NEPAL ELECTRICITY AUTHORITY

(A GOVERNMENT OF NEPAL UNDERTAKING)

DISTRIBUTION AND CONSUMER SERVICE DIRECTORATE

DAMAK DISTRIBUTION CENTER

DAMAK

SEALED QUOTATION NO: NEA-DMK-2074/075-03,Re- SQ

SEALED QUOTATION
FOR
Truss shed Works over Damak & Bluechowk SS.

First Date of Notice Publication: 2074/11/09

Last Date /Time of Purchasing: 2074/11/23 during Office Hours.

Last Date /Time of Submission: 2074/11/25 not later than 12:00 Hrs.

Time of opening of Sealed Quotation: 2074/11/25 at 14:15 Hrs

Issued To:

M/S ... ...

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Section I. **Invitation for Sealed Quotation**

दरभाउपत्र आह्वानको सूचना

(गोरखापत्र दैनिकमा सूचना प्रकाशित मितिः २०७४/११/०९)

यस कार्यालय अन्तर्गतका तपसिलका वितरण केन्द्रहरूमा निम्न लिखित कार्य दरभाउपत्रको माध्यमबाट गराउनु पर्ने भएकोले सम्बन्धित कार्यको लागि नेपाल सरकारबाट ईजाजतप्राप्त, VAT, PAN मा दर्ता भएका, आयकर तिरेका, रजिष्टर्ड कम्पनी/निर्माण/आपूर्ति कर्ता वा अख्तियार प्राप्त फर्मबाट नियमानुसार तोकिएको शर्तको अधिनमा रही कार्य गर्न दरभाउपत्र आह्वान गरिएको विस्तृत सूचना सम्बन्धित कार्यालयको सूचना पाटीमा टाँस गरिएको छ। दरभाउपत्रहरू **E-Bidding** का लागि नेपाल विद्युत् प्राधिकरणको वेवसाइट **eproc.nea.org.np** मा समेत राखिएको छ। दरभाउपत्र सम्बन्धि अन्य थप कुरा बुझ्नु परेमा उल्लेखित वेवसाइट वा सम्बन्धित कार्यालयमा कार्यालय समय भित्र सम्पