly wet. Other work on concrete shall not start until 3 days after laying of concrete. Concrete curing shall be done strictly for seven days. Any failure of keeping the concrete work in constant wet condition, the work will be done by Employer/ Engineer and cost of above work shall be deducted from Contractor's bill.

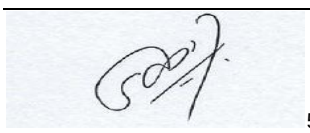
5.1.5 MEASUREMENT

Measurement shall be in cubic metre of exact length, breadth and depth. This shall be exclusive of any form work required to complete the item. Rate shall include all materials and labour.

6. Reinforced Cement Concrete (RCC) GENERAL

Providing and laying PCC for RCC work with stone aggregate 20mm and down gauge well graded excluding the cost of formwork and the cost of the reinforcement

i) M 15/20



6.1 MATERIALS

The materials used in the works shall be of the qualities and kinds specified. Materials delivered to the works shall be equal to the approved samples which shall be deposited with the Employer/ Engineer at least 30 days before it is required for use in work. The quantity of all necessary materials should be checked by the Employer/ Engineer for any casting. Delivery shall be made sufficiently in advance of constructional requirements to enable further samples to be selected and tested if so desired by the Employer/ Engineer. No material shall be used in the works until approved. Materials failing to comply with the approved samples and specification shall be immediately removed from the works at the Contractor's Cost.

6.1.1 WATER

Water used in mixing concrete shall be free from injurious amounts of oils, acids, alkalis, organic materials or other deleterious substances. It should be clean as drinking water.

6.1.2 CEMENT

The cement shall be ordinary Portland cement of approved brand and manufacture and shall comply in all respects with the I.S. 269-1967 for ordinary Portland Cement. It shall be delivered on the site in packages with an unbroken seal fixed by the manufacturer and plainly marked with the name of brand and the manufacture. It shall be stored in a dry place, in regular piles not exceeding six bags high and in such a manner that it will be efficiently protected from moisture and contamination, and that the consignments can be used up in the order in which they are received. Set cement shall be immediately removed from the work and replaced by the Contractor at his own expense. If desired, tests shall be made by taking samples of cement from stores or elsewhere from the works. The selection of samples and procedure for testing shall comply with appropriate I.S. specification.

6.1.3 AGGREGATE

All aggregates shall conform to I.S. 383 - 1970. Aggregate shall, where possible, be derived from a source that normally produces aggregate satisfactory for concrete, and if requested by the Employer/ Engineer, the Contractor shall supply evidence to this effect. If instructed to do so, the contractor shall supply samples of the aggregate for the purpose of making preliminary concrete test cubes as herein-after specified.

Aggregate shall consist of naturally occurring sand and gravel or stone crushed or uncrushed, or a combination thereof. They shall be hard, strong, dense, durable, clean and free from veins and adherent coating. As far as possible, flaky and elongated pieces should be avoided.

Aggregate shall not contain any harmful materials, such as iron pyrites, coal, mica, shale or similar laminated materials, clay, alkali, soft fragments, organic impurities etc. in such quantity as to affect the strength or durability of the

concrete or in addition to the above for reinforced concrete, any material which attack the reinforcement. Aggregate which are chemically reactive with the alkalis of cement are harmful, as cracking of concrete may take place. These aggregate shall be protected from spilling oils, mobiles, diesels over it on site.

6.1.4 FINE AGGREGATES (SAND)

The fine aggregate shall be natural sand or sand derived by crushing suitable gravel or stone and shall be free from coagulated lumps. Sand derived from a stone unsuitable for coarse aggregate shall not be used as the fine aggregate.

The fine aggregate shall conform to the requirements of I.S. 383 - 1970. Fine aggregate shall not contain more than 3% of material removable by decantation test, nor more than 1% dry lumps. The total of coal, clay lumps, shale, soft fragments and other deleterious substance shall not be more than 5%.

The percentage of clay lumps shall be determined by examining the various fractions that remain after the material has been tested for grading. Any particles that can be broken with fingers shall be classified as clay lumps and the total percentage of clay lumps shall be determined on the basis of the total original weight of the sample. The fine aggregate shall be well graded from fine to coarse and shall meet the following gradation requirements:

Table - 1 GRADATION FOR FINE AGGREGATE

Sieve designation Percentage by weight passing

Sieve Designation	10mm	No.4	No.16	No.30	No.50	No.100
Fine Aggregate	100	95-100	45-80	25-55	10-30	2-10

Blending will be permitted in order to meet the gradation requirements for the fine aggregate.

6.1.5 COARSE AGGREGATE

The coarse aggregate shall be crushed stone aggregate. The pieces of aggregates shall be angular. Friable, flaky and laminated pieces, mica, shale shall only be present in such quantities as not to affect adversely the strength and durability of the concrete as ascertained by tests on concrete cubes. After twenty four hours immersion in water, a previous dried sample shall not have gained in weight more than 5% and not more than 10% if it is to be used in plain concrete or elsewhere as described. The coarse aggregate shall conform to the requirements of I.S. 383 - 1970. The percentage of wear at 500 revolutions of Los Angeles Rattler Test shall not be more than 50%. The coarse aggregate shall meet the gradation of Table-2. Moreover it should confirm previous specification on coarse aggregate.

Table - 2 GRADATION FOR COARSE AGGREGATE.

Percentage by weight passing

Sieve Designation	50mm	40mm	25mm	20mm	10mm	No.4	No.8
40mm & down	100	90-100	20-25	0-15	0-5		
20mm & down			100	90-100	20-25	0-10	0-5

All R.C.C. work shall be carried out in strict accordance with this specification, I.S. Specifications and the working drawings. Any discrepancies in the dimensions on the drawings or any points not clear to the Contractor shall be brought to the notice of the Employer/ Engineer or clarified in advance before proceeding with the work.

The Contractor shall allow for all wastage in all materials. He shall also allow for all tests of concrete materials and if required produce manufacturer's certificate for cement and steel unless issued by the Owner.

1) All form work should be get checked for levelling and dimensions as well as all necessary supporting spouts from the Employer/ Engineer.

2) Only after getting the formwork checked, reinforcement should be placed properly as according to the drawing and detailing.

3) The date and time of any casting of concrete should be informed to the Engineer/Employer's 2 days in advance.

No concrete work shall be cast in the absence of the Employer/ Engineer. The Contractor shall personally check that both the formwork and reinforcement

have been correctly placed and fixed and satisfy himself that all work preparatory to casting is completely ready, before requesting the Employer/ Engineer for final inspection and approval.

6.1.6 ADMIXTURES

The use of admixtures to improve the workability is allowed only if there is proved evidence that neither the strength nor the other requisite qualities of concrete and/or steel accessories grout, etc. are impaired by their use. The use of admixtures containing calcium chloride, fluorides, nitrates and sulphates is prohibited. The decision of the Employer/ Engineer on all matters relating to the use of admixtures shall be final.

Admixtures shall be stored in suitable waterproof building. Any material which has deteriorated or which has been contaminated whether during transit to the site, at the site or otherwise, shall not be used in the work and shall be immediately removed from the site and replaced at the expense of the contractor.

6.1.7 MIX DESIGN

Concrete mixes for various specified design strengths shall be worked out by the Contractor. The mix proportions shall be selected to ensure that the workability of the fresh concrete is suitable for the conditions of handling and placing, so that after compaction it surrounds all reinforcement or tendons and ducts and completely fills the formwork. When the concrete is hardened its quality shall be such as to comply with the strength, durability and other requirements taking into account the conditions to which it will be exposed.

Any standard method of mix design may be used. For determining the "required average strength" the specified minimum shall be taken as one in ten. Unless the Contractor can prove from his past experience that he is capable of achieving a high degree of control a "FAIR" control should be assumed in the initial mix design. Before arriving at the average strength values due regard shall be given to the criteria acceptance of site concrete.

The mixes designed by the Contractor shall be used on works only after obtaining a written approval of the Employer/ Engineer. It is to be understood that the mix design shall be entirely the responsibility of the Contractor and such approval by the Employer/ Engineer shall not relieve him of his responsibility in respect thereof. Sand shall be of an approved quality, clean, sharp and free from injurious amount of dust, mica, shells, soft and flaky particles, shale, alkali, organic matter, loam or other deleterious substances. The sand shall be taken from a source approved by the Employer/Engineer and if required by him it shall be thoroughly washed, screened and graded by the contractor at no extra cost and to the satisfaction of the Employer/ Engineer.

The whole of the ingredients of the coarse aggregate shall consist of hard stones and shall contain no soft or elongated pieces. If it is considered necessary, the Employer/ Engineer may instruct it to be washed, screened and graded at no extra cost.

6.1.8 MEASUREMENT AND PROPORTIONING OF CONCRETE MATERIALS

The aggregate shall be measured by volume in a gauge box of correct and approved size based on the weight of the material or by other approved accurate means. The gauge box or other container shall be filled with the aggregate without compacting to a predetermined uniform depth, accurate allowance being made for bulking due to moisture content of the fine aggregate, if required on site.

The cement shall be measured by weight, one or more complete bags containing 50kg being used for a single batch of concrete and as the size of the mixer shall permit this to be done. One weighing machine shall be placed in standby condition on casting day and if the Employer/ Engineer feels that any concrete bag contains less than 50kg, he can measure the weight of it and will direct the Contractor to fulfil necessary weight of cement from contractor's side.

The normal proportions of cement and aggregate shall comply with the quantities specified below for the concrete described for each part of the work. The specified quantities shall be altered if instructed after examination of the aggregate materials in samples or in bulk in order to obtain the dense concrete with approved materials. Any such alterations within the range of 1 part of fine aggregate to $1\frac{1}{2}$ parts of coarse aggregate and 1 part of fine aggregate to $2\frac{1}{2}$ parts of coarse aggregate shall be made without any alteration in the charge made by the Contractor.

6.2 PROPERTIES OF CONCRETE

The minimum cement content of the mixture shall be as below in specified in clause no 6.2.1

6.2.1 CONCRETE PROPORTIONS

The minimum cement content of mixture shall be as below:

Grade	Minimum cement content in Kg/cu.m.
M 15	260

6.2.2 WATER CEMENT (W/C) RATIO

In general, w/c ratio of the concrete mix shall be kept minimum during casting. Generally one bag of cement concrete mix shall use 35.6 litres of water or as necessary. As moisture content of fine and coarse aggregate varies, for workability of concrete mix, the Employer/ Engineer may vary the water quantity and once the water quantity to be placed for one bag of cement concrete mix, is fixed by the Employer/ Engineer, the Contractor shall follow it strictly. As information to the Contractor, the Employer/ Engineer will depute one checking supervisor to the mixing batch, the quantity of water used shall be varied to suit the moisture content of the aggregate, and shall be just sufficient to produce a dense concrete, consistent with practical workability.

6.2.3 CONCRETE GRADE AND STRENGTH

The compressive strength (cube strength) for Portland cement concrete shall be in accordance with I.S. 456-1964.

Grade	Preliminary Test at 7 days	Work Test at 28 days
M 15	100 Kg/cm2	150 Kg/cm2

6.2.4 CONTROL OF CONCRETE

(i) Preliminary Tests

The Contractor shall be called upon to submit representative samples of materials to be used for concrete in order that they may be tested at a laboratory and the suitability of materials established. All expenses in connection with the above materials, tests shall be done by the Contractor.

(ii) Works Cube Tests

During the progress of the work, 15cm cubes shall be made as per I.S. 456-1964 as necessary and tested in accordance with I.S. 516-1959.

6.2.5 MEASUREMENT OF CONSISTENCY

The consistency shall be determined by making trial mixtures with dried aggregate. The consistency of the trial mixture of approved consistency shall be measured as instructed.

The slump of approved trial mixture shall be measured and this slump shall not be exceeded throughout all batches of concrete made from the same materials mixed in the same proportions as the trial mixtures and used in these parts of the works as instructed. In no case, the slump shall exceed 50mm. for concrete in slabs, or exceed 25 mm. for consolidated by mechanical vibration. The slump test shall be made on concrete actually being placed in the works at the commencement of each grade of concrete placing and such other times as instructed.

The apparatus used for the slump test shall be standard cone. When cone is filled, it shall be raised vertically clear of the concrete and the measurement of the slump shall be measured. Care shall be taken to prevent vibration of the sample being tested. If the Employer/ Engineer requires the use of other means for testing the consistency of the concrete it shall be done as instructed without any extra charge. For this standard I.S. Method shall be followed.

6.2.6 CONCRETE MIXING

The cement and aggregates shall be thoroughly mixed together in the specified proportions by volume or weight in a batch type mechanical mixer, unless another type of mixer is approved. The water shall be admitted to drum of the mixer only when all the cement and aggregates constituting one batch be in the drum. The concrete shall be mixed until the mixer is of uniform color and in no case for less than one minute. If the drum rotates at lower speeds, the minimum period shall be increased inversely proportional to that speed. The period of mixing shall be

measured from time when all the materials and water are in the drum. The entire contents of the drum shall be discharged before materials for the succeeding batch are fed into the drum. Materials spilled from the skip or other container shall not be used. No partly set or frozen concrete shall be used in the work. Partly set concrete shall not be remixed with the cement or aggregate of the next batch.

6.2.7 DISTRIBUTION OF CONCRETE

The concrete shall be distributed from the mixers to the position of placing in the works by approved means that do not cause segregation or otherwise impair the quality of the concrete. While transporting concrete over slabs and over beams by any suitable means, the contractor shall conform that the tied bar i.e. upper bar and lower bar shall not get distorted or displaced from its original place.

6.2.8 PREPARATIONS FOR PLACING CONCRETE

Before the concrete is placed, the shuttering shall be tied - up and any water accumulated therein shall be removed. All saw dust, chips, nails, and other debris shall be washed out or otherwise removed from within the formwork. The reinforcement shall then be inspected for accuracy of fixing. Immediately before placing the concrete, the formwork shall, except in frosty weather, be well wetted and inspection opening closed.

6.2.9 PLACING CONCRETE

The interval between adding the water to the dry mix and completion of the concrete placing operation shall not exceed 20 minutes nor, when an approved admixture that accelerates the initial setting of the cement be used, exceed ten minutes or as directed by the Employer/ Engineer.

Except where otherwise approved for slabs and large sections concrete shall be placed in the formwork by shovels or other approved implements and shall not be dropped from height more than 1.5 m nor handled in a manner to cause segregation. Accumulations of hardened concrete dropping on the reinforcement shall be avoided. Concrete shall be sorted along the formwork to that position.

Each layer of concrete while being placed shall be compacted by approved methods of ramming or mechanical vibrations to form a dense surface free from honey combing and tolerably free from water marks and air holes or other blemishes. The concrete shall be tamped against the face of the formwork so as to produce dense smooth surface. The number and type of mechanical vibrations shall be approved before compacting by vibration. Placing and compaction of concrete shall be done in such a manner as not to disturb concrete already placed, and reinforcement projecting from concrete already placed shall not be vibrated or jarred. For concreting reinforced concrete walls and other structures having least lateral dimensions of 13mm. or under, each layer of concrete while being placed shall be properly compacted by approved methods of mechanical vibrations produced by internal or external mechanical vibration.

The laying of concrete over slabs should be uniform thick of required thickness after vibration. This can be confirmed by dipping wooden pegs of required length. The level of all slabs should be in level unless otherwise specified and directed by the Employer/ Engineer. If required, the Employer/ Engineer will check the thickness and give order to the contractor to fill up the newly vibrated

slab concrete surface. Any slab thickness after construction, if found less thickness than specified, the contractor will be responsible for above job.

Any water accumulating on the surface of the newly placed concrete shall be removed by approved means and no further concrete shall be placed thereon until such water is removed. No fresh concrete shall be brought into contact with the concrete containing cement of different type. Unless otherwise approved or instructed, concrete shall be placed in a single operation to the full depth of slabs, beams, and members similar thereto and shall be placed in horizontal layers not exceeding 0.50m deep in walls, columns until completion of the part of the work between construction joints as specified hereafter or of a part of approved extent. At the completion of a specified or approved part of a construction, joints of the form and in the position herein after specified shall be made. If a temporary cessation of concrete placing be unavoidable elsewhere, a construction joint shall likewise be made.

6.3 PLACING CONCRETE IN EXTREME WEATHER

Work shall be done according to clause 20.1.6 of I.S. 456- 1964.

6.4 VIBRATION

6.4.1 APPEARANCE

The concrete that is to be compacted by vibration should appear anything from earth dry to slightly glistening. The mix should have the appearance of lacking in fines.

6.4.2 VIBRATORS

The contractor must use vibrator on beams and slabs to compact the newly laid concrete. Generally two types of vibrator shall be used.

a) NEEDLE OR IMMERSION TYPE OF VIBRATOR

Casting fall beams and columns shall be compacted by means of needle type of vibrator. 4" dia needle type vibrator shall be used over beam section more than 350mm x 400mm and rest of section need only 2" dia needle type vibrator.

b) FLAT BOTTOM VIBRATOR FOR SLABS

The contractor shall require flat bottom type of vibrator to compact all concrete over slabs. No immersion type of vibrator will be allowed to compact the concrete over slab.

Moreover, the contractor shall require at least two number of vibrator for one casting and other should kept in standby position. In case vibrator got damaged or not in working condition during casting, the vibrator shall be immediately replaced. If the contractor shall fail to replace another vibrator during casting, no further casting of concrete will be permitted. The contractor shall in that case, immediately remove the remaining concrete mix from the site of work.

6.4.3 PLACING

Segregation is likely to take place when the concrete is tipped into the form work and this should be avoided. The concrete mix should not contain surplus water and sand which will develop segregation under influence of vibratory compaction. The distribution of new concrete should be uniform over the whole section and the surface kept horizontal all the time thus ensuring the movement of concrete is downward only. Vibrators shall not be used as a spreading or distributing agent.

The vibrators shall be of rotary out of balance immersion type or the electro-magnetic type and operate at a frequency of not less than 4,000 cycles per minute. The vibration shall be of such a power - input as to produce an acceleration of 1 to 3 m/sec in the mass of the compacted concrete. The vibrators shall be provided for continuous operation.

6.4.4 DISPOSITION OF VIBRATORS

Internal vibrators shall be disposed within the mix, when placed, so as to maintain the whole of the concrete under treatment in an adequate state of agitation such that de-aeration and effective compaction may be attained at a rate commensurate with the supply of concrete from the mixers. Insertion of vibrators at about 450mm centre to centre is considered sufficient.

6.4.5 PERIOD OF VIBRATION

Vibration shall continue during the whole period occupied by placing the concrete, the vibration being adjusted so that the centre of vibration approximates to centre of the mass being compacted at the time of placing. The concrete should not be over vibrated and the period of insertion of internal vibrator should be about 15 seconds at any point.

6.4.6 COMPACTNESS

The concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate so as to form a glistening and even surface except for slight irregularities where the coarse aggregate breaks this smooth surface. When this condition has been attained, the vibrators shall be withdrawn slowly.

The vibrator must not be placed against the steel or the formwork, the minimum distance being 8 mm. It must be placed in such a position that formwork, reinforcement and recently laid concrete are subjected to the minimum amount of vibration.

6.4.7 CONSTRUCTION JOINTS

Construction joints shall be made in the positions hereinafter specified or elsewhere as approved. Such joints shall be truly vertical or horizontal as the case may be, except that in an inclined or curved members the joint shall be strictly at right angles to the axis of the member.

Construction joints shall be made horizontally at the top of the foundations and horizontally 8 mm. below the lowest beam soffit at the head of columns. Concrete in the ribs and slabs of small tee, all beams shall be placed in one operation, but, for large beams concrete in the rib upto a level 2.5 mm. below the slab soffit shall be placed first. Concrete in haunches or splays on the beams or braces and concrete in the head of adjoining portion of the columns shall be placed at the same time as that in the beams or braces. Concrete in splays at the junction of walls and slabs shall be placed at the same time as that in the slab. Construction joints in the length of a beam shall be avoided where practicable, but where joints are unavoidable they shall be made as previously approved by the Employer/ Engineer. Construction joints in slabs shall be made parallel to the main reinforcement, and where required at right angles to the main reinforcement, they shall be made at a place previously approved by the Employer/ Engineer.

Before placing new concrete against concrete already set, the face of the old concrete shall be cleaned and scum removed. The face shall be roughened and any loose aggregate removed there from. Immediately before placing the new concrete the face of the old concrete shall be thoroughly wetted and a coating of neat cement grout applied. The new concrete shall be well rammed against the prepared face before the grout sets. Construction joints will not be paid separately.

6.4.8 PROTECTION AND CURING OF CONCRETE

Immediately after placing or finishing, concrete surface not covered by forms shall be protected from loss of surface moisture for at least seven days when the average daily temperature is at least 21°C, where Portland cement has been used. Protection from loss of surface water shall be done by any of the following methods where applicable to the type of work involved:

i) By water covering.
ii) By covering of surfaces with water impervious paper.
iii) By application of approved impervious membrane.

Surfaces from which forms have been removed before the curing period has elapsed shall be protected as specified for surfaces not covered by forms. Membrane curing shall not be used on surfaces required to receive additional concrete or concrete fill, or on cement finish coats that are to receive dust proofing or hardening treatments, or during hot weather.

Water curing shall be performed by keeping the concrete surface wet by ponding, by continuous spraying or by covering the surface with an approved water-saturated covering such as 2.5mm of sand or sawdust, or by one or more layers of burlap. The exposed concrete surfaces shall be saturated with water throughout the full stipulated curing period. Where forms remain in place during the curing period, they shall be kept sufficiently wetted with clean water to reduce cracks and to prevent joints from opening in the forms.

The impervious membrane curing compound shall be an approved non-bituminous, colourless, liquid sealing compound in atomized form so as to preserve the natural color of the concrete. The curing compound shall be applied as soon as surface water has disappeared from concrete surfaces with approved pressure spraying equipment in accordance with the manufacturer's directions and in sufficient thickness to form an effective water seal. No compounds shall be used which will adversely affect the subsequent installation of finished flooring.

Joints of sheet membrane used for curing shall be lapped at least 150mm and sealed with water proof tape as recommended by the manufacturer. Polyethylene sheet shall be considered the water-impervious paper for purposes of interpretation of this item. No liquid curing compound may be used without specific written approval of the Employer/ Engineer regarding type, manufacturer, location and extent of use and application procedures.

6.4.9 FINISHES

The concrete surface shall in general be smooth finish. However, immediately after stripping form work, minor defects and honey combed areas shall be patched and holes filled before the concrete is thoroughly dry, patch areas shall be chipped away to 2.5mm depth, with regular edges perpendicular to the surface. Area to be patched shall be thoroughly wet including the areas at least 150mm. wide entirely surrounding them, just prior to placing the patching mortar. Mortar shall be of the same material and proportions as used for the concrete, without coarse aggregate. A sufficient quantity of white cement shall be substituted for part of the ordinary cement so that the patching mortar, when dry, will match the surrounding concrete. Water in the mix shall be kept to a

minimum and mortar shall be re-tempered without adding water and shall be allowed to stand for one hour prior to use during which time it shall be mixed to prevent setting. The mortar shall be thoroughly compacted into place, screeded so as to leave the patch slightly higher than surrounding surfaces, left undisturbed for one to two hours to permit initial shrinkage and finished to match the adjoining work. Where patches exceed 2.5mm deep, they shall be trimmed and wet as specified, after which the opening shall be filled to within 2.5mm of the surface. After sufficient shrinkage time has elapsed, the patching shall proceed as described above.
Patches shall be kept wet for five days. Tie holes left by the withdrawal of rods, or holes left by removal of ends of ties shall be filled solidly with mortar. For holes passing entirely through the wall, plunger-type grease gun or other device to force mortar through the wall, starting at the back face, shall be used. When a hole is completely filled, excess mortar shall be struck off with a cloth flush with the surface. Holes not passing entirely through walls shall be filled solidly with mortar. Any excess mortar shall be struck off with a cloth on the wall surface. The surface of non-shuttered faces concrete work other than slabs shall be smoothed with a wooden float (or if approved with a steel trowel) to give a finish equal to that of the rubbed down shuttered faces. Concealed concrete faces shall be left as it is except that honeycombed surfaces shall be made good.

The top faces of slabs not intended to be surfaced shall be levelled and floated to a smooth finish at the levels or falls shown on the drawings or elsewhere.

The floating shall not be executed to the extent of bringing excess fine material to the surface. Ribbed surfaces of slabs shall, where instructed, be formed at the time of taming and leveling. Indentation in slab or stair surfaces shall be formed by approved implements giving the depth and patterns instructed. The top faces of slabs intended to be covered with screed, granolithic or similar surfacing shall be left with a spade finish.

The soffits of slabs and faces of walls intended to be rendered shall be roughened by approved means to form a key. Concrete surfaces to take finishes other than those specifically referred to herein shall be prepared in an approved manner to suit the finish as instructed.

6.5 TEST ON STRUCTURE

The Employer/ Engineer shall instruct that a loading test be made on the works or any part thereof if in his opinion such a test be deemed necessary for one or more of the following reasons:

a) The site - made concrete test cubes failing to attain the specified strength.
b) Over - loading during construction of the works or part thereof.
c) The shuttering being prematurely removed.
d) Concrete improperly cured.
e) Any other circumstances attributable to alleged negligence on the part of the Contractor which in the opinion of the Employer/ Engineer may result in the works or part thereof being less than the expected strength.
f) Any reason other than the foregoing.

The test shall be made at the contractor's own cost. If the test be instructed to be made for one or more of the reasons from (a) to (e) inclusive, and If the test be instructed to be made for the reason (f), the contractor shall make the test and shall be reimbursed for all cost relating thereof irrespective of the result of the test.

For the purpose of the load test on floors, roofs and similar structures and their supports, the test load shall be equivalent to 1 and 2/3 times the superimposed load for which the works or part thereof to be tested have been designed. The test load shall not be applied within 90 days (or 28 days if rapid hardening Portland cement be used) of the completing of placing of the concrete in the part of the works to be tested, and the latter shall not be supported during the test by shuttering or other non permanent support. Means shall be taken to ensure that in the event of a failure under the test temporary support of the loaded member shall be immediately available. The test shall proceed strictly as instructed. For the loading test on floors, roofs or similar structures the result shall be deemed satisfactory if upon removal of the test load, the residual deflection does not exceed one - quarter of the maximum deflection after 24 hours loading. If the residual deflection exceeds this amount the test loading shall be repeated, and the result shall be deemed to be satisfactory if the residual deflection after removal of the second test load does not exceed one-quarter of the maximum deflection occurring during the second test.

If the result of the loading test be not satisfactory, the Employer/ Engineer shall instruct that part of the works concerned shall be taken down or removed and reconstructed to comply with this specification, or that such other remedial measures shall be taken as to make the works secure. If the test be instructed to be made for one or more of the reasons (a) to (e) inclusive as herein before specified, the Contractor shall take down or remove and reconstruct the defective work or shall take the remedial measures instructed at his own cost.

6.5.1 MEASUREMENT

In calculating the contents of any R.C.C. member, for measurement proposes the dimensions adopted shall be structural concrete members exclusive of any finish,

6.5.1.1 RAFT SLABS AND BEAMS

It shall be measured in cu.m. of work done as per drawing. Measurement shall be done for the raft concrete below the column junction to the raft slab/beam. Nothing extra shall be paid for any odd size or shapes.

6.5.1.2 BEAMS

Measurement shall be between R.C.C. columns or resting on walls cubic metre of the work done as shown on the drawing. The depth shall be taken from the bottom of the stem to the top of the slab or projections if any. Lintels when connected to main RCC structure shall be measured as beams.

6.5.1.3 COLUMNS

These shall be measured in cu.m. of work done according to the drawings from top of the footing or raft slab to the top of slab in case of ground floor

and from top of slab to the top of slab for all other floors. Unless specified otherwise nothing extra shall be admissible for any odd size and for any special section and shape of column i.e. square, rectangular, round, elliptical etc. and laid at any angle as may be shown on drawings.

6.5.1.4 SLABS

These shall be measured in cubic metre of the work done as per drawings. These shall be measured from beam to beam, wall to wall or beam to wall including bearing part on the wall. Unless otherwise specified in the schedule nothing extra shall be admissible for slabs laid to slope, canopy slabs or those of any shape or section any cantilevered part of any projections small or big beyond the bearing beam or wall as may be shown on drawings or the slabs sunk for lavatory. Plaster shall be paid for separately.

6.5.1.5 WALLS

These shall be measured from end of slab/column/beam, termed wall. It shall be paid in cubic metre excluding the finish.

6.5.1.6 LINTELS

All lintels spanning over independent openings unrelated to main RCC structure shall be measured under lintels, in cubic metre of the work done according to drawing. Width of the lintels shall be taken according to wall thickness specified unless set back or projected from wall as shown on the drawing. Unless otherwise described or shown on the drawings, bearing over the openings shall be depth of the lintel or 150mm whichever is higher.

6.5.1.7 FACIA AND PARAPETS

These shall be measured in cu.m. of the concrete work down as per design, drawing, exclusive of finishing. For sills, all projection up to 100mm beyond the wall on either side shall be made without any extra charge and these shall be inclusive of forming pattern of drip mould.

6.5.1.8 WATER TANK

These shall be measured in cu.m. of concrete work done for all the slab, walls etc. forming the water tank. Nothing extra shall be allowed for its shape, size and location. It shall be paid in cubic metre of the concrete work.

6.5.1.9 COLUMN FOOTINGS

These shall be measured in cu.m. of the concrete work done as per design, drawing. Unless specified otherwise, nothing extra shall be admissible for any particular shape of the footing.

7. REINFORCEMENT

7.1 INSTALLMENT OF REINFORCEMENT STEEL

Supplying and fixing tor steel reinforcement in RCC work including bending, binding with GI wire, placing in position including the cost of binding wire, as per drawing

Reinforcement shall be free from pitting due to corrosion, loose rust, mill scale, paint, oil, grease, adhering earth, or other materials that may impair the bond

between the concrete and the reinforcement or that may in the opinion of the Employer/ Engineer cause corrosion of the reinforcement or disintegration of the concrete.

7.2 BAR REINFORCEMENT

Bar reinforcement described as "TOR steel" shall be hot rolled deformed bars or cold twisted steel bars. With respect to manufacture, quality, physical properties and related requirements, reinforcement of the fore-going descriptions shall comply with appropriate parts of IS Standards Nos. 432-1966, 1139-1966 and IS 1786-1966 for mild steel and tor steel respectively.

7.3 CERTIFICATES AND TESTS FOR REINFORCEMENT

For each consignment of bar reinforcement used in the works, the Contractor shall, if required, supply a certificate giving the ultimate strength, yield stress and elongation and the result of the cold bend test for each type and each size of bar. Tests for the purpose of obtaining the information shall conform to relevant I.S. specification.

The reinforcements supplied for which the Manufacturer's test sheets or other records are not available, or where in the opinion of the Employer/ Engineer has been subject to corrosion or other bad effects, the Employer/ Engineer shall select as many test pieces as he deems necessary, and the Contractor shall supply and deliver the test pieces free of cost without reimbursement and pay the cost of preparing and testing them as well. This test shall be performed in presence of the Employer/ Engineer.

7.4 DIMENSIONS OF REINFORCEMENT

The size of reinforcement bar described in the working drawings or elsewhere shall be the minimum and the rolling margin and other tolerances shall be wholly above this size. The length of a reinforcement bar shall not be less than the length on the drawing or elsewhere and shall not be more than 50 mm in excess of that length. Bar bending schedule shall be prepared by the Contractor and submitted for approval of the Employer/ Engineer. Such schedules shall be prepared based on reinforcement details, prior to the execution of the work. Nothing extra shall be paid for this.

7.5 BENDING REINFORCEMENT

Reinforcement bars shall be bent by approved means producing a gradual and even motion. Bars shall comply with the dimensions described in the drawings. Overall dimensions of bent or internal dimensions of bending or the like shall be within a tolerance of 30mm Any discrepancies or inaccuracies found by the Contractor in the drawings or other documents shall be immediately reported to the Employer/ Engineer whose interpretation and requirements relating there to shall be accepted. The internal radius of bends shall be not less than twice the size of the bars unless described to the contrary on the bending lists or elsewhere in the drawing. Hooks and other anchorage bends for tor steel shall be bent to an internal radius of the twice diameter of the bar. This internal radius of the bends of corners of binders or stirrups or links shall be half.

7.6 FIXING REINFORCEMENT

Reinforcement shall be accurately fixed and by approved means maintained in the position described in the drawings. Bars intended to be in contact shall be securely wired together at all such points with 16 gauge soft iron tying wire. Binders, stirrups and links shall tightly embrace the bars with which they are intended to be in contact and shall be securely wired or, if approved, spot welded thereof.

Reinforcement shall be lapped, joined or spliced only at the positions described. Splices and the like found to be necessary elsewhere shall be formed only if and as instructed. Lapping shall be provided as shown in the drawing and as permitted. Where practicable bars in each member shall be assembled and fixed in the form of a rigid cage or skeleton before placing in the moulds or formwork. For this, all lapping bar on beams and slabs shall be scattered i.e. as far as possible minimum number of laps shall be permitted in one section of slab and only one lap will be permitted at one section in case of beams. In case of columns the lapping of bar shall be permitted only at the centre zone of column.

7.7 LAPPING LENGTH

a) In case of beams and slabs, lapping length shall be 57 dia. of designed bar.
b) In case of columns the lapping length shall be 45 dia. of the designed bar.

Immediately before concreting, the reinforcement shall be checked for position, cleanliness, freedom from rust or retarding liquid. Means shall be taken to ensure that reinforcement remains correctly in position with required cover during the placing and compacting of the concrete.

Reinforcement projecting from work being concreted or already concreted shall not be bent out or its correct position for any reason unless approved and shall be protected from deformation or other damage. Reinforcement left projecting for bending with future extensions shall be thoroughly coated with cement grout wash or encased in concrete or other-wise protected from corrosion as instructed.

7.8 COVER OF CONCRETE AND SPACING OF BARS

Unless otherwise described, the clear cover of concrete to the reinforcement shall be as follows:

7.8.1 Horizontal, Vertical or Inclined Slabs

15mm or the size of the bars whichever is greater.

7.8.2 Lintels

20mm or the size of the bar whichever is greater.

7.8.3 Beams

25mm or the size of the main bars whichever is greater. Binders and the like 15mm minimum.

7.8.4 Columns

Cover for main bars for columns not exceeding 20 mm diameter shall be 25mm and the main bars in columns exceeding 20mm diameter shall be 40 mm or the size of the main bars whichever is greater, 15mm minimum for rectangular binders or links or helical binding.

7.9 CHAIRS AND SUPPORTS FOR REINFORCING BARS

Chairs of appropriate depth in suitable form shall be installed on all top bars in case of slab. The shape of chair shall be checked by the Employer/ Engineer. The spacing for slab top bar chairs will be such that during casting time, the reinforcement shall not get disturbed.

7.10 CONCRETE CHAIR BLOCK FOR BOTTOM BARS

All bottom bar in slabs shall be raised as accordance with cover for concrete by means of small concrete blocks tied with binding wires. These blocks shall be placed at sufficient intervals during casting time, to maintain the cover for reinforcement.

In case of beams, the bottom blocks as well as side reinforcement shall be provided with concrete chair blocks so that the reinforcement shall not get disturbed during casting.

7.11 MEASUREMENT

For the purpose of ascertaining payments due to the Contractor the basis of measurements of bar or wire reinforcement used in the works shall be the calculated weight in kg which shall be computed from the sizes and lengths of the bars or wires described on the working drawings or elsewhere. No allowance in the weight shall be made for cutting to waste, rolling margin, extra length, lapping of bars or other tolerances. Nothing extra, whatsoever shall be admissible on bars 12 mm and below, rolled by the Contractor directly from the market on actual weight basis. The Contractor is deemed to have taken this factor into consideration and quoted his rate accordingly in the tender. The Contractor's rate for unit weight of bar reinforcement shall be deemed to include all allowances omitted in calculating the weight and for any other tolerances, and for providing tying wire, spacer bars, chairs and cover blocks as specified hereinafter for carriage and handling, for bending hooking, cranking, and for fixing and maintaining in the correct position in the works. Standard laps of the lengths as shown in the drawing or as instructed at site shall be admissible. Standard hooks (9 times the dia. for each hook for tor steel) shall be added to the finished length to arrive at the length of the bar for cutting and measurement. No hooks are required for ribbed or tor steel.

8. FORMWORK

8.1 CENTERING AND SHUTTERING

Centering and shuttering of plywood and steel formwork in slabs, walls, beams etc. including propping, strutting etc. and removal of forms including applying form oil to shuttering.

8.2 DESIGN

Formwork shall be designed and constructed for removal so that the concrete can be properly placed and thoroughly compacted. Formwork shall be firmly supported and adequately strutted, braced, or tied. It shall be capable of

adjustment to the lines and dimensions of the finished concrete and it shall be sufficiently strong to resist without distortion, the pressure of concrete during its placing and compaction, and other loads to which it may be subjected. It shall not be liable to suffer distortion under the influence of the weather. When concrete is to be vibrated, special care shall be taken to ensure that the formwork will remain stable and the joints tight. The safety and adequacy of centering and shuttering shall be the sole responsibility of the Contractor. The Contractor shall if required supply to the Employer/ Engineer drawings and calculations for the formwork he proposes to use, for the concrete work.

8.3 MATERIAL FOR FORMWORK

All surface of the formwork shall be of plywood or steel plate which shall give uniform concrete surface after removal. No wooden planks or other means of form work shall be acceptable. For struts and props the Contractor shall use sal wood 75mm x 100mm props or Iron lifting type strut over form base i.e. it shall not get depressed at the time of loading or casting. Any strut, if found defective shall be replaced as directed by Employer/ Engineer.

8.4 DEFLECTION AND CAMBER

The Contractor shall make allowance for any settlement or deflection of the formwork that is likely to arise during Construction, so that the hardened concrete conforms accurately to the specified line and level. The Contractor shall also make allowance in the formwork for any camber specified by the Employer/ Engineer to allow for the elastic deflection of structural members and deflection due to creep of the concrete. In the absence of any specified camber, the soffit of all beams and slabs shall be given a camber equal to 1/240 of the span length to ensure that the structure has the prescribed shape after removal of the forms.

8.5 SUPPORTS

Formwork shall be constructed so that the formwork to the sides of members can be removed without disturbing the soffit formwork or its supports. Props and supports shall be designed to allow the formwork to be adjusted accurately to line and level and to be erected and removed in an approved sequence without damage to the concrete. Supports shall be carried out which is sufficiently strong to afford the necessary support without damage to any portion of the structure. This may mean in some cases that it be carried down to the foundations or other suitable base. Props and bracing shall be provided for the temporary support of composite construction where separately specified.

8.6 JOINTS AND EDGES

All joints in the formwork shall be close-fitting to prevent leakage of cement slurry from the concrete. At construction joints, formwork shall be tightly secured against previously cast or hardened concrete to prevent the formation of stepping or ridges in the concrete. Formwork shall be constructed to provide straight and true angles, arises or edges. Where cambers are shown on the Drawings, the fillets shall be accurately cut to size to provide a smooth and continuous chamfer. Formwork panels shall have true edges to permit accurate alignment at sides and provide a clean line at construction joints in the concrete

which shall be fixed with their joints either vertical or horizontal, unless otherwise specified.

8.7 SUNDRIES

Formwork shall be provided to the top surface of concrete where the slope or the nature of the work requires it. Provision shall be made for forming holes and chases for services and for building in pipes, conduits and other fixings, as shown on the drawings. The material and position of any ties passing through the concrete shall be as directed by the Employer/ Engineer. Except where corrosion of a metal tie is unimportant, it shall be possible to remove a tie so that no part of it remaining embedded in the concrete shall be nearer to the finished surface of the concrete than the specified thickness of cover to the reinforcement. Any holes left after the removal of ties shall be filled with concrete or mortar of approved mix.

8.8 CLEANING AND TREATMENT OF FORMWORK

Spaces to be occupied by concrete shall be free from all rubbish, chipping, shavings, sawdust, dirt and tying wire etc., before concrete is placed. The formwork to be in contact with the concrete shall be cleaned and treated with suitable non-staining form oil or other approved material. Care shall be taken that oil or composition is kept away from contact with the reinforcement or with concrete at any construction joints. Surface retarding agents shall not be used except with the permission of the Employer/ Engineer. Formwork shall be thoroughly cleaned after each use. Damaged or distorted formwork shall not be used.

8.9 PAINTING ON FORMWORK

The concrete repellent painting on all contact surface of the formwork shall be of approved non bituminous colourless form oil so as to preserve the natural color of the concrete. The repellent compound shall be applied so as to effect quick removal of form work. It shall be applied as per the manufacture's direction. No compound shall be used which will adversely affect the concrete work or surface. No form repellent compound may be used without specific written approval of the Employer/ Engineer regarding type, manufactures, location and extent of use and application procedures.

8.10 REMOVAL OF FORMWORK

All formwork shall be removed without shock or vibration that might damage the concrete. Before the soffit and props are removed the surface of the concrete shall be exposed where necessary in order to ensure that the concrete has hardened sufficiently. In no circumstances shall formwork be struck of until the concrete reaches cube strength of at least three times the stress to which the concrete may be subjected at the time of striking. The formwork to vertical surfaces such as walls, columns and sides of beams may be removed after 24 hours in normal weather conditions although care must be taken to avoid damage to the concrete, especially to arises and features. In cold weather a longer period may be necessary before striking. Suitable curing methods should immediately follow the removal of the formwork. The following minimum times shall elapse before removal of formwork:

The times given for the removal of props are based on the assumption that the total live load plus dead weight to be supported at the time of removal is not more than one half the total design load. For horizontal members where the loading is a higher proportion of the total design load these times may need to be increased.

8.11 MEASUREMENT

Measurement for payment shall be done of the area on which centring shuttering has been done. It shall include the application of the form oil and removal of the formwork as well.

9.0 STONE WORK

9.1 STONE WORK IN FOUNDATION AND IN SUPERSTRUCTURE

All stone work shall be made with random rubble stone from the best quarry and built in 1:4 cement mortar (1 cement: 4 sand) The stones must be approved by the Employer/Engineer before using in the construction work.

The stone shall be hard, tough sound and durable. No stone shall be less than 6" and more than 18". Face stone should be comparatively larger and uniform in size and colour to with a good appearance. Breadth of face stone should be greater than height. All the stones shall be wetted thoroughly before laying.

The joints should not be thicker than 3/4". Face joint should be thinner. No pointing shall be allowed afterwards. In the corners, the stones should be chiselled at both sides and also on the top of the stone walls where the wall is ending and such surfaces being built up. Not more than 2 feet height of masonry shall be constructed at one time.

9.2 MEASUREMENT

The measurement of the work shall be the product of length, height and thickness. All the thickness of stone work shall be measured and will be as per drawing.

11. FINISHING:

11.1 PLASTERING WORKS

11.1.1 CEMENT SAND PLASTERING ON WALLS IN CEMENT SAND (C/S) MORTAR

11.1.1.1 SCAFFOLDING

For plastering work on walls, unless otherwise specified, double scaffolding having two sets of vertical supports shall be provided. The Contractor shall be responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

11.1.1.2 MORTAR

The type of mortar mix to be used shall be as specified in the description of the item.

11.1.1.3 WORKMANSHIP

All joints in the masonry shall be raked out properly to a minimum depth of 1/2". Dust and mortar shall be brushed out. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced. The thickness of the plaster shall be as specified. The plaster may be applied in 1, 2 or 3 coats as specified or as directed by the Employer/ Engineer, but no single coat shall exceed 1/2" thickness.

Ceiling plaster shall be completed before the commencement of wall plaster. All wall plaster shall be started from the top and work down towards floor.

Gauges of plaster 6" x 6" shall be first applied horizontally and vertically, at not more than 6 ft. intervals over the entire surface to serve as guides for plastering and to ensure even thickness and a true surface. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The surface shall be finally given the type of finish as specified in the description of the item or as directed by the Employer/ Engineer. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises, junctions etc. where required shall be done without any extra payment.

In suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically. The work shall be closed on the body of wall and not nearer than 6" to any corners on arises. When recommencing, the edge of the old work shall be scraped clean and wetted before plaster is applied to the adjacent areas.

Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a minimum period of 7 days. The dates of plaster shall be legibly marked on the various sections of the wall so that curing for the specified period thereafter can be watched. Any cracks which appear in the surface and all portions, which sound hollow when tapped or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the Employer/Engineer.

11.1.1.4 MEASUREMENT

It shall be done in square metre of the surface over which the plaster has been done. The thickness of the plaster shall not be taken into account except for independent columns where the measurement shall be of finished surface allowing 12mm over the designed dimensions. Opening shall be deducted in full, and jambs and soffits shall be allowed. Openings less than 1 sq.m shall not be deducted and nothing extra shall be paid for finishing jambs, soffits and the sides of such openings. Unless

otherwise specified, nothing extra shall be allowed for plaster on independent columns and beams, short with or on curved surface.

11.1.2 CEMENT SAND PLASTERING ON CEILING IN CEMENT SAND (C/S) MORTAR

11.1.2.1 SCAFFOLDING

Stage scaffolding independent of the walls shall be provided for all ceiling plaster.

11.1.2.2 MORTAR

The mix of mortar to be used shall be as specified in the description of the item.

11.1.2.3 WORKMANSHIP

Projecting burns of mortar formed due to the gaps at joints in shuttering shall be removed. The surface shall be scrubbed clean with wire brushes. In addition, concrete surfaces shall be pack marked with a pointed tool at spacing of not more than 2" centres to ensure proper key for the plaster. The surface shall then be cleaned of all oil, grease, etc. and well wetted before the plaster is applied. The thickness of the ceiling plaster shall be 1/4" to 1/2" unless otherwise specified. The plaster may be applied in one or two coats as specified.

Ceiling plaster shall commence only after the slab above has been finished and the centering removed. In the case of ceiling of roof slabs, plaster shall commence only after the terrace work has been completed. Gauges of plaster 6" x 6" shall be first applied at not more than 5ft. intervals in both directions to serve as guides for the plastering and to ensure even thickness and a true surface. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface.

The surface shall be finally given a smooth finish, unless otherwise specified, when the work is in progress all horizontal lines and surfaces shall be frequently tested for their accuracy. Curing shall be started 24 hours after finishing the plaster and shall be continued for a minimum period of 7 days. The dates of plaster shall be marked so that curing for the specified period thereafter can be watched.

Any cracks which appear in the surface and all portions, which sound hallow when tapped or are found to be soft or otherwise defective, shall be cut out in rectangular shape and remedied as directed by the Employer/ Engineer.

11.1.2.4 MEASUREMENT

Measurement shall be done in square metre of the surface over which the plaster has been done. The rate shall include all the cost of materials and labour etc.

B. SPECIFICATION FOR PLUMBING AND SANITARY WORK

1. WATER SUPPLY

This section covers the basic requirements for water supply, general requirement of plumbing connection to water supply to water systems.

All pipe work shall be so laid or fixed and maintained as to be and to remain water tight thereby avoiding waste of water, damage and the risk of contamination of water conveyed.

Underground piping shall be laid at such a depth that it is unlikely to be damaged by frost, traffic loads and vibrations. Special precautions shall be taken to avoid damage to the piping by corrosion, water hammering. No abrupt bend shall be made to avoid friction loss.

1.1 LAYING OF MAINS AND PIPES

The mains and pipes on site shall be laid in accordance with good standard practice. The work shall cover all materials required for such pipes and fittings. The work shall include line marking, level marking, excavation and laying, filling with excavated materials, jointing of pipes, groove cutting, fixing with couplings, T-bend etc. complete with testing and ready for operation.

1.2 MATERIALS

The pipes shall be galvanized mild steel seamless screwed and socket tubes confirming to the requirements of at least IS: 1239-1938 and of at least commercial grade of INDIAN TATA tubes of medium grade or as approved by the Employer/ Engineer. All fittings for pipe shall be galvanized mild steel. All pipes shall be tested before use in laying. In general, the pipe diameter shall be in the range of 1"-2" as specified in the Bill of Quantities. Stop-cock, valve etc. shall be of appropriate diameter and capacity made from gun metal of approved quality and make. Jointing of pipes shall be as per standard practice and or as directed.

1.3 METHOD OF EXECUTION

The setting and arrangement of pipes and service net work shall be prepared by the Contractor and all detail drawing shall be prepared and produced for the approval of the Employer/ Engineer. All pipes shall be completely concealed from view unless and until the requirements and as approved by the Employer/ Engineer.

No bend or curve in any line shall be made as it shall diminish the water way or internal diameter of pipe. Water pipes are cut to size ends to be connected shall be threaded and screwed with sockets, joints of G.I. to make all of them completely water tight. All branching or bend shall be done with the help of T or U bends connected with couplings and sockets.

1.4 INSPECTING & TESTING

All pipe fittings and appliances shall be inspected by the Contractor and shall produce the manufactures guarantee of the products. Any defective items shall be clearly marked as rejected and forthwith removed from the site. The Contractor shall inform the Employer/ Engineer for the check before laying.

After laying and jointing, the main shall be slowly and carefully filled with water, so that all air is expelled from the main by providing with stop-cock, allowed to stand full of water for a few days, if time permits, and then tested under pressure. The test pressure shall be 5 kg/cm or double the maximum working pressure, whichever is greater. The test pump be manually operated or power driven. The testing shall be done with joints opened.

The service pipe shall then be inspected under working conditions of pressure and low when all draw off taps are closed, the service pipe shall be absolutely watertight. Any control by the Employer/ Engineer shall not relieve the Contractor of his responsibility for the accuracy of the layout, fittings, or part of them with regards to their functions and quality.

The rates shall be inclusive of all materials required such as pipes, fittings, clamps etc., line marking, level marking, groove cutting, fixing in position, construction of Civil Works as per civil specification, testing all complete. The water supply lines shall be measured in running meter correct to an inch for finished work, including fitting link, joint coupling T-L bend etc. exclusive of taps and valves. Valves, taps shall be measured in number and shall be paid as per Bill of Quantity. Water tanks shall be measured in lump sum inclusive of outlet, inlet, overflow fittings and re-make of civil works as per civil work standards and specification.

The rate shall be inclusive of supply fitting fixing, labour etc. all complete and fixed satisfactorily.

2 DRAINAGE AND SANITARY

The Contractor shall carry out survey for the detail plan for the sanitary installation or drainage installation for approval to the Employer/ Engineer.

The Contractor shall ascertain the Employer/ Engineer about the approximate level of subsoil water and flood level in relation to the sewer system.

Any drainage system be designed and produced for approval to the Employer/ Engineer.

Where no method of disposal is possible, foul water may be collected and dispersed into subsoil, the general sub-soil water level and the sub-soil conditions shall be ascertained including the absorptive capacity of the soil.

If the sub-soil dispersed or soak pit system would be followed, the pit shall not be in the vicinity of water supply source at least by 50cm.

The efficient and adequate system shall be proposed by the Contractor for approval of the Employer/ Engineer.

2.1 SEWER PIPE

2.1.1 PVC PIPES

A PVC pipe conveying to a drain any solid or liquid shall be circular and shall have a minimum diameter of 100mm. The PVC pipes shall be laid from manhole situated outside the building and shall be continued up to septic tank, septic tank to soak pit and separately from building to soak pit.

2.2 RAIN FALL AND RUN-OFF

Rain fall statistics for the area shall be studied by the Contractor. The rain-water run-off of the site area shall discharge directly or by means of a channel into or over an inlet to surface drain.

2.3 TESTING

All sewer pipes and all other pipes when above ground shall be approved by the Employer/ Engineer. Smoke test may be conducted under pressure or 25mm of water maintained for 15 minutes after all trap seals have been filled with water. Any leakage will be visible and the defective part of work shall be made good by the contractor on his own cost.

The rates shall be inclusive of all materials required such as pipes, fittings, bends, clamps, line marking, level marking, fixing in position, testing etc.

The pipes shall be measured for finished work including fittings, link, joint coupling, T, L, bend, window etc. and paid as per approved rate in Bill of Quantities.

3.0 SELECTION AND INSTALLATION OF SANITARY APPLIANCES

Selection, installation and maintenance of sanitary appliances shall be done in accordance with standard practice.

All sanitary appliances and fittings shall be carefully examined for defects before they are installed and also in the completion of work. The Contractor shall give notice to the Employer/ Engineer from time to time prior to installation and execution of work at least 7 days before fitting after getting approval for the make of appliances.

The rate for all such work shall be for all works described in the Bill of Quantity, description, specification, drawing and direction to execute and to complete in all respect, in position, level dimension, with all necessary fixtures, clamps, connections etc. including cutting, bending, grooving, installation and re-installation of civil works as per specification with materials.

3.1 SANITARY WORKS AND FIXTURES

The work shall cover providing and installing sanitary works and fixtures complete set with all necessary fitting, internal and external for fixing at positions of the building including cutting and making good the damaged groove to its original finish and ready for operation after testing.

3.2 MATERIALS

All sanitary fittings shall be as approved by the Employer/ Engineer. Alternatively a schedule of other manufactured fittings may be submitted for approval of the Employer/Engineer and these shall be indicated in detail along with the tender.

3.4 SEPTIC TANK

The septic tank shall be of chimney made brick masonry work in 1:4 cement sand mortar, the foundation and floor shall be of M15 (Cement: Sand: Aggregate= 1:2:4) concrete. Inside shall be finished with 12mm cement plaster 1:4 with 1:1 cement smooth punning or as per drawing.

The rate shall include all the necessary fittings, fixture- civil works, UPVC pipe, cowl, bend joints, etc, as per item indicated in Bill of Quantity an shall be paid as per the rate indicated in the Bill of Quantity.

3.5 SOAK PIT

Soak pits shall be constructed with honey combed brick masonry wall in 1:4 cement sand mortar filled with at least 7.5 cm size brick bats or as per drawing and as directed by the Employer/ Engineer.

The upper portion of the lining up to the inlet valve at least 40cm in height should be made with masonry in mortar cement 1:4 for strengthening, for preventing surface water to enter into the pit and to prevent rat throwing earth into the pit. The inlet pipe shall be fixed in the wall of the pit with mortar. The pit shall be covered with R.C.C slab of M15 with necessary reinforcement. The absorption area of sock pit shall depend on the nature of soil type and underground water table. The Contractor shall propose the depth and soak area and location of tanks depending on the number or users, type and nature of soil water table.

Rate shall include the civil work fixture, fill-in materials, labour etc. as per item indicated in Bill of Quantity.

3.6 MAN HOLE

The manhole shall be made as per requirement and direction. The manhole shall be made with brickwork in 1:4 cement mortar concrete base of M15, 20mm plaster with 1:4 cement smooth punning.

The cover shall be of heavy duty metallic and double sealed, complete with painting. The manhole frame bedded in cement mortar shall be given recessed for lifting hooks.

The above mention sanitary and drainage structures shall be as per drawing, the Employer/Engineer's direction and approval of the Employer/ Engineer.

The pipes shall be measured in running meter correct to a as per Bill of Quantities for finished work inclusive of bend, tee etc. The overlaps of such pipes shall not be measured.

The rate shall include all the necessary materials, labour, their fixing fittings, etc as per requirements, approval and as directed by the Employer/ Engineer. It shall contain all the performances regarding groove making, dismantling of R.C.,

masonry, fixing, concealing and remark with required materials to the standard specified in civil works and as per direction and approval of the Employer/ Engineer and also include labour workmanship, required fixtures with fittings all complete as directed.

4.0 BRICK MASONRY WORK

4.1 Materials

(a) Brick units shall be first class, sound, well burned, and free from defects thatwould impair its strength or affect its service-ability.
(b) Cement shall be ordinary Portland as per ASTM C150 Type I or equivalent.
(c) Sand shall be clean, fine, sharp granules, free from foreign or deleterious matter.
(d) Water shall be clean and free from acid, alkalis, oil or organic matter.
The Contractor should submit samples of cement, sand, lime and locally manufactured brick samples of six pieces for Employer's approval.

4.2 Mortar Mixtures

The type of mortar mixture for brick masonry shall be 1:4 in ratio

4.3 Brick Masonry Laying

(a) Lay brick masonry in accurately spaced courses, level, plumb and true to line.
(b) Soak brick units in clean water for one hour before laying. Units shall be damped when laid.
(c) Lay brick in running bond with joints approximately 10mm wide.
(d) When brick masonry walls cross the recessed floor cable trenches provide and install cast-in-situ concrete lintels of sufficient size and strength to support and carry masonry walls across the trench sprays.
(e) Reinforce all masonry walls with cast-in-situ reinforced concrete formed flush with the masonry surfaces for cement plaster-finish.
(f) Provide concrete plasters and horizontal tie for every 9 square meters of masonry wall surface, plus at all corners and door jambs.

4.4 Curing

Spray masonry surfaces with water twice daily for a period of 10 days, or until the surface receives a plaster finish.

4.5 Protection

Where exposed to weather, protect top of masonry with water tied material in such a way
that it will protect the completed work. Masonry wall shall set for 48 hours before any load is applied on the completed work.
Payment for the Contract item “Brick Missionary Work " will be made at the lump sum price
bid. Therefore, in the Price Schedule, the lump sum price shall include full compensation for
all costs incurred in furnishing all materials, machines, labor and other operations related to
floor concreting work of respective building.

1200 PAINTING

1201 Scope

This Section covers furnishing of materials and construction of different types of painting works in accordance with the BOQ, Drawing and this Specification or as directed by the Engineer.

1202 Delivery and Application of Paint:

All materials shall be delivered on site intact in the original drums or tins and shall be mixed and applied strictly in accordance with the manufacturer's instructions and to the approval of the Engineer. All cement paints and washable distemper shall be applied by brush; emulsion paints shall be applied by means of a brush then rolled. All enamel paints are applied by brush or sprayed, and bitumen and bituminous base aluminum paints are applied by brush. Before application of any paint, adjoining surfaces shall be covered by cloth, or paper and wherever paints stains it shall be removed before leaving the work in same day.

The only addition, which will be allowed to be made locally will be liquid thinners supplied or recommended by the manufacturers and none shall be, thinned more than approved by the Engineer.

1203 Preparation and priming of surfaces:

Concrete and Cement rendered surfaces shall be smooth and free from defects and shall be allowed to dry out thoroughly. Surfaces shall be thoroughly brushed down and left free from all efflorescence, dirt and dust.

All such surfaces, which are to be finished with oil or enamel paint, shall be primed with two coats of alkali resisting primer.

Plaster surfaces shall be perfectly smooth and free from defect. All such surfaces shall be allowed to dry for a minimum period of four weeks. Surfaces shall be stopped with approved plaster compound, rubbed down flush, thoroughly brushed down and left free from all efflorescence, dirt and dust.

Fair-faced surfaces shall be dry, brushed down and free from dust or dirt and shall be treated with an approved alkali resisting primer (for plastic emulsion).

Metal work generally shall be thoroughly wire brushed to remove all scale, rust, and through sand papering shall be done before any painting is done. Where severe rust exists, the special anti-rust primer must be used. After painting it shall be stored in covered shed and 60cm above ground.

Shop primed surfaces shall have bare places touched up with an approved metal primer.

Un-primed surfaces shall be given one coat of primer as last.

Galvanized surfaces, which are thoroughly weathered, shall be, brushed down with white spirit, washed down and given one coat of zinc chromate primer.

Bituminous-coated surfaces shall be given as isolating coat of shellac knotting followed by an approved metal primer.

Woodwork generally shall be rubbed down, given one coat shellac knotting, one coat wood self knotting primer, and all cracks, nail holes, defects, and uneven surfaces, etc., stopped and faces up with hard stopping rubbed down flush.

Before oiling woodwork all stains must be removed and uniform color obtained and filled.

1204 Colors and Priming:

The priming undercoats and finishing coats shall each be of differing tints and the priming and undercoats shall be of the correct types and tints to suit the respective finishing coats in accordance with the following instructions. All finishing coats shall be of colors and tints selected by the Engineer. The paintwork shall have and uniform finish and all paint for external work shall be exterior quality only.

(1) Rubbing Down:

Each coat of paint shall be properly dried and shall be well rubbed down with fine glass paper before the next coat is applied. The paintwork shall be finished smooth and free from brush marks.

Samples Cards of all paints, etc., shall be submitted to and samples prepared for approval of the Engineer before laying on and such samples, when approved, shall become the standard for work.

(2) Program:

The contractor shall so arrange his program of work that all other Trades are completed and away from the area to be painted when the painting begins.

(3) Ironmongery, Protection and Cleaning Up:

All ironmongery shall be removed from joinery before painting is commenced and shall be cleaned and renovated of necessary and re-fixed after completion painting.

Cover up all floors, etc., with non-resinous sawdust or other approved covering when executing and all painting decorating work.

Paint splashes, spots and stains shall be removed from floors, woodwork, etc., and damaged surface touched up and the whole of the work left clean upon completion.

(4) Materials:

All paint materials of specified brand shall be obtained the manufacturer or authorized dealer. All sealers, primers and undercoating are to be obtained from the makers of the finishing materials and are to be in accordance with their recommendation for the particular finish required.

(5) Knot Sealer:

For use on knots and resinous portions of woodwork.

Stopping and Filling composed of parts putty to one part of stiff white lead.

(6) Lacquer:

Approved polyurethane eggshell clear lacquer applied in accordance with the manufacturer's instructions.

- Polish shall be an approved brand of wax polish.
- Oil shall be best quality linseed oil.
- Filler for polished or oiled surfaces to be Beeswax filler.

(7) Wood Preservative:

All wood work, as specified or instructed shall, be treated after cutting and preparation but before assembly or fixing with three coats of solution consisting of one part if Atlas "A" wood preservative brown grade to three parts of water. The solution is to the brushed in all faces of all timbers unless exposed to view and painted. This is applicable in the wood frame contact with masonry and roof purling, batten and counter rafter.

The contractor shall note that this solution is HIGHLY POISONOUS and shall take all necessary precautions and instruct his workmen accordingly.

(8) Paint Application:

Painting Items as described hereafter shall comprise the following, and shall all include for preparing and priming surfaces as above described: -

Cement Paint	:Apply two coats.
Plastic Emulsion	:Apply a minimum of three coats, using a thinning medium or water only if and as recommended by the manufacturer. An approved plaster primer tinted to match may be substituted for the first coat.
Paint	:Apply two undercoats and one finishing coat of enamel gloss oil paint.
Flat oil paint	:Apply two coats of flat oil paint, using thinning medium in accordance with the manufacturer's instructions.
Oil	:Apply two coats of linseed oil.
Wax Polish	:Apply a minimum of two coats to approval.
Lacquer	:Apply three coats of Polythene lacquer as described, to approval.
Prime	:Prepare and prime only before fixing.

1205 Cement Paint

Cement paint shall be of ready mixed type in sealed container of Approved brand. It shall be procured either in 50 kg. Container or 25 kg.Container. All such container shall have unbroken seal with manufacturer's name and trade marks as well as a description of contents all clearly marked. Such paint shall be mixed and applied strictly in accordance with the manufacturer's instructions and with the approval of site In-charge. All materials shall be stored in dry place.

Only fresh cement paint shall be used, hard or set paint shall not be used. The container shall be made loose by rolling and shaking the container before opening.

First a paste shall be prepared by mixing 2 parts of cement paint powder with one part of water by volume and immediately this shall be thinned by adding another part of water to have uniform solution of consistency of paints.

Before application of paint all dust and foreign materials shall be removed from the surface by use of wire brush. The surface shall be allowed to run off. The fresh mixed point shall be frequently stirred during application and no mixture (paint) shall be used after an hour of mixing. The first coat shall be kept wetted for at least 24 hours before the second coat is applied. The surface shall be thoroughly wetted before the second cost is applied.

The final painted surface shall exhibit uniform and good finished appearance. Measurement shall being square meter of actual covered area. No extra shall be allowed for scaffolding, curing and painting corners, plaster strips etc.

1206 Enamel Paint

The enamel paint shall be of Approved Brand. All surfaces to be painted shall be planed and thoroughly sand papered, first by using No. 120 sandpaper. Ordinary putting shall fill up nail holes, cracks or other in equalities. Putting shall be made up of 2 parts of best quality whiting (absolutely dead stone lime) 1 part if white lead mixed together in

linseed oil and kneaded (3 oz. of linseed oil to 1 lb. of whiting). A primer coat shall be locally applied in holes, cracks etc. before putty is applied.
After the surface is dry, it shall be sand paper by using No. 60 sandpaper.
Surface so prepared shall be painted with one coat of primer. The primed surface when dry shall be sand papered by using No. 100 sand paper.
The primed surface so prepared shall be painted with one coat of selected enamel using bristle brush and not horsehair ones. The paint shall be applied in thinnest possible layers with parallel strokes.
Care shall be taken to ensure the surface being free from dust or other foreign material before priming or enameling the surface. No paint shall splash on the floor, wall jambs, sill or other part of the building.
Primers and paints shall be of first class approved quality and of approved manufacturer as specified. These materials shall be ready mixed and in sealed tins with manufacturer's name, color and instruction clearly painted in the container.

1207 Washable Distemper

Washable distemper shall be of approved Brand. The Engineer shall examine the paints before seal is broken.
Only fresh distemper shall be used, hard or set shall not be used.

1208 Plastic Emulsion Paint

Approved brand of plastic emulsion paint shall be used in the plaster of Paris or lime punned surfaces.

1209 Bituminous Aluminum Paint

Bituminous Aluminum paint shall be of approved Brand. The Engineer shall examine the paints before seal is broken.

1309 Red Lead Primer

Red Lead primer paint shall be approved brand. The lead content in the paint shall be less than 60% by weight. The site in charge shall examine the paints before seal is broken.

1210 Chapra Polish

Before application of Chapra polish, the timber surfaces shall be thoroughly sand papered to obtain smooth surfaces and all the dust are removed from the surfaces. A coat of primer of chalk power mixed with resign is applied and sand papered to fill in the voids and joints.
The chapra polish is prepared from the chapra mixed with spirit. The chapra must completely dissolve in the spirit. Over the primed surfaces, two layers of resin is applied by the smooth cotton clothes and dried.

1211 Polyurethane Paint

Approved polyurethane or equivalent eggshell clear lacquer applied in accordance with the manufacturer's instructions.
Polish shall be an approved brand of wax polish.
Oil shall be best quality linseed oil.
Filler for polished or oiled surfaces to be Beeswax filler.

1212 White Washing

Fresh white lime slaked at Site of Work shall be mixed with clean water to make thin cream. It shall be screened through a coarse cloth, and gum (glue) in the proportion of 100 grams to 16 liters of water shall be added.
The surface to be white washed must be dry and thoroughly cleared from dust and dirt. The wash shall be applied with "Babio" or brush, vertically and horizontally alternately, and the wash kept stirring in the container while using as per standard code of practice..
No paint should splash on floor or door/window frames and panels.

1213 Measurement

Prices of paints, etc., shall include for preparation of surfaces, rubbing down between each coat, stopping, knotting, etc., and all other Work in connection as described and as necessary to obtain a first class and proper finish. Should the description stated in the items of the bills be insufficient in the Contractor's opinion to obtain such a finish, the Contractor must allow in his prices for such extra coats, materials or Work necessary to obtain such a finish to the Engineer's approval. Price must include for the provision of all necessary scaffolding, plant and tools, and also for applying different colors and cutting into where and as necessary.
Painting Items as billed hereafter shall comprise the following, and shall all include for preparing and priming surfaces as above described:-
Cement Paint - Apply two coats.
Plastic Emulsion - Apply a minimum of three coats, using a thinning medium or water only if and as recommended by the manufacturer. An approved plaster primer tinted to match may be substituted for the first cost.
Paint - Apply two undercoats and one finishing coat of enamel gloss oil paint.
Flat oil paint - Apply two coats of flat oil paint, using thinning medium in accordance with the manufacturer's instructions.
Oil - Apply two coats of linseed oil.
Wax Polish - Apply a minimum of two coats to approval.
Lacquer - Apply three coats of Polyurethane lacquer as described, to approval.
Prime - Prepare and prime only before fixing.
Measurement of all the painting works will be made in m^2 of works as specified except for the grills, handrails, railing and cornices.

1214 Payment

Payment for work will be made on the basis of contract unit price indicated in the BOQ. The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified

1700 METAL WORK

Generally all materials shall be the best of their respective kinds, free from defects, and to be obtained from approved manufactures. All work shall be carried out in a workman like manner and strictly as directed by the Project Engineer. The materials in all stages of transportation, handling and storage shall be kept clean, free from injury and breaking, bending and distortion prevented.
All smith's work shall be forged clean from the anvil, all screwed work shall have full internal and external threads.

Balustrades, etc., shall be well framed together and all connections properly fitted, shouldered, drilled, tapped and screwed together with set screws counter sunk flush with the surface where indicated.
Welded joints shall be neatly made, filed smooth and left clean and adequate means shall be employed for temporarily fastening the parts to be welded together until the joints are welded.
Nails, Spikes and Bolts shall be of approved manufacture and best quality mild steel or wrought iron of lengths and weights approved by the Project Engineer.
Nails shall comply with the relevant British or Indian standard Specification.

(1) Windows and Frames

Windows shall not be forced into openings which are out of square or too small. The windows shall be secured at head jamb and sill, and care shall be taken that windows shall be secured distorted when screwing up to lugs and fixing screws. Windows shall be grouted with cement mortar into the prepared openings and joints between building openings and window frames shall be caulked with mastic cement obtained from the window manufactures.

(2) Building in

Unless otherwise described, all items of metal work shall include for "building in" to concrete or walling etc. and for "making good" finishing thereto.

1701 Aluminum Windows Frame And Shutters

(1) Material

These shall be fabricated from 15 micron natural or color anodized Aluminum profiles conforming to IS: 733-1983.
The glazing glass shall be clear IAG float glass or equivalent without any distortion.
The window shall be made out of extruded aluminum section (Al. Mg. Si.) and shall conform to IS – 63400, AA-6063 unless otherwise directed. Aluminum sections shall be anodized and the anodic film shall be 12-15 microns. The colors shall be as directed. The 2-3 tracks on outer frame of standard size otherwise directed shall be fixed in the position by using heavy duty plastic grips with necessary plugs and fillers. All the sliding shutters shall be provided with two ball bearing rollers and ratting pieces/guides one each at the top and bottom, weather strips all around. Openable window shall be double weather stripped, one strip shall be provided in outer frame and outer shall be in the shutter frame. The hinges or stay hinges of openable window shall be strong. Pin of the hinges shall be of non-corroding materials, preferably nylon/steel. All the joints shall be mechanically fixed. All the window shutter shall be provided with special locking arrangement. Glass shall be fixed in the shutter by means of rubber gaskets.

(2) Construction Procedures

The sliding window frames are of two-track design and the shutters are to be jointed by special cleats for extra strength. Rollers mounted on ball bearings are to be fitted to obtain smooth operation. The sliding shutters shall have provisions for grooves for weather strips to exclude wind, water or dust ingress. The shutters are glazed with 4mm thick approved quality and clear transparent glass using gaskets of ethylene- propylene or PVC (EPDM/ PVC). The doorframe shall be made of aluminum extrusion as per design. The ventilator frames with fixed glass shall be of same dimension as the sliding two-track frame. The

frames and shutters are to be fabricated by using the crimping method of corner jointing. Corners of frames are to be miter cut on high speed TCT saw machines to give burr free corners. Sturdy corner cleats should hold the frames with only a hairline corner joint visible and the frames should be square/ rectangular and free from distortions. The frames shall be firmly secured to the walls in line and level. Only aluminum screws shall be used for joining and no welding will be allowed. The joint between the frame and the plaster on walls, sill and lintel beam shall be filled with silicon sealant. The aluminum windows/ ventilators/ doors shall be free from scratches and other visible defects.

The frames are fixed to the wall with plastic grips and steel screws of suitable color.

(3) Measurement

Measurement of works will be made in m^2 of works as specified.

(4) Payment

Payment for work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

1702 Mild Steel Folded Door and Windows Frame and Shutters

(1) Materials

Specifications and Codes: All work shall conform to relevant Indian/ British or American Standard specifications and codes of practice for materials, methods and practices.

1. All metals shall be free from defects impairing strength durability or appearance and shall be of best commercial quality for each intended purpose.
2. Fastenings, which are exposed, shall be of the same materials, color and finish the metal to which they are applied, unless otherwise shown on the Drawings, or specified. All items employed with galvanized iron and steel shall be galvanized ferrous metal.
3. Steel: Mild steel shall comply with B.S. 15, where a guaranteed yield stress is required and shall comply with B.S. 3706 Grade –I for other general uses where a guaranteed yield stress is not required that rolled sections shall comply with B.S. or Mild rolled steel sections/ frames for windows, doors etc. shall be as B.S. 990: Pt2: 1972 or B.S.1787, 1951 or IS 2062-1962. Pressed steel sections & frames for windows, doors & ventilators shall comply with IS 4351 1976.
4. Sheet Steel: Shall conform to the requirement of British Standard Specifications.
5. Filter Metal for Welding: Welding electrodes for manual shielded metal are welding shall conform to British Standard Specification.
6. Details and Specification: of accessory items for which standard products are available are representative guides to requirements for such items Standard products generally meeting such equipments will be accepted, if details of construction and installation are approved of the consultant.

Painting and Protection:

1. All ferrous metal surfaces, except pre-finished galvanized items and those obviously not to be painted, shall before leaving the shop or manufacturing plant, be cleaned of all scale, rust, grease and other foreign matter and shall be given one (1) thorough step coat on all surfaces, of an approved primer of red lead until and unless changed, ready and compatible for finish painting at the building site under painting Section. Primer shall be compatible with materials to be used infield painting and shall be used directly from factory-labeled containers. Touch-up damaged and abraded spots after installation using same paint. Steel fully embedded in concrete shall be left unpainted.

Workmanship

1. All work shall be executed by experienced mechanics and shall conform to details, be clean and straight with sharply defined profiles. Unless otherwise particularly noted, finished surfaces shall have smooth finish.
2. Curved work shall be formed to true radius and punching shall be done cleanly so as not to deform or mar adjacent surfaces.
3. Shop connections shall be welded or rivaled and field connections bolted unless otherwise indicated. Use flat-head counter-sunk rivets finished flush where riveted connections are exposed to view in finished work. Bolts shall be turned up tight and threads deformed to prevent loosening.
4. Castings shall be sound and free from warp, holes and other defects that impair strength and appearance. Exposed surfaces shall have a smooth finish with sharp well-defined lines and arises. Machined joints shall be milled to a close fit. Provide all necessary logs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.
5. Flanges shall be concealed where pre thickness of metal/ metal sheets and sheets and details of assembly and support shall be such as to provide sample strength and stiffness.
6. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metal work. Holes shall be drilled or punched and reamed in the shop.
7. Joints and connections exposed to weather shall be formed to exclude water.
8. All materials and workmanship under this section shall be subject to inspection in the mill, shop and field by the consultants.

(2) Construction Procedures

Doors, windows, ventilators and other frames required for fixing glazing/ shutter shall be out of high strength aluminum or steel as described above. All samples are to be approved by the consultant prior to fixing, and the units shall not be forced into opening which are out of square or too small. The doors, windows and ventilators shall be secured at head jamb and sill, and care shall be taken that the units are not distorted when screwing up to lugs and fixing screws. Frames shall be grouted with cement mortar into the prepared openings and joints and the frames shall be caulked with mastic cement/ synthetic resin obtained from the window manufacturers, or as approved and specified. Metal doors, windows

and ventilators shall be provided with one shop coat of rust inhibitive paint and three coats of enamel or aluminum paint upon installation. Metal windows shall be installed in masonry or concrete with steel holdfasts in an approved manner and shall be installed in plumb line & level.

i. Each window shall be complete including anchors, clips, bolts, mullions, hardware and attachments required.

ii. Drips and weep holes shall be provided.

iii. Mullion covers shall be provided for mullion.

iv. Openable sections of windows shall be watertight and water stripped.

v. All glazed panels shall be provided with glazing arrangements with clips, beads or other approved method. Glass shall be as per specification and conform to IS: 2835-1977. Putty for fixing shall not be less than 185gms per meter of glass per meter.

Steel Door and Windows Frames shall be made from M.S. Steel sheet of 18G and shutter from 20G M.S. Steel sheet folded to the shape as shown in drawing. The bending joints are welded smoothly and grinded to form the same surface as the section and shall be in perfect line and level. Doors and Windows shall not be forced into openings, which are out of square or too small. The doors and windows shall be secured by three holdfast in each side if required on the top and bottom, and care shall be taken that doors and windows shall not be distorted when screwing up to lugs and fixing screws. Doors and Windows shall be grouted in M15 Concrete at hold fast point into the prepared openings and joints between building openings.

For each doorframe, sal wood timber of 250mm*internal section shape shall be fixed at each hinge location.

Welded joints shall be free from slag, neatly made, filed and grinded smooth and left clean and adequate means shall be employed for temporarily fastening the parts to be welded together until the joints are welded. All welding scrape shall be removed before painting primer.

The Engineer In-charge shall of Indian manufacture and best quality mild steel or wrought iron of lengths and weights approve nails, Spikes and Bolts.

Nails shall comply with the relevant British or Indian standard specification.

Building in unless otherwise described, all items of metal work shall include for "building in" to concrete or walling etc. and for "making good" finishing thereto.

(3) Testing

The Engineer In-charge shall be at liberty at all reasonable times to enter the site of the works, or any other premises in which the work in being prepared for the purpose of inspection. Any work found defective or which is not in accordance with the drawings or the specification, engineer in charge shall reject and such defective work shall be at once make good at the contractor's expenses.

(4) Measurement

Measurement of works will be made in m2 of works as specified.

(5) Payment

Payment for work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified

1703 Mild Steel Grill

(1) Material

The Mild steel grills are fabricated from the Mild Steel flat, angle and channels conforming to the BS 15 or equivalent. The welding shall be butt-welding conforming to sub clause 170.1

The grips are of plastic or metal. The screws shall be steel screws.

(2) Construction Procedures

The mild steel grill shall be made according to pattern given as per drawing. Welded joints shall be neatly made, filled smooth and left clean, the consultant is to be informed when the welded work is ready for inspection and any such work must be left unprimed until the consultants gives his approval. The contractor shall furnish at his own expenses all necessary tools and all materials, which he may require for the safe erection of the work and remove the same when the work is completed. The contractor shall be solely responsible for any damage doe to the structure during erection and any member, which has been bent or otherwise distorted either before or during erection, shall be straightened or replaced in an approved manner at his own expenses. The grillwork shall be finished with two coats of red lead followed by three coats of aluminum or enamel paint and fixed in the opening, as per instructions of the consultants.

The grills are fixed to window opening by plastic grips with steel screws firmly to the faces of opening.

(3) Testing and Inspection

The erected fencing shall deform any post and wires shall be straight with out sagging.

(4) Measurement

The above work shall be measured in m^2 of opening in vertical plan completed as specified.

(5) Payment

Payment for the work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

1704 Mild Steel Collapsible Gate

The Mild steel collapsible gates are fabricated from the Mild Steel flat, angle and channels conforming to the BS 15 or equivalent.The welding shall be butt-welding conforming to relevant clause of this specification

The grips are of plastic or metal. The screws shall be steel screws.

The gate is primed with two coats of red lead primer.

The gate is painted with two coat of enamel or bituminous aluminum paint as specified in the BOQ, to get uniform painted surfaces.

(1) Measurement

The above work shall be measured in m^2 of opening in vertical plan completed as specified.

(2) Payment

Payment for the work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

1705 Mild steel Main Gate

The Mild steel gates are fabricated from the Mild Steel flat, angle and channels conforming to the BS 15 or equivalent.The welding shall be butt-welding conforming relevant clause of this specification

The grips are of plastic or metal. The screws shall be steel screws. The gate shall of steel sheet conforming to BS 15 or equivalent of 20G.

The gate is primed with two coats of red lead primer.

The gate is painted with two coat of enamel of bituminous aluminum paint to get uniform painted surfaces.

(1) Measurement

The above work shall be measured in m^2 of opening in vertical plan completed as specified.

(2) Payment

Payment for the work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

1706 Cattle Trap

The Cattle Traps are built before the gates to prevent cattle entering the compound. The cattle trap consist of 75mm NB "Heavy Class" Galvanized pipes laid in parallel at the interval 150mm center to center. These pipes are embedded in the concrete works.

(1) Measurement

The above work shall be measured in m of pipe laid completed as specified.

(2) Payment

Payment for the work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

1707 Mild steel Main Gate

The Mild steel grills are fabricated from the Mild Steel flat, angle and channels conforming to the BS 15 or equivalent.The welding shall be butt-welding conforming to sub clause 170.1

The grips are of plastic or metal. The screws shall be steel screws. The gate shall of steel sheet conforming to BS 15 or equivalent of 20G.

The gate is primed with two coats of red lead primer.

The gate is painted with two coat of enamel of bituminous aluminum paint to get uniform painted surfaces.

(1) Measurement

The above work shall be measured in m^2 of opening in vertical plane completed as specified.

(2) Payment

Payment for the work will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

1900 DISMANTLING WORK

1901 Dismantling of Gabions

The Contractor shall dismantle any sound or damaged gabions as indicated in the drawings or as ordered by the Engineer. The resulting property shall be the property of the Employer and all suitable materials shall be stockpiled for reuse within a lead of 30 m as directed by the Engineer. Unsuitable material shall be disposed off as directed by the Engineer.
Gabion dismantling shall include labor, cutting of the binding wire, opening the crate, emptying the stones, transporting the stones and dismantled gabions, stockpiling and all incidental and provisions necessary to complete the work.

1902 Dismantling of Cement Masonry Works

The Contractor shall dismantle any cement masonry works as indicated in the Drawings or as ordered by the Engineer. The resulting material shall be the property of the Employer and all suitable materials shall be stockpiled for reuse purposes within a lead of 30 m as directed by the Engineer. Unsuitable material shall be disposed off as directed by the Engineer.
Cement masonry dismantling shall include use of labor and proper equipment, transporting, stockpiling and all incidental and provisions necessary to complete the work.

1903 Dismantling of Plain Concrete/Reinforced Concrete

The Contractor shall dismantle any plain or reinforced concrete works as indicated in the Drawings or as ordered by the Engineer. The resulting material shall remain the property of the Employer and all suitable materials shall be stockpiled for reuse purposes within a lead of 30 meter. Unsuitable material shall be disposed off as directed by the Engineer.
Concrete/reinforced concrete dismantling shall include use of labor and proper equipment, transporting, stockpiling and all incidental and provisions necessary to complete the work.

1904 Dismantling of Dry Stone Masonry Wall

The Contractor shall dismantle any dry stone masonry wall as indicated in the drawings or as instructed by the Engineer. The resulting material shall remain the property of the Employer and all suitable material shall be stockpiled for reuse purposes within a lead of 30 m as directed by the Engineer.

1905 Measurement

Measurement of works in Sub-Clauses 1901 to 1904 shall be in m^3 according to the average cross-sections at various levels and corresponding lengths measured at site.

1906 Payment

Payment for the above works will be made on the basis of contract unit price indicated in the BOQ.

The payment will be full and final compensation for all material, labor, and equipment to complete the works as specified.

SPECIFICATION: Electrical Items

1. ELECTRICAL INSTALLATION WORKS

General

The following specifications will apply under all circumstances to the equipment to be installed against this Agreement and it is to be ensured that the Developer, shall obtain for himself at his own expense and on his own responsibility all the information which may be necessary for purpose of making the tender and for entering into a Agreement keeping in view the specifications detained hereunder, drawing, and designing of the electrical installation and inspection of Site.

The rates shall include for the cost of material erection, commissioning, labor, supervision, tools, plant, transport, all taxes, contingencies, breakage, wastage, sundries, scaffolding, maintenance of wiring for one year etc. i.e. they should be for an item complete in all respect.

Workmanship and good appearance of the installation shall be of equal importance with its electrical and mechanical efficiency, and all portions of the work shall be so laid out and installed that the Work as a whole is of uniform quality and shall present a neat and mechanical appearance in a manner meeting the approval of the Site Engineer. The Developer shall verify in the field all measurements necessary for the electrical Work and shall assume responsibility for their accuracy.

Materials which are defective or damaged during the progress of Work shall be replaced or repaired in an approved manner at the expense of the Developer. The installation shall comply with all applicable laws and ordinances and with the requirements of the B.S. or Indian Codes and as specified herein or shown in the Drawings. The progress of the electrical work shall be carried out so as to conform the progress of the Work of the other trade and the entire installation shall be completed as soon as the condition of the building with permit.

All cutting, drilling, channelling, patching, etc., required for installation of electrical shall be carried out in a manner approved by the Site Engineer. Any deferring of finish, planning, woodwork, metal work, masonry, concrete or other material,

resulting from the performance of the Work shall be replaced or repaired at no expense to the owner and to the satisfaction of the Site Engineer.

Site Condition

The equipment materials to be erected and commissioned should be suitable for the Site conditions. It is estimated that the maximum temperature at Site will be 40o C.

Scope of Works

Provide all labor, materials, equipments, transportation and operation and tests necessary for and incidental to the completion and operation of the complete Electrical System, Protection and Telephone as required and as specified herein or shown on the Drawing.

(a) Complete Electrical Installation including underground line, disconnect switches etc. as detailed in the Bill of Quantities.

(b) Complete Lighting and Power Wiring Systems and Earthing Systems

(c) Lighting and Power Panel Boards, Switchboards.

(d) Lighting Fixtures, Switches, Outlets, Conduits, etc

(e) Excavation rock fill, cutting and patching main Work and contain Work, sleeves, inserts, anchor, etc. as required for proper installation in accordance with the requirements, drawings and specifications.

Provide for installation of other miscellaneous electrical wiring required for all plumbing, electronic and mechanical equipment, complete as shown on the Drawings and as specified herein.

(g) Complete protection system.

(h) Complete telephone internal and external cable network, plug in outlets and distribution panels.

(i) Installation and testing of motor control panels to be used for pumps.

(j) Where the Electrical Work is associated with the Work of others, the Developer shall confer with the persons affected, and shall furnish them with necessary information, drawings, dimensions etc. and shall coordinate the electrical work with the Work of other trades to ensure a satisfactory installation, in accordance with the Drawings and Specification and with the highest standards of trade practices based on IS Codes of Practices.

Standards

The installation shall generally be carried out in conformity with the 'Indian Code of Practice' for electrical wiring and fitting in building and for the electrical equipment on buildings. All materials and equipment to be supplied should conform to the relevant Indian Standard Specification. Where no specification is available for any materials or equipment, it shall be governed by specific approval of the Site Engineer.

1.05 I.S. Specifications

The following Indian Standard Specifications will apply to the equipment and the Agreement:

(a) Low tension air circuit breakers : IS 2516 - 1965 Part I Selection I.

(b) Switch gear bus bars : IS 375 - 1963

(c) Distribution fuse boards : IS 2675 - 1966

(d) Enclosures for low voltage switch gear : IS 2147 - 1962

(e) PVC Cables : IS 1554 - 1964

(f) Tubular fluorescent lamps for general lighting service : IS 2418 - 1965

(g) Tungsten filament lamps for general service: IS 418 - 1963

(h) Ceiling fans : IS 374 - 1966

(i) Flood lights : IS 1947 - 1961

(j) Flame proof electrical lighting fittings : IS 2206 - 1962(Part I)

(n) Industrial light fittings with metal reflectors: IS 17 - 1961

(o) Water tight electric light fittings : IS 3553 - 1968

(p) Switch socket outlets : IS 4615- 1968

(q) Three pin plug and socket outlets : IS 1293 - 1967

(r) Switches for domestic and similar purpose: IS 3854 - 1966

Codes of Practices

Earthing : IS 3043 - 1966

Electrical wiring installation : IS 732 - 1963

Switchgear : IS 3072 - 1965(Part I)

Lighting Protection : IS 2309 - 1960.

Materials

All materials and equipment shall be new and shall be in accordance with the standards as established by the Indian Standard Institute or the requirements of the B.S. Where materials or equipment are specified or shown on the Drawings by name of manufacturers, they shall be used. Equipment or material of other manufacturers may be considered for use if equal quality appearance, and electrical and mechanical characteristics and approved by the Site Engineer.

Power Supply

The power supply system is alternating current 3 phase with neutral at a frequency of 50 cycles per second and 400/230V.

Main Power Control Panel Board

Main power control panel shall be made of folded steel sheet 2.5 mm thick with thrust protection and anticorrosion painting. They shall be installed in the substation/electric room as shown on the drawings.

The low voltage distribution switchboard serving to control and protect the L.V. outgoing distribution boards shall be manufactured and tested in accordance with the provisions of I.S. and the relevant. It shall be provided with a pressure resistant two-wing door and a detachable plate of structural material in the cable termination space.

(b) Bus bars

Each L.V. panel shall comprise five busbars: three for the phases, one for the neutral and one for potential equalization (ground). Busbars shall be made of hard drawn high conductivity electrolytic copper according to Indian standard. They shall be air insulated, of dimensions and short circuit rating as shown on the drawings.

(c) Moulded Case Circuit-Breakers (MCCB)

The moulded case circuit-breakers shall be manufactured according to IEC 157 or equivalent and shall have the following characteristics.

- Rated voltage : 400 V
- Nominal current rating : 400 A, 250A, 40 A, 60 A, 100 A as shown on the drawings
- Nominal frequency : 50 Hz
- Breaking capacity (r. m. s.) : 30 KA for 250 A and 10 KA for 100 a current rating
- Number of poles : 3
- Total break-time : 20 ms

The switch disconnectors shall consist of a fully enclosed housing fabricated from non-tracking, heat resistant insulating material, accommodating the silver plated fixed and movable contacts.

The movable contacts shall be driven by a robust switching mechanism with quick make-and-break operation.

Handle complete with position indication shall be provided, the protection class, shall be according to IS.

(d) Ammeters:

Ammeters shall be of 96 X 96 mm size with quadrant scale, scaled according to the corresponding current transformer rating and shall have the following characteristics:

- Mechanism : Moving iron
- Tolerance : Class 1.5
- Maximum current : 5A
- Frequency range : 15 to 65 Hz
- Scale graduation : Starting at about one fifth of full scale value.
- Overload capacity : 1.2 times continuously, 50 times for sec., 4 times for 2 or 3 min, 2 times for about 10 min.

Ammeters shall be connected through current transformers.

(e) Voltmeters

Voltmeters shall be of 96 X 96 mm size with quadrant scale, scaled 0 500 V with built-in series to the rear of the indicator, having the following characteristics:

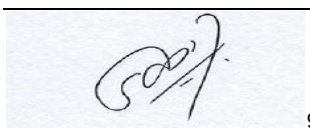
- Mechanism : Moving coil
- Tolerance : Class 1.5
- Frequency range : 15-65 Hz
- Scale graduation : Starting at about one fifth of full scale value.
- Overload capacity : 2 times for 1 min

The measuring of voltage for each phase shall be affected through one five-way voltmeter selector switch.

(f) Miscellaneous

Before dispatching from the factory, all components of the main low voltage distribution switchboard shall be subjected to the routine tests specified in relevant Indian Standards, or equivalent.

Furthermore certificates issued by a testing organization selected by the Site Engineer shall be submit to the Site Engineer by the Developer proving that the types of the components to be supplied have passed the type tests prescribed in the relevant British Standard or equivalent.



Prior to ordering the relevant equipment the Developer shall submit to the Site Engineer for approval information and data stated in the relevant British Standard or equivalent as regards the components for the distribution board.

(g) L.V. Cable Distribution Cabinets

The low-voltage cable distribution cabinets (feeder pillars)shall have the following characteristics:

- Power supply system: Three-base and neutral solidly earthen, 400/230 V, 50 Hz.

- Busbars: Three for the phases, one for the neutral and one potential equalization bulbar.

- Types and equipment as shown on the drawings.

- Installation: Outdoors on recast concrete base.

Each cabinet shall consist of a supporting frame of which sheet-steel housing covers are secured and a saddle shaped roof. All housing parts shall be hot dip galvanized.

M.C.B. Distribution Boards

1. This section comprises of surface/recess type Distribution Boards complete with required miniature circuit breakers (MCB).

2. These Distribution Boards with enclosures, bus bars, neutral links, and earth links, shall be of the original manufacturers only as indicated in the approved lists.

3. The D.B.s' shall be duly connected with the wire way ducting or conducts to make it electrically and mechanically continuous with the help or sockets bushes, or flange plates, as desired by the Site Engineer.

4. All D.B.'s shall be required to be connected with incoming sub-main cable and outgoing circuit wiring with Dowel's or approved equivalent crimping lugs for wires of 6 sq. mm. or bigger sizes cables lugs shall be crimped with proper tools at Site. Rates quoted by the Developer shall include the connections in the D.B.'s.

5. D.B.'s shall be fixed on the walls/or flush with wall (recessed) in approved manner and damage to wall made good as per original.

6. Damage to the original paint to the D.B.'s if any, shall be made good as desired by the Site Engineer.

7. D.B.'s shall be dust and vermin proof. These shall have hinged cover and MCB's shall not be open able without opening these covers. Phase barrier and shrouding sheets shall also be provided in D.B. The D.B. shall be fabricated of 14 SWG CRCA sheet steel and shall be stove enamel painted.

8. Blank spaces (spares) shall be covered with blanking plate.

9. The breaker shall have quick break trip free mechanism with thermal over load and magnetic short circuit tripping devices. The mechanism shall be such that the circuit can not be held closed against a fault. The thermal items shall prevent reclosing of a circuit when a fault or over load persist.

10. The contact shall be silver tungsten or other suitable material to give long contact file. Multiple units shall have common inter tripping mechanism.

11. Miniature Circuit breakers in the panels shall have phase sequence numbering. The phase to which each single pole branch is connected shall be clearly indicated and so arranged that any three adjacent branches are connected to phase R,Y and B respectively and the same relationship of phase sequence is maintained.

12. Each MCB shall have fault current of 9 KA for 5 A and 15 A load at 220 V supply system.

13. Circuit Diagrams of each D.B. shall be stuck to over cover of the D.B. which shall clearly identify circuit number and connected load points.

14. Approved M.C.B. Distribution Board names are: Indoasisn,

LV Cable

Single core, four core, or five core, as shown on the drawing, copper conductor, PVC insulated, PVC sheathed, single wire armored and PVC served, 0.6/1 KV rated cables shall be used in the low voltage distribution system. The cable shall comply with IS or equivalent and have the following technical characteristics.

- Number of cores: 4 or 5 for three phase systems 2 or 3 core for single-phase systems.
- Rated voltage: 0.6/1 KV
- Neutral of distribution system solidly earthen.
- Cross-section of copper conductors as shown on the drawings.
- Cable shall withstand a continuous copper temperature of 75oC.

The Cable shall consist of:

- Shaped standard copper conductors
- PVC insulation

- Layer of extruded PVC
- Galvanized steel wire armor.

The conductors shall be stranded with successive layers of plain annealed wires, drawn from electrolytic copper of high conductivity meeting the requirements of BS 6360. In the stranding and shaping process, each conductor shall be prespiralled to the lay of the finished cable, so the cores will automatically bed in their correct relative position when laid up. Conductors shall have smooth contour, free from sharp edges or projections, which could damage the insulation or cause high local electrical stresses. Number and diameter of wires shall be according to IS.

The cables shall be sheathed over the laid-up cores by a layer of extruded PVC complying with IS or equivalent.

The amour shall consist of a single layer of galvanized steel wires complying with IS or equivalent. The diameter of the amour wire shall be in accordance with IS.

HV Cables

Three or single core 12.7/22 KV Earthen Aluminum conductor, screened, XLPE Insulated Armored Shielded and PVC Sheathed cables conforming to IS 7098 (Part II) amended upto date shall be used in the High voltage system from overhead line to the sub-station installed distribution transformer. Other physical characteristics of the HV cables shall be in conformity to the LV cables. HV cables shall be laid in underground into a separate high density polytene pipes or ducting.

Cable Laying

Laid Underground: Where cables are laid underground they shall be laid in a trench 0.9l mm deep from the general ground level. The problem of the trench shall be levelled and the cable shall be laid on a 7.62 cm bedding of fine chemically inert, sand. Mechanical protection shall be given with single layer of well burnt bricks on sides with concrete tiles on top, the inside cavity being filled with sand so that at least a 5.08 cm layer of sand remains on top of the cable. The concrete tiles shall be interlocking type with the word "DANGER" impressed on top. Back filling shall be done with well rammed and watered earth. Cast from cable markers shall be placed so as to be visible on the surface at suitable intervals and at every bend. Wherever cables run through or enter the building, crosses road or drain, CI sleeves pipes of approved diameter shall be provided.

The rates quoted shall include trenching, giving protection, sleeving and clamping, including supply of all materials as specified above.

Wherever cables are to run along wall surface of either the building or electrical duct or on the ceiling, these shall be fixed with clients. Clients shall consist of moulded insulated materials divided in two halves flat steel of suitable approved section. The securing shall be by means of studs and nuts with lockouts and washers. For PVC armored cables, aluminum or GI claw type clamps may be used.

The raises quoted shall include supply and installation of all fixing materials specified above.

Laid in ready trench: This will mean laying of cable in ready prepared trenches directly on trench floor. Minimum bending radius shall be twelve times the overall cable diameter in case of APLSTS cables and six times for PVC armored cables if not otherwise recommended by the Site Engineer.

The lengths of cables given in the schedule of quantities are only approximate. The successful Developer is required to measure out the actual lengths needed before laying. Straight though joints will not generally be permitted.

Jointing: Cable jointing shall be carried out by skilled jointures with expert supervision. The Developer shall use the best jointing materials and the necessary cable compound and all jointing, sweating, basting, wiping and filling in of compound shall be done in an approved manner. In case of aluminum conductor cable special care should be taken for its marked difference from copper conductor cable.

For PVC cable standard compression type tinned brass glands shall be used.

Wiring System

Concealed Point wiring shall consist of branch wiring for final sub distribution board together with the controlling switch (or push) as far as and including the ceiling rose or any other approved terminations or socket outlet. In case of more than one light point controlled by the same switch, the wiring up to the ceiling rose or any other approved terminations of the first light point including the switch shall be considered as a primary point, loop wiring from light to light shall be considered as a secondary point and the distinguishing rate shall be quoted.

A three pin socket outlet point shall include the earth continuity base copper conductor cable of 2-5 sq. mm from the earth pin to the terminal or bus at the final distribution center.

Wiring shall be done in "looping system" and phase or live conductor shall be looped at switch box and neutral conductor can be looped from light, fan, or socket outlets.

i) In estimating the current to be carried out by any conductor, incandescent lamps, shall be rated at 100 watts, the ceiling fans shall be rated at 80 watts, table fans and ordinary socket points at 60 watts, fluorescent lamps of 4 ft at 50 watts and 2 ft at 25 watts and power socket outlet at 1000 watts, unless the actual values are specified.

ii) Lights fans, and socket outlet may be Worked on a common circuit. Such sub-circuits shall not have more than a total of 8 points of lights, fans and sockets outlets. The load of such circuits shall be restricted to 800 watts. The number of socket outlets shall not be more than two per circuit.

As regards power sub-circuits, the outlet shall be provided according to the load design

for these circuits, but in no case shall these be more than two outlets on each circuit.

Rates:

The rates for wiring light, fan and all plug points given in the schedule of Work attached with the tender, shall be irrespective of the length of points. Circuit wires of these points shall also from part of the point rate. The conductor for final sub-circuit for points shall have a nominal cross section area not less than 2.5 sq. mm. (Copper conductor for light and fan circuit and 4 sq. mm for power sub-circuit in case of general light and power wiring.

The Developer shall prepare fabrication and detailed working drawings and obtain the approval. All Work shall be carried out only on approval of these drawings. However, approval of the drawings does not relieve the Developer of his responsibility to meet with the intent of the specification.

The Developer shall also submit complete layout drawings on completion of the work. The rate quoted by the Developer shall be inclusive of this Work. These drawings must give the following information.

Runs of PVC conduits and number of wires contained in circuits and size of wires for point wiring.

Location of all distribution boards, main switches, junction and pull boxes and fuses;

Complete schematic diagram of the installation;
Location of earthing stations.

The virtual completion certificate will not be issued till the drawings are submitted.
Position of Lighting, Distribution Boards and Switch Gears

Should there by any discrepancy or incomplete description ambiguity or omission in the drawings and other documents, whether original or supplementary forming the Agreement, the Developer shall immediately on discovering the same, draw attention of the Site Engineer.
Before commencement of Work, the exact final position of all points switch boxes and the distribution boards shall be ascertained by the Developer from the Project Engineer.

Sampling:

The Developer shall submit 2 sets of samples of accessories and apparatus, he propose to use in the installation, to the Site Engineer for approval. Drawings or samples, as required shall be submitted by the Developer and this specification shall not be departed from without any written instructions from the Site Engineer. The verbal approval given by the Site Engineer to any drawings or samples submitted by the Developer shall in no way exonerate the Developers from their liability to carry out the Work in accordance with the terms of the Agreement.

Earthing

Earth Installation: The entire electrical network shall be solidly and effectively earthen vigorously following the methods as per I.S. 3043 - 1966.

The Site for earth stations shall be selected as close to the sub-station or switch room as possible. The Site so selected shall have to be moist with a tendency to remain water-logged even during the driest season of the year. Such places can be located near the drain outlet from the main building. The earth pit shall be one meter square and 2 m deep 1 m x 1 m x 6 mm electrolytically pure copper plate shall be used as earth electrode which shall be laid vertically from the base of the pit. The earth lead from the electrode shall be (25X3) mm in copper strip or 6.No S.W.G. copper conductor as specifies which has to be brazed with the electrode to sustain flow of heavy current without effecting the brazing during heavy fault conditions. In order to improve the conductivity of the soil, common salt and charcoal shall be used to required quantity to cover the electrode before refilling the pit. The earth resistance then shall have to be measured and it must remain as close as one ohm. If this value is not reached the other pits shall have to be dug and be repeated the similar process and connect the earth stations in parallel till the required value of the earth resistance is obtained.

Following separate and independent earthing installations shall be completed in the entire electric system of the project Site referred herein:

(a)	Generator Earthing	: two points (Grids)
(b)	Lighting arrestor earthing	: 2 points
(d)	Main power control panel earthing	: 1 point
(e)	Lighting protection ring earthing	: 1\4 to 6 points

Detail Working drawings be prepared and approval of the Site Engineer to be obtained prior to commencing the Earthing Installation (Grids) system.

Testing of Installation

Insulation Resistance

i) The insulation resistance shall be measured by applying between earth and the whole system of conductors or Any section thereof with all fuses in places an all switches closed, and except in earthen concentric wiring and all lamps in position or both poles of the installation otherwise electrically connected together, a direct current pressure of less than twice the working pressure provided that it need not exceed 500 volts for medium voltage circuits. Where the supply is derived from the 3 wire (A.C. or D.C.) or a poly phase system, the neutral pole of which is connected to earth either direct or through added resistance, the working pressure shall be deemed to be that which is main trained between the outer or phase conductor and the neutral.

ii) The insulation resistance measured as above shall be not less than 50 divided by the number of points on the circuit provided that the whole installation shall not be required to have an insulation resistance greater than one mega ohm.

iii) Control rheostats, heating and power appliances and electric signs may, if required, be disconnected from the circuit during the test, but in that event the insulation resistance between the code or frame work, and all live parts of each rheostat, appliances and sign, shall be not less than that specified in the relevant Indian Standard Specification or where there is no such specification shall be not less than half a megaohm.

The insulation resistance shall also be measured between all conductors connected to one pole or phase conductor of the supply and all the conductors connected to the middle wire or the neutral or to the other pole or phase conductors of the supply and its valve shall be not less than that specified in sub-clause (ii).

On completion of an electric installation (or an extension to an installation) a certificate shall be furnished by the Developer counter signed by the certified supervisor under whose direct supervision, the installation was carried out. This certificate shall be in the prescribed from as required by the local Electric Supply Authorities.

(b) Testing of Earth Continuity Path

The earth continuity conductor including metal conduits and metallic envelopes of cables in all cases shall be tested for electric continuity and the electrical resistance of the same along with the earthling 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 shall not exceed one ohm.

(c) Testing of Polarity of Non-linked Single Pole Switches

i) In a 2 wire installation of test shall be made to verify that all non-linked single pole switches have been fitted in the same conductor throughout and such conductor shall be labelled or marked for connected to an outer or phase conductor or to the non-earthen conductor of the supply.

ii) In a three wire or a four wire installation, a test shall be made to verify that every non-linked single pole switches fitted in a conductor which is labelled or marked for connection to one of the outer or phase conductor or the supply.

The Developer shall be responsible for providing the necessary instruments and subsidiary earth for carrying out the test. The earth continuity tests shall comply with the IS specifications as may be applicable. Should the above tests not comply with the limits laid down, the Developer shall rectify the faults until the required results are obtained.

Lightning Protection System

The Developer shall be responsible for the supply and installation of the complete lighting protection system, which may be carried out by a specialists sub-Developer approved or specified by the Site Engineer. The installation shall consist of air networks connected to water tower top and down conductors, and finally, terminated to earth

electrodes, via. suitable test points, all in accordance with the details as indicated on the drawings.

Conductors shall consist of 25x3 mm. soft annealed copper strips.

Air Termination Network:

Air termination shall consist of a system of horizontal conductors insulated in accordance with the Indian Standard Code 2309:1969 Practice for the Protection of Buildings and allied structures against lighting/B.S. Code of Practice CP: 326:1965.

All exposed metal work and roof structures, forming part of the structure to be protected shall be bonded to the net work by conductors of the appropriate cross section.

Down Conductors:

From the air terminations 25x3 mm. down conductors shall be installed and fixed to the structure as indicated on the drawings. The conductors shall follow the most direct route to the earth rod or earth network. Test clamp's connecting down conductors to the earth system shall be fixed to the water tower structure at between 450 mm and 2 M .above ground level.

Joints in down conductors shall not be permitted and provision shall be made for expansion and contraction of conductors. Special care being taken in the fixing of support to allow for movement.

Earthing Arrangement

Earth tables of 25x3 mm minimum size shall be connected to the down tapes at the test clamps and routed to the earth rods as indicated on the drawings. The tapes shall be hurried at not less than 0.5 meters below ground.

The arrangements shall conform withearthing section of this specifications.

Test Clamps:

Test clamps shall be manufactured from phosphor bronze, admiralty brass or approved equivalent with two fixing holes suitably counter sunk to receive No. 8 screws.

Copper bonding tapes shall be tinned prior to bolting to test clamps and connected surfaces of all tapes shall be treated with an approved petroleum jelly or grease.

Tape conductors shall be fixed to flat roof surfaces by means of suitable felt pads, fused to the bitumen felt covering or asphalt, alternative fixing arrangements may be used subject to the approval of the Site Engineer.

Where tape conductor are fixed to walls or structural work they shall be fixed by means of distance type saddles or hold fasts, as detailed. They shall be not less than 19 mm

wide by 3 mm thick of phosphor bronze, admiralty brass or hard drawn copper for copper taped, and aluminum for hard drawn copper for copper tapes, and aluminum for aluminum tapes, and galvanized for galvanized iron tapes.

Conductors shall be supported by saddles at the following spacing:

(a) Vertical runs at 0.75 mm center;
(b) Horizontal runs on horizontal surfaces at 0.6 m centers;
(c) Horizontal runs on vertical surface at 0.6 m centers.

All fixing screws shall be brass and the minimum size used shall be 31 mm * 8 mm. Round headed screws shall be used generally but where necessary counter sunk screws shall be used.

Joints and Bends

Joints will not normally be permitted, but where specified or approved, they shall conform to IS:

All bonds shall conform to earthing sections of this specifications. In case of G.I. strips joints shall be welded and protected from corrosion.

Testing:

All systems shall be tested in accordance with I.S. code of Practice for lighting protection, as well as I.S. Code of Practice for earthling.

The resistance from any point of the system to earth shall not exceed to ohms.

The resistance of each metallic conducting path, including all joints shall not exceed the calculated resistance of the tape itself by more than six percent.

In addition, the resistance from the earth electrode to the nearest test clamps shall not exceed 0.2 ohms.

Stand by Diesel Generating Set

Stand by diesel generating set of 415 Volts, three phase four wire 50 Hz rating shall be used by the Developer for installation and commissioning and load run test. Following scope of works will be covered up in this section:

(a) Installation of D.G. set on its mounting pad in the substation. Handling, lifting, anchoring setting the foundation pads, bolts will be completed by the Developer. Civil part i.e. floor costing will be done by the civil Developer.

(b) Installation of Day Service Tank AME panel or change over switches etc.

(c) Power and control cables laying and terminations.

(d) Fuel, lubricating, cleaning and other related Works.

(e) Test run and Load run for a duration of minimum of 6 hours to 10 hours

her appurtenant services required of the complete installation, testing and commissioning in accordance with relevant drawings and meeting the requirements of the specifications and relevant I.S. Specifications including the fees for inspection together with the liabilities and obligations as detailed in the general conditions of Agreement.

2. Prices shall remain firm and free from variation due to rise and fall in the cost materials and labor or any other price variation whatsoever whether during the stipulated period of execution or during extended period of completion if any, except direct statutory, increase by the act of Govt. or local Bodies.

3. Item rates shall remain valid for any variations in the estimated quantities given in the schedule of qualities.

In order to facilitate the technical scrutiny of various quotations, the tender must supply with their quotations detailed technical particulars, make, catalogues and erection drawings for various items under different parts specified in the schedule of quantities.

The power supply shall be 3 phase, 4 wire, 415/240 volts A.C. and frequency of 50 cycles, per second. All consuming devices shall be suitable for the voltage and frequency mentioned above.

6. The drawings and specifications lay down minimum standard of equipment and workmanship and deviations, if any, shall be clearly set down in Annexure-I. In the absence of any deviations, it will be deemed that the tender is fully satisfied with the intents of the specifications and drawings and their compliance with the statutory and fire insurance provisions including local codes. Where the drawings and specifications conflict, the more stringent shall apply.

7. All equipment and the installation shall be tested as specified and a test certificate in the prescribed from as required by the local supply authorities shall be furnished.

8. The entire installation shall be guaranteed against defective material or workmanship for a period of 12 months from the date the installation has been certified by the Site Engineer and taken over by the owner. During the guarantee period, all the defects shall be rectified by the Developer, free of cost.

9. The successful tender shall submit the drawings for all the HT/LT boards to the Site Engineer for approval. The approval of these drawings will be general and will not absolve the Developer of the responsibility of the correctness of these drawings. At least 6 copies of the approved drawings shall be supplied to the Site Engineer for their distribution to various agencies at Site at no cost to the Site Engineer.

10. The successful Developer shall arrange water and power connections required for the Work at his own cost. The Developer shall also install tested meters at his own cost. The Developer shall pay the actual consumption at the supply company/agency rates.

11. The tenders must see the Site conditions and take all the aforesaid and foregoing factors while quoting the rates, as no extra will be allowed on any ground arising out of or relating to the aforesaid and foregoing.

12. The successful Developer shall include in his rates for painting with 3 coats of synthetic enamel paint to match the surroundings or as directed by the Site Engineer for all down rod hangers pertaining, to light fixtures fans etc.

13. The Developer shall supply completion drawings of the entire installation on a tracing cloth showing the complete wiring diagram as executed at Site drawn to scale approved by the Site Engineer after the completion of Work but before completion certificate is given by the Site Engineer.

14. The Developer must include in their rates any fees to Govt. and arrange all sanction from the electrical inspector.

After laying and jointing the cables shall be subject to necessary tests as stipulated in IS No. 5959 (Part -I), 1970.

The materials of the 1st preference shall be used and the Developer may excuse himself of not doing so only, if the required range, as per tender specifications, is not manufactured by the particular manufacturer. The evidence of such case shall be supported by a letter from the respective manufacturer. All samples of all electric fittings an other accessories shall be approved by the Site Engineer prior to their installation.

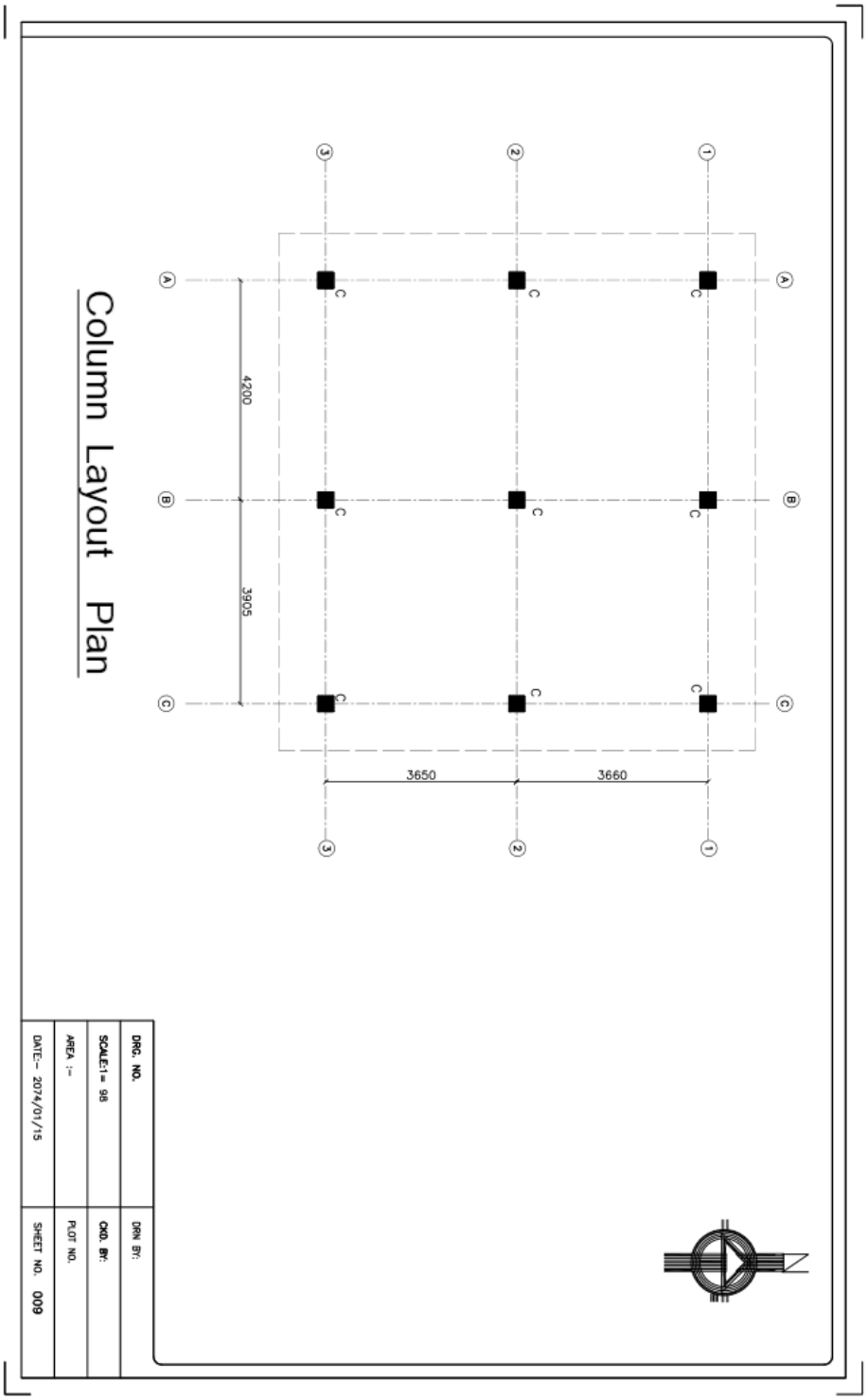
In case where this specification and the description in the Schedule of Quantities differ, the Work shall be carried out, as detailed in the schedule of quantities.

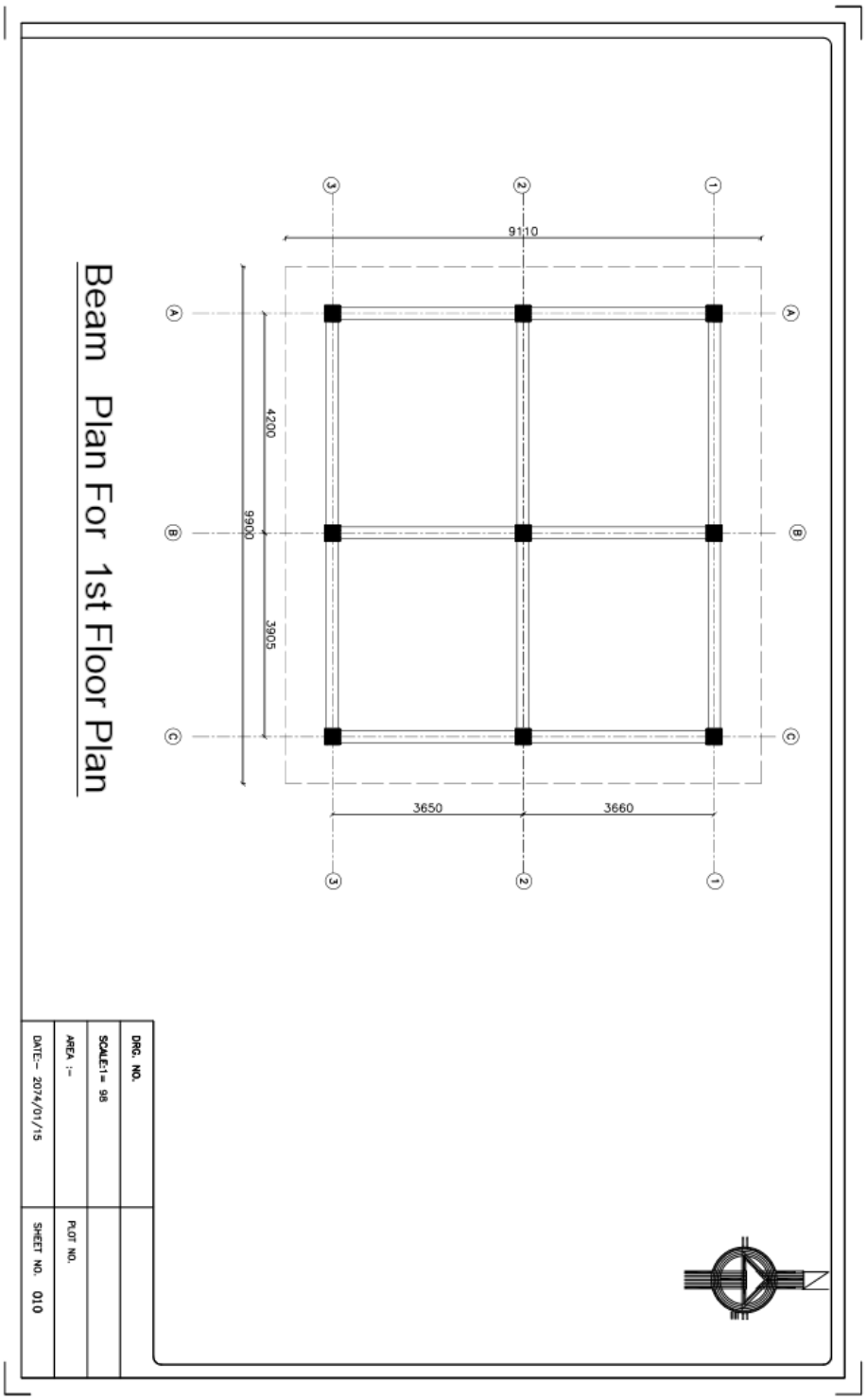
No alternation whatsoever is to be made to the text or quantities of this schedule of quantities, unless such alteration is authorities in writing by the Architects. Any such alteration or additions shall, unless authorize in writing, be disregarded when tender documents are considered.

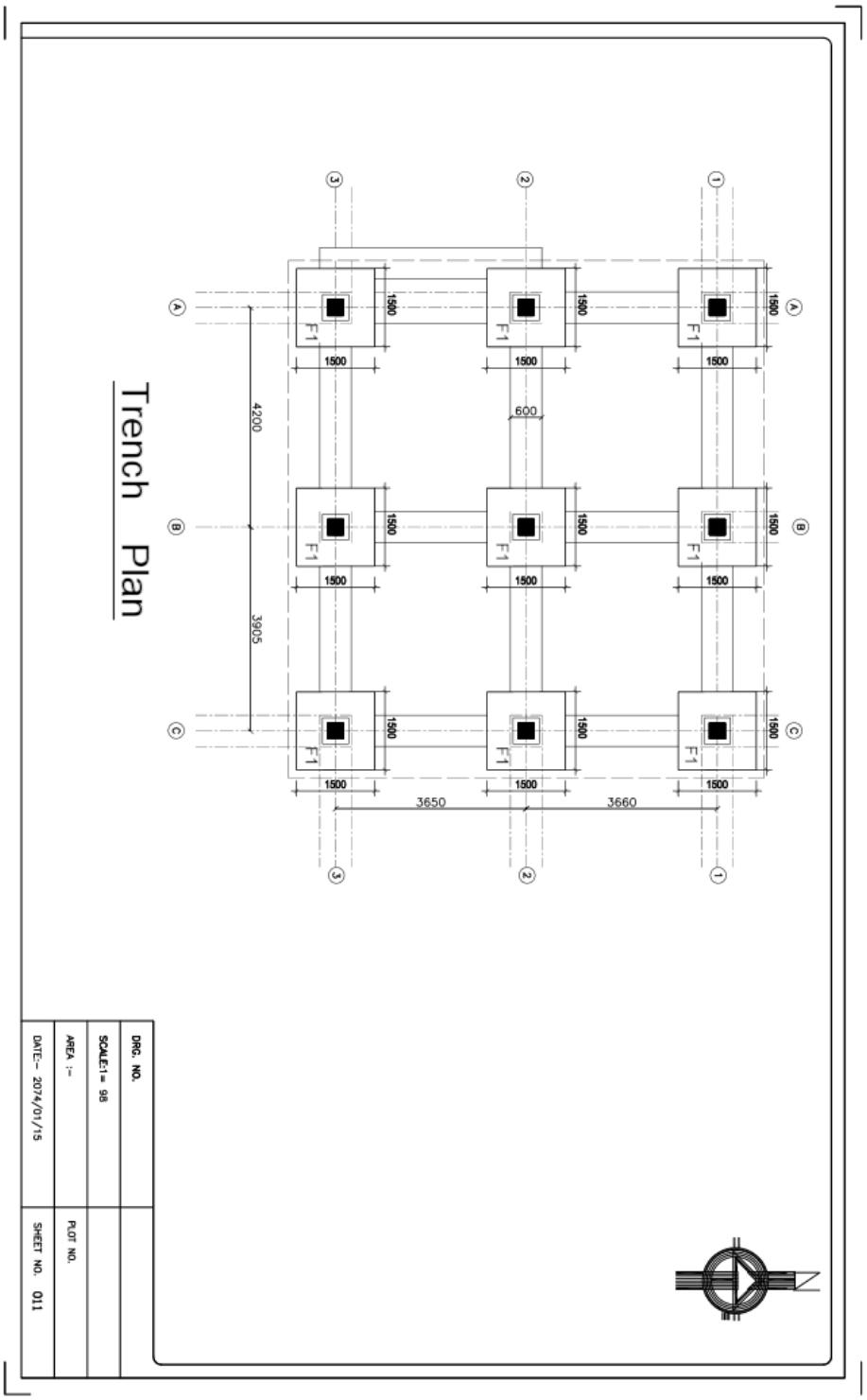
Any error in description or in quantity or omission of items from the Agreement shall not vitiate this Agreement but shall be corrected and demand to be a variation required by Site Engineer.

All measurements shall be taken in accordance with the Indian Standard Electrical Installation in Buildings Method of Measurements of IS: 5808:1770, unless otherwise specified.

Section VII. Drawings




Beam Plan For 1st Floor Plan
9110
4200
3905
9900
3650
3660
DRG. NO.
SCALE:1= 98
AREA :-
DATE:- 2074/01/15
PLOT NO.
SHEET NO. 010


Trench Plan
F1
1500
600
4200
3905
3650
3660
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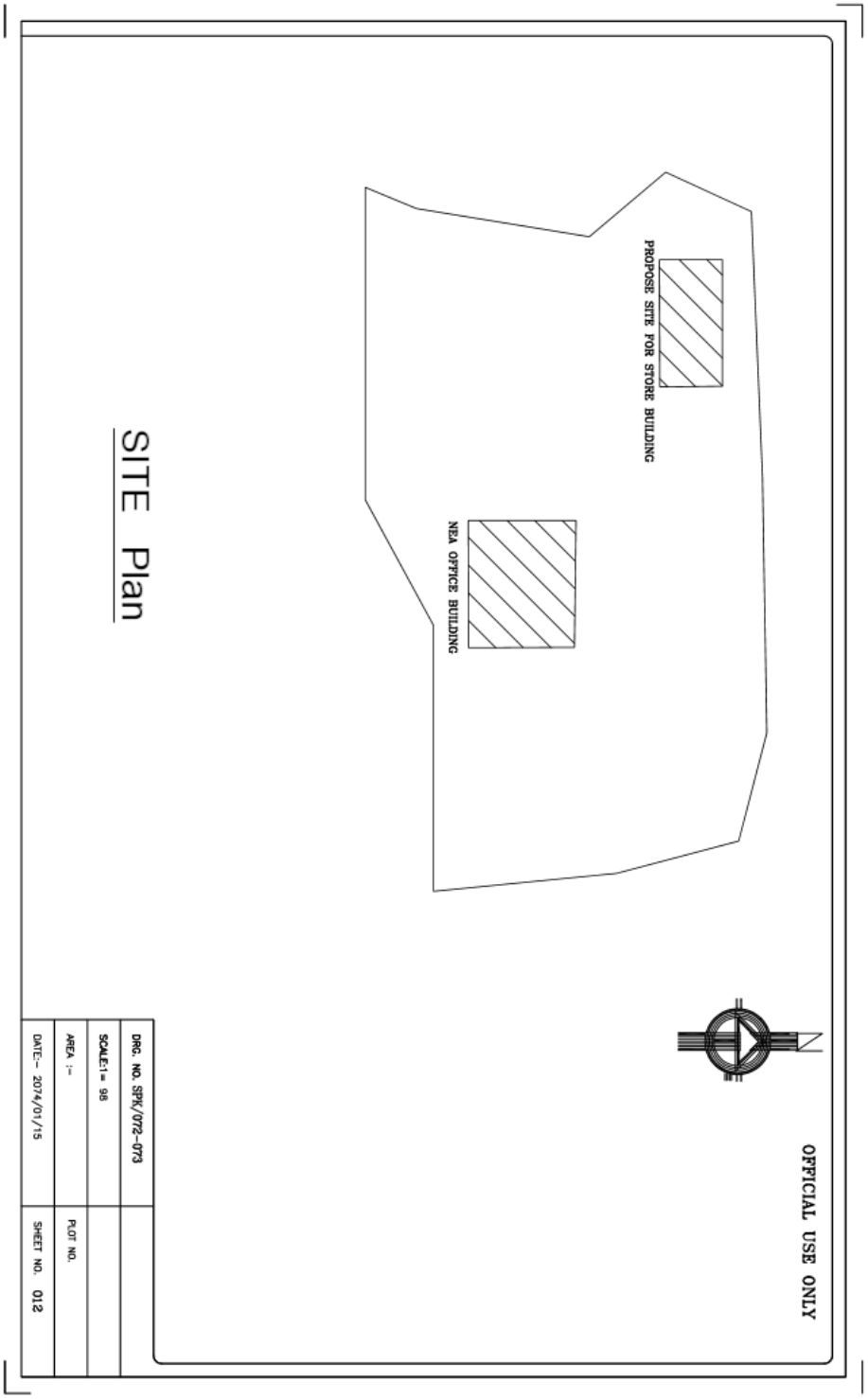
SITE Plan
PROPOSE SITE FOR STORE BUILDING
NEA OFFICE BUILDING
OFFICIAL USE ONLY
DRG. NO. SPK/072-073
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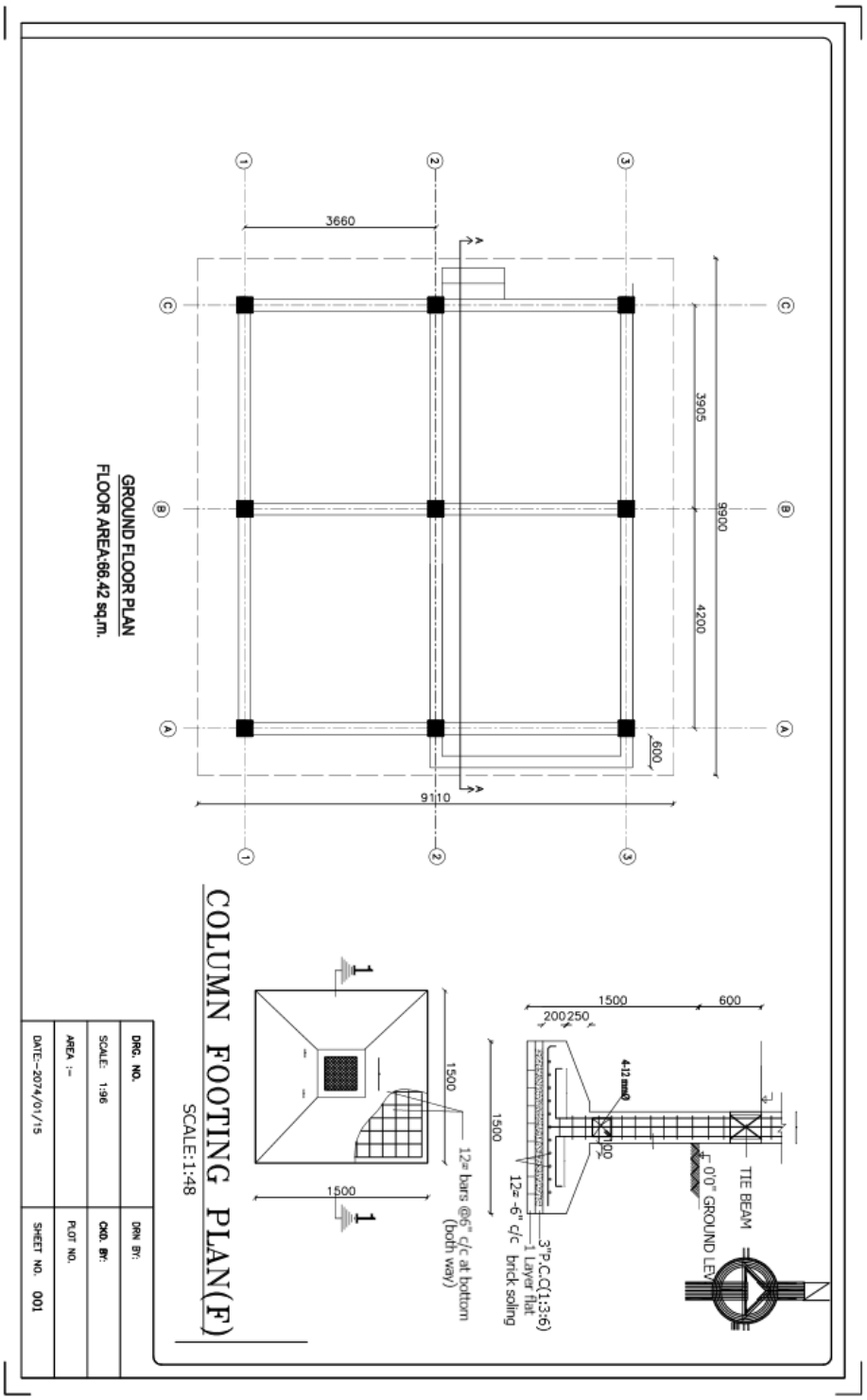
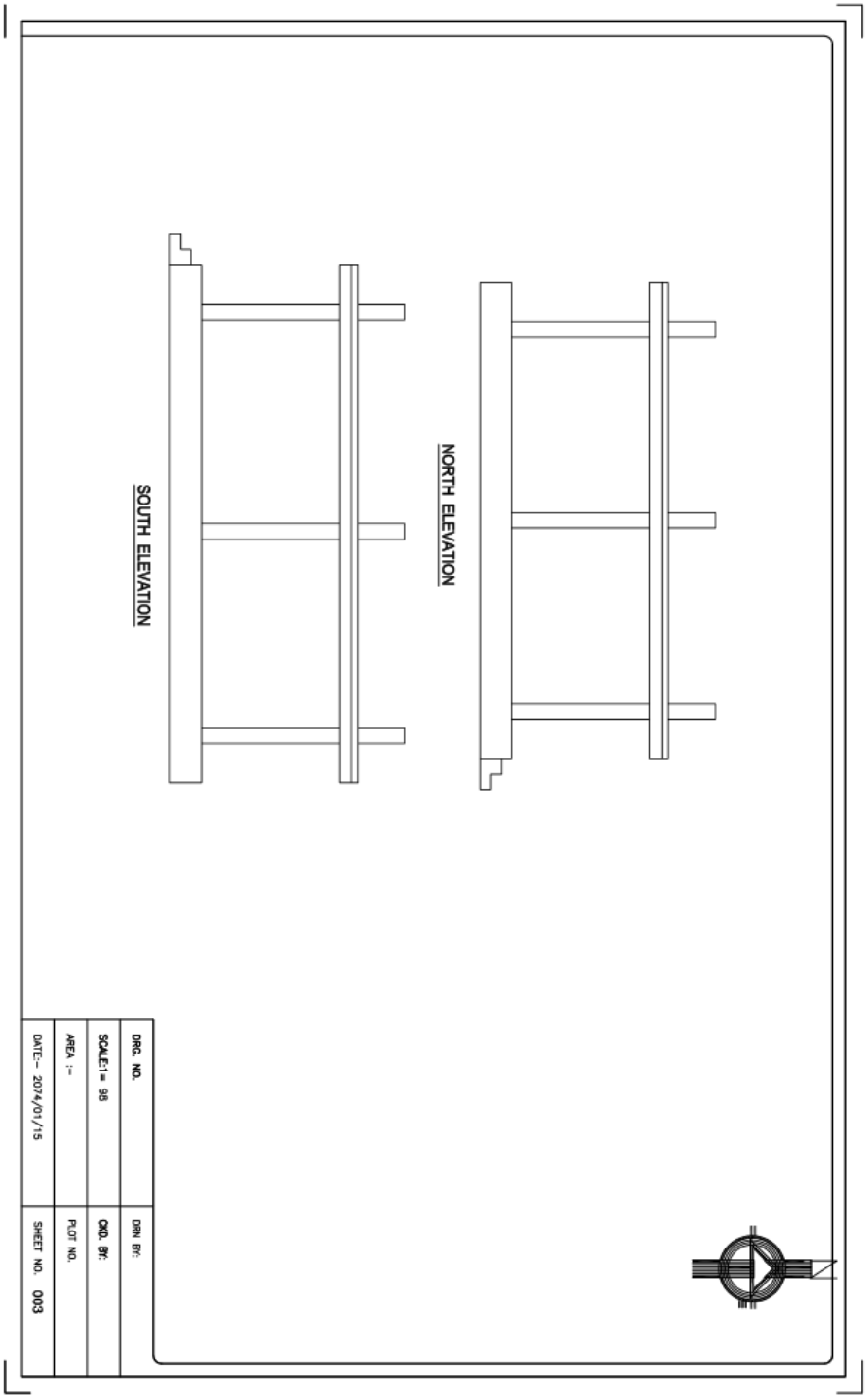
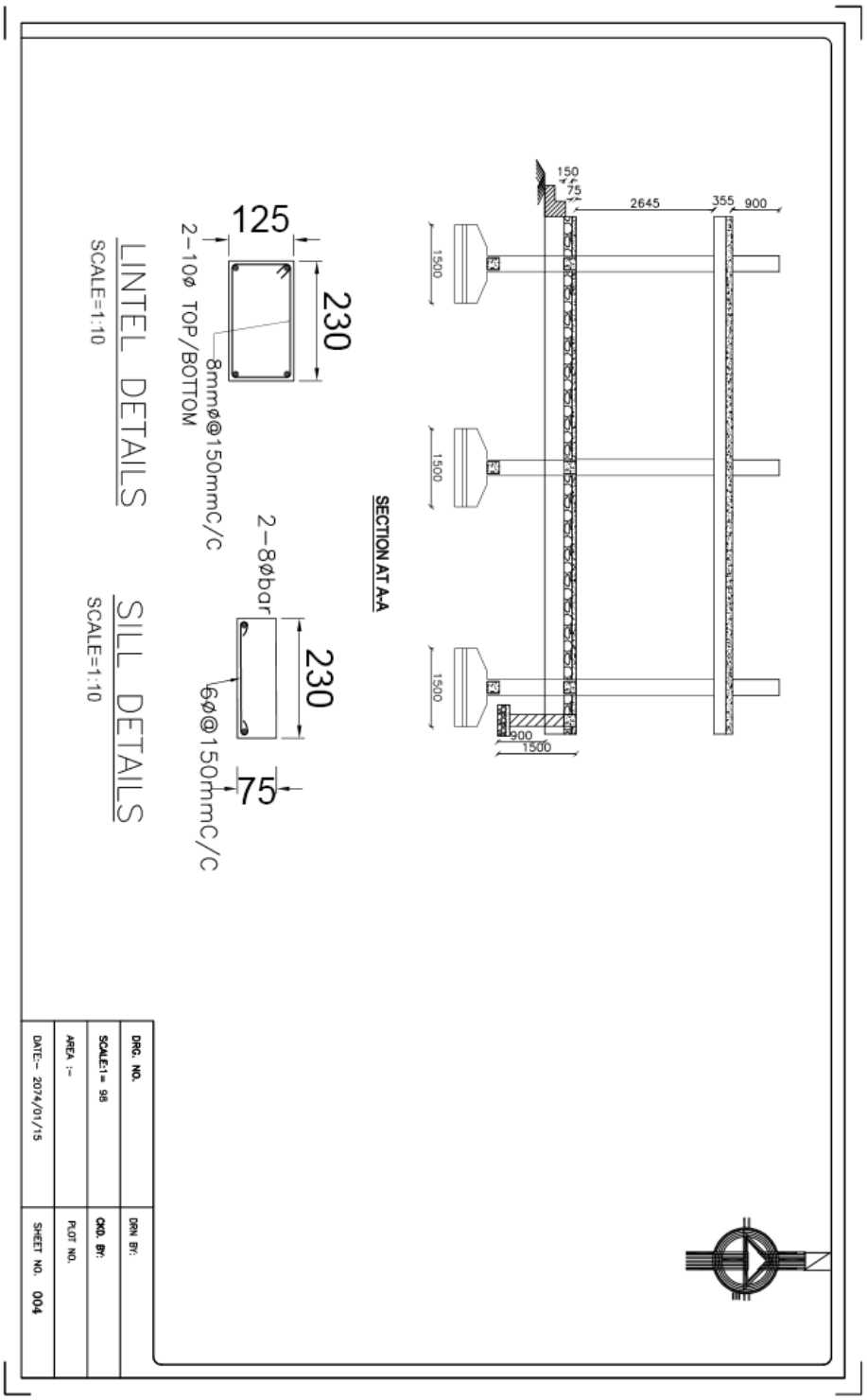
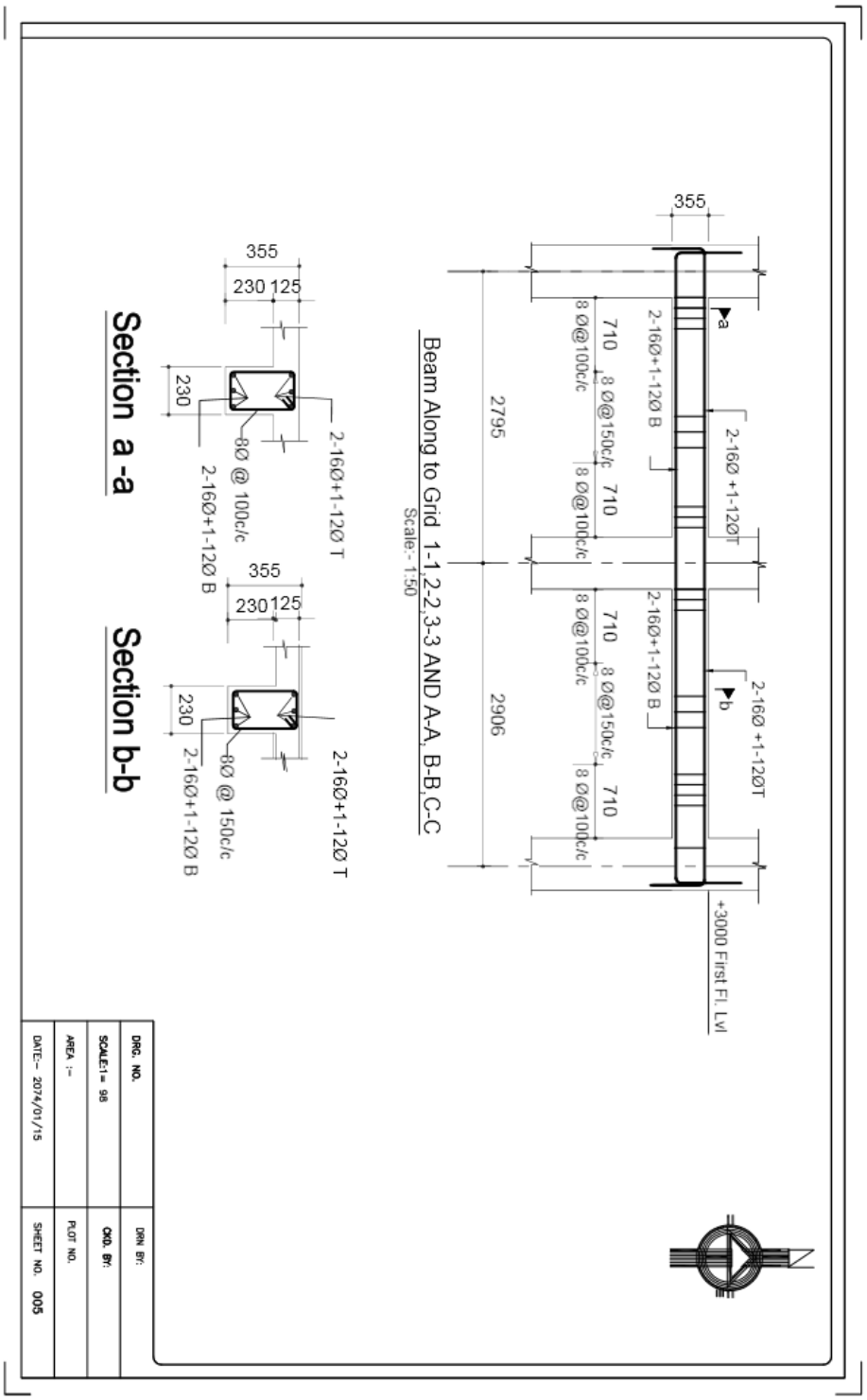
PLOT NO.
DATE:- 2074/01/15
SHEET NO. 012

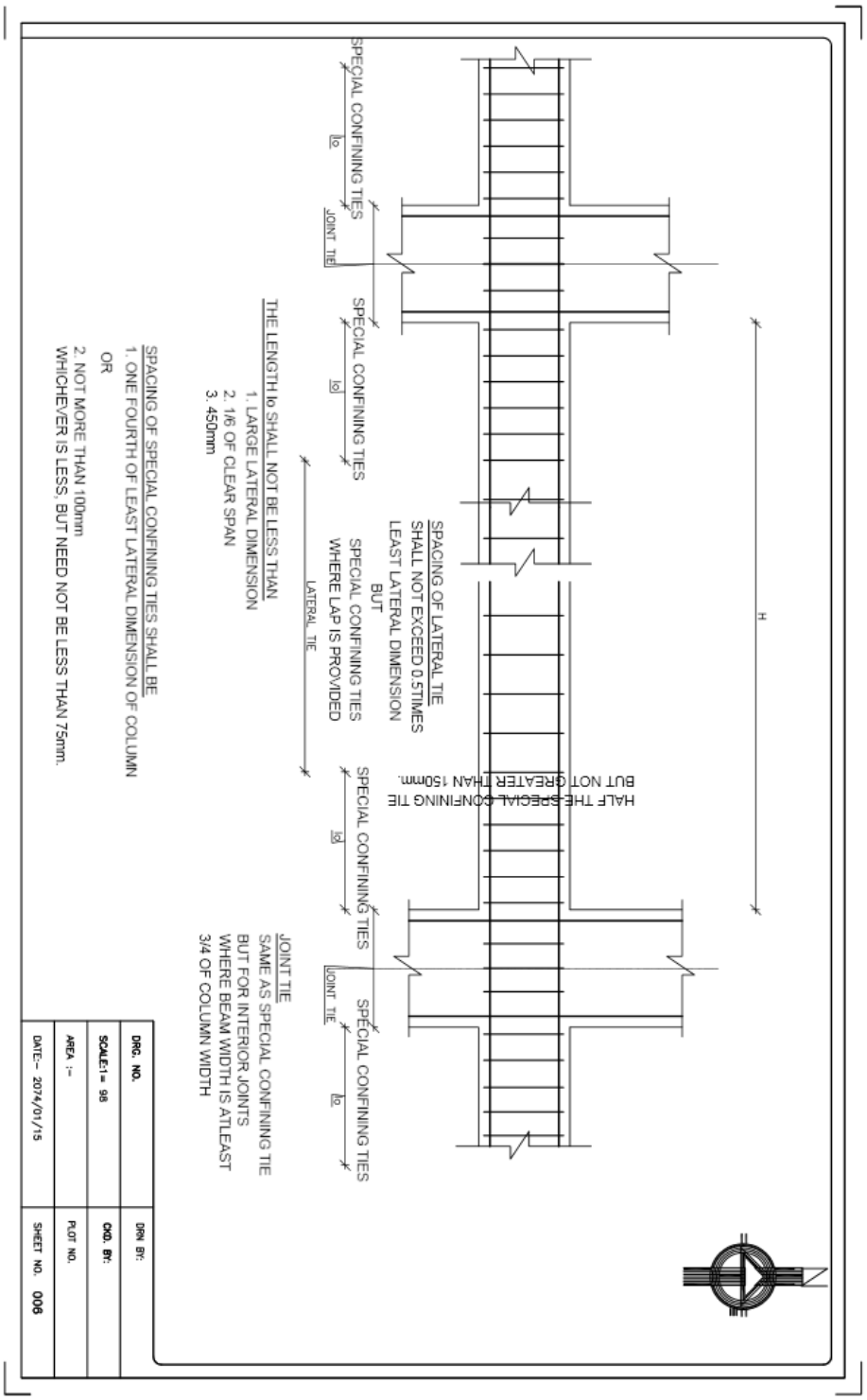

GROUND FLOOR PLAN
FLOOR AREA:66.42 sq.m.
3660
3905
9900
4200
600
9110
COLUMN FOOTING PLAN(F)
SCALE:1:48
1500
1500
12≠ bars @6" c/c at bottom (both way)
1500
600
200250
4-12 mmΦ
1500
12≠ -6" c/c
3"P.C.C(1:3:6)
1 Layer flat brick soling
TIE BEAM
0'0" GROUND LEV
DRG. NO.
SCALE: 1:96
AREA :-
DATE-2074/01/15
DRN BY:
CHD. BY:
PLOT NO.
SHEET NO. 001

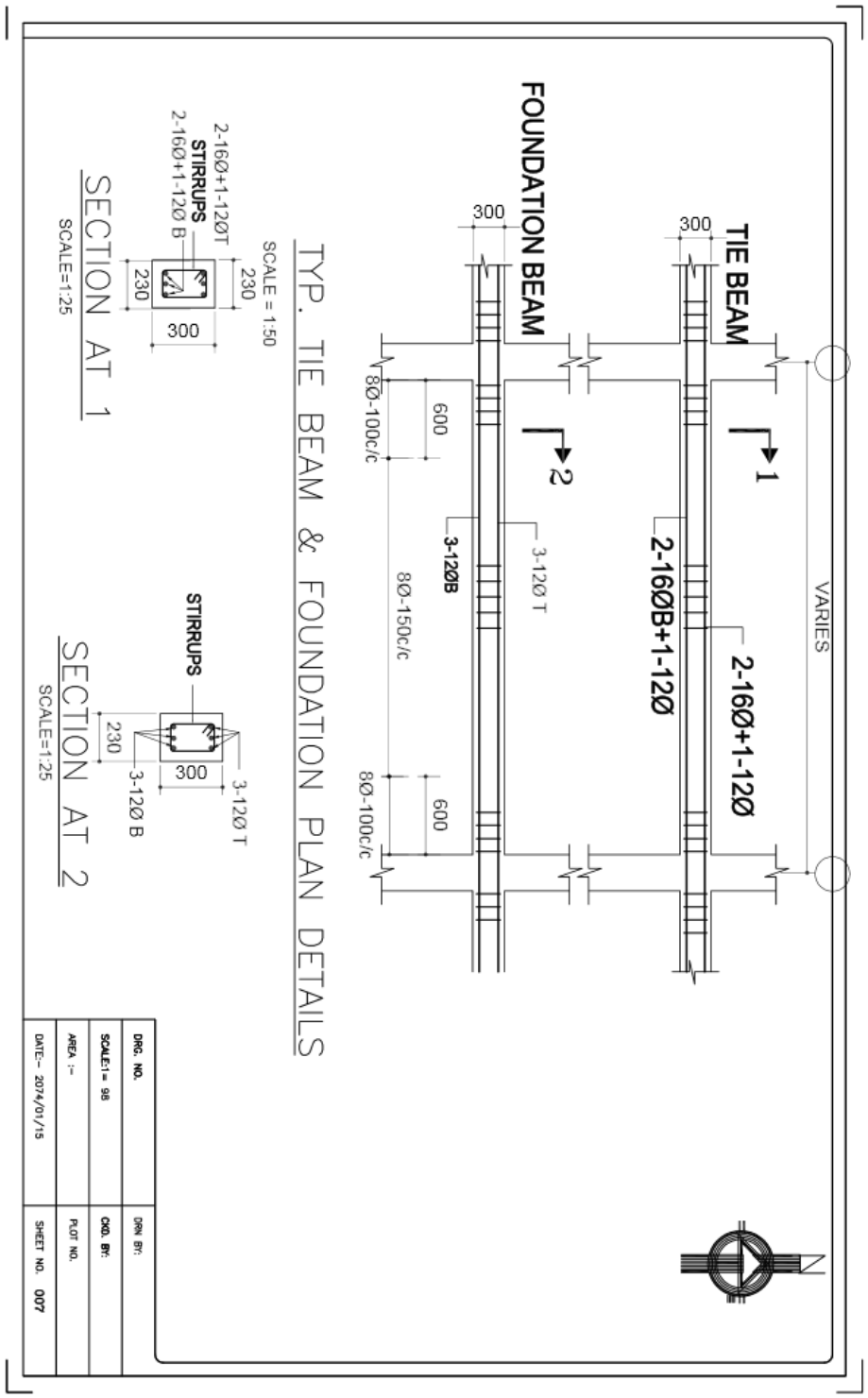
EAST ELEVATION
WEST ELEVATION
Notes:
1. Minimum depth of footing shall not be less than 1500mm. from the original ground level.
2. Minimum concrete grade to be M20.
3. Minimum Grade of reinforcement steel to be Main TMT 500
4. Cover to reinforcement shall not be less than 50mm for Foundation, 40mm for Column,25mm for Beam &15mm for slab.
5. Only written dimensions to be followed, drawings not to be measured as per given scale.
6. Any discrepancy or omission in this drawing if found shall be reported immediately to the site engineer.
7. Bearing capacity for foundation design is assumed to be 110KN/m2
OWNER:-
DRG. NO.
DRN BY:
SCALE:1= 98
CKD. BY:
AREA :-
PLOT NO.
DATE:- 2074/01/15
SHEET NO. 002

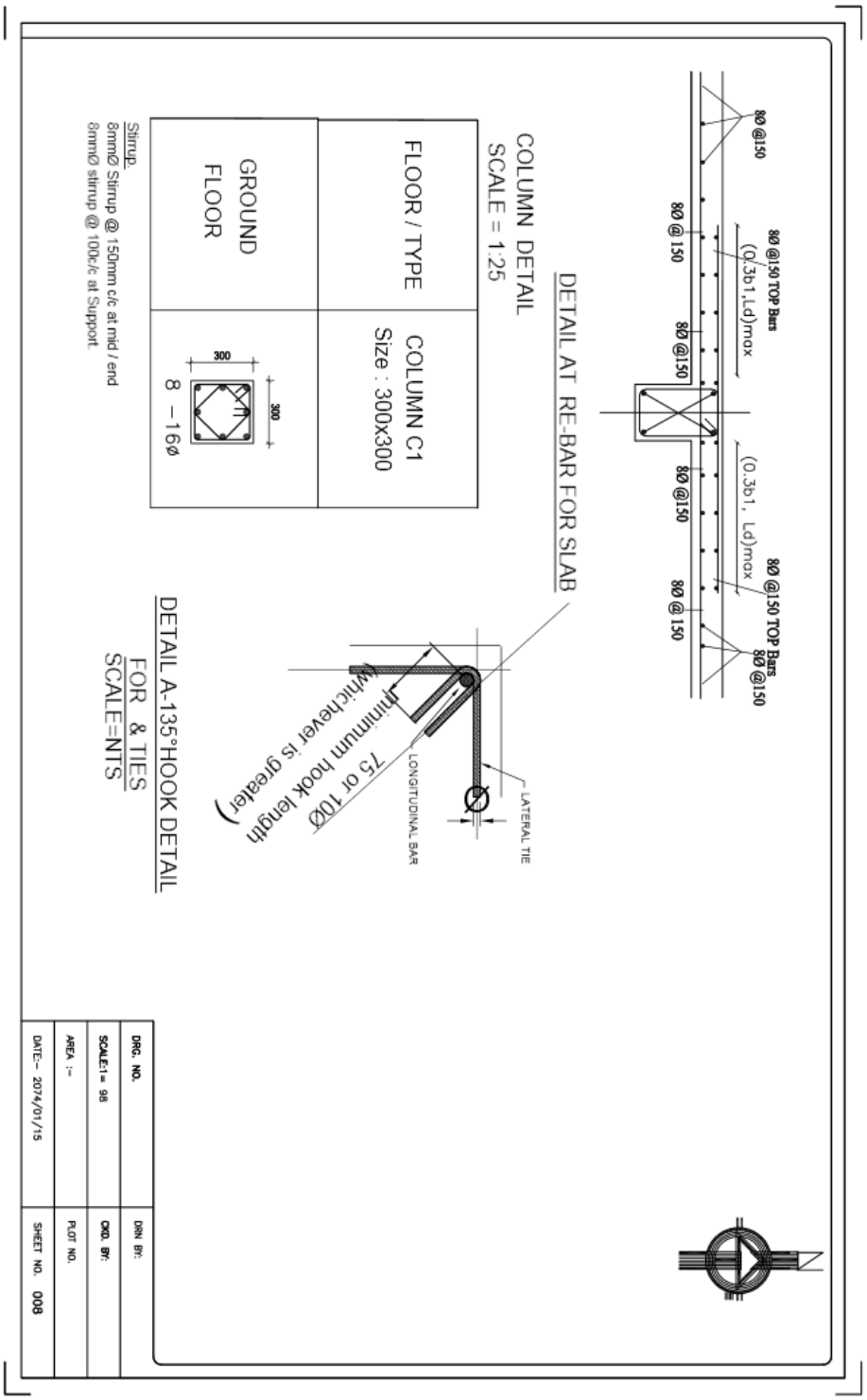

SOUTH ELEVATION
NORTH ELEVATION
DRG. NO.
SCALE:1 = 98
AREA :-
DATE:- 2074/01/15
DRN BY:
CKD. BY:
PLOT NO.
SHEET NO. 003


150
75
2645
355
900
1500
1500
1500
900
1500
SECTION AT A-A
125
230
2-10ø TOP/BOTTOM
8mmø@150mmC/C
LINTEL DETAILS
SCALE=1:10
2-8øbar
230
6ø@150mmC/C
75
SILL DETAILS
SCALE=1:10
DRG. NO.
DRN BY:
SCALE:1= 98
CKD. BY:
AREA :-
PLOT NO.
DATE:- 2074/01/15
SHEET NO. 004


Beam Along to Grid 1-1,2-2,3-3 AND A-A, B-B,C-C
Scale:- 1:50
355
2-16Ø+1-12Ø B
2-16Ø +1-12ØT
710
8 Ø@100c/c
8 Ø@150c/c
2795
2906
+3000 First Fl. Lvl
Section a -a
Section b-b
355
230 125
230
8Ø @ 100c/c
2-16Ø+1-12Ø T
2-16Ø+1-12Ø B
8Ø @ 150c/c
DRG. NO.
DRN. BY:
SCALE:1 = 98
CKD. BY:
AREA :-
PLOT NO.
DATE:- 2074/01/15
SHEET NO. 005


SPECIAL CONFINING TIES
lo
JOINT TIE
SPECIAL CONFINING TIES
lo
SPACING OF LATERAL TIE
SHALL NOT EXCEED 0.5TIMES
LEAST LATERAL DIMENSION
BUT
SPECIAL CONFINING TIES
WHERE LAP IS PROVIDED
LATERAL TIE
HALF THE SPECIAL CONFINING TIE
BUT NOT GREATER THAN 150mm.
SPECIAL CONFINING TIES
lo
JOINT TIE
SPECIAL CONFINING TIES
lo
H
THE LENGTH lo SHALL NOT BE LESS THAN
1. LARGE LATERAL DIMENSION
2. 1/6 OF CLEAR SPAN
3. 450mm
SPACING OF SPECIAL CONFINING TIES SHALL BE
1. ONE FOURTH OF LEAST LATERAL DIMENSION OF COLUMN
OR
2. NOT MORE THAN 100mm
WHICHEVER IS LESS, BUT NEED NOT BE LESS THAN 75mm.
JOINT TIE
SAME AS SPECIAL CONFINING TIE
BUT FOR INTERIOR JOINTS
WHERE BEAM WIDTH IS ATLEAST
3/4 OF COLUMN WIDTH
DRG. NO.
DRN BY:
SCALE:1= 98
CHD. BY:
AREA :-
PLOT NO.
DATE:- 2074/01/15
SHEET NO. 006


TYP. TIE BEAM & FOUNDATION PLAN DETAILS
SCALE = 1:50
TIE BEAM
FOUNDATION BEAM
300
300
1
2
VARIES
2-16Ø+1-12Ø
2-16ØB+1-12Ø
3-12ØB
3-12Ø T
8Ø-100c/c
8Ø-150c/c
8Ø-100c/c
600
600
SECTION AT 1
SCALE=1:25
2-16Ø+1-12ØT
STIRRUPS
2-16Ø+1-12Ø B
230
230
300
SECTION AT 2
SCALE=1:25
STIRRUPS
230
300
3-12Ø B
3-12Ø T
DRG. NO.
SCALE:1= 98
AREA :-
DATE:- 2074/01/15
DRN BY:
CHD. BY:
PLOT NO.
SHEET NO. 007


80 @150
80 @150 TOP Bars
(0.3b1,Ld)max
80 @ 150
80 @150
80 @150
80 @150 TOP Bars
(0.3b1, Ld)max
80 @150
80 @ 150
DETAIL AT RE-BAR FOR SLAB
COLUMN DETAIL
SCALE = 1:25
FLOOR / TYPE
COLUMN C1
Size : 300x300
GROUND FLOOR
300
300
8 –16ø
Stirrup
8mmØ Stirrup @ 150mm c/c at mid / end
8mmØ stirrup @ 100c/c at Support
DETAIL A-135°HOOK DETAIL
FOR & TIES
SCALE=NTS
75 or 10Ø
(whichever is greater)
minimum hook length
LONGITUDINAL BAR
LATERAL TIE
DRG. NO.
DRN BY:
SCALE:1= 98
CKD. BY:
AREA :-
PLOT NO.
DATE:- 2074/01/15
SHEET NO. 008

Section VIII. Bill of Quantities

NEPAL ELECTRICITY AUTHORITY
DHUNCHE DISTRIBUTION CENTRE
DHUNCHE, RASUWA
BOQ

JOB:- Construction of Store Building for Nepal Electricity Athurity DCS Dhunche

Item No.	Description of Work	Unit	Quantity	Unit Rate in Figure	Unit Rate in words	Total Amount	Remarks
A. Civil Works							
1	**Earthwork and Earthfilling**						
1.1	**Site preparation work with cleaning and disposal of debrises, uprooting roots, solid wastes etc. all complete as per instruction.**	Sqm	100.00				
1.2	**Earthwork in excavation in hard/boulder mix soils in foundation including 10m hauling distance and 1.5 m. lift all complete.**	Cum	69.69				
1.3	**Earth filling including supply of filling materials all complete.**	Cum	38.33				
1.4	**Earth filling in 150/150 mm thick layer, watering, ramming including supply of filling materials within 10 m distance all complete.**	Cum	9.48				

2	**Rubble stone filling work in foundation and in floor .**						
	Rubble stone filling work in foundation and in floor.	Cum	18.16				
3	**PCC Works**						
3.1	**Plain cement Concrete (PCC) in 1:3:6 ratio for foundations, flooring and walls with approved quality of cement and sand and crushed stone aggregate including mixing, laying, curing etc all complete in approval of site engineer.**	Cum	9.06				
4	**RCC WORK**						
4.1	**Plain cement Concrete (PCC) for RCC works (1:1.5:3) for column/beam/slab/lintels with approved quality of cement and sand and crushed stone aggregate including mixing, laying, curing etc all complete in approval of site engineer.**	Cum	37.97				
5	**STEEL WORK**						
5.1	**Tor steel or TMT reinforcement bar of fe 415/500 grade including straightening, cleaning, cutting, binding & fixing in position with annealed tying binding wire as per drawing, design & instruction all complete.**	MT	4.47				
6	**Brick Masonary work**						

6.1	**Good quality local chimney made Brickwork in 1:4 C/S mortar up to ground floor in perfect line level finish including wetting the bricks, racking the joints and curing the work for at least 7 days all complete.**	Cum	5.46				
7	**Formwork**						
	Formwork, shuttering, centering with 19mm thick waterproof ply board and steel post for all works necessary propping, scaffolding, staging, supporting inclusive of wedging and cutting holes for utilization till the support if fully unyielding net.						
7.1	**On column**	Sqm	31.86				
7.2	**On beam**	Sqm	172.26				
	Total:						
	13%VAT:						
	Grand Total Amount with VAT:						

Company seal…… Signature……

Date…… Designation……..

Section IX.
Forms of Securities

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 *[address]* (hereinafter called "the Bank") are bound unto *[name of Employer]* (hereinafter called "the Employer") in the sum of *[amount]*[1]for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors, and assigns by these presents.
Sealed with the Common Seal of the said Bank this *[day]* day of *[month]*, *[year]*.
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,

we undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer's 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 *[number]* days[2] 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 Nepali Rupees. This figure should be the same as shown in Clause 13 of the Instructions to Bidders.*
[2] *Usually 30 days after the end of the validity period of the* bid*. The date should be inserted by the Employer before the bidding documents are issued.*

Performance Bank Guarantee

To: *[name and address of Employer]*

Whereas *[name and address of contractor]* (hereinafter called "the contractor") has undertaken, in pursuance of Contract No. *[number]* dated *[date]* 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] [amount in words]*[3]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]*[4] 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 there under 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 for at least 30 days beyond the date of issue of Defects Liability Certificate.

Signature and seal of the Guarantor _____

Name of Bank _____

Address _____

[3] *An amount is to be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract, and denominated in Nepalese Rupees.*

[4] *The Unconditional (or "On-Demand") Bank Guarantee has the merit of simplicity and of being universally known and accepted by commercial banks. The contracting community, however, strongly objects to this type of Security because the Guarantee can be called (or threatened to be called) by Employers without justification. Employers should recognize the contractual conditions governing non performance by the Contractor and should normally act only on the advice of the Project Manager in calling a Performance Guarantee.*

Date _____

Bank Guarantee for Advance Payment

To: *[name and address of Employer]*

[name of Contract]

Gentlemen:

In accordance with the provisions of the Conditions of Contract, Sub clause 11.9("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] [amount in words]*[5]

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] [amount in words]*[6]

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed there under 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.

The validity period of the guarantee shall be 30 days beyond the period scheduled for repayment of the advance payment and the guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until the *[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: _____

[5] *An amount is to be inserted by the Bank or Financial Institution representing the amount of the Advance Payment, and denominated in Nepali Rupees of the Advance Payment as specified in the Contract.*

[6] *An amount is to be inserted by the Bank or Financial Institution representing the amount of the Advance Payment, denominated in Nepali Rupees.*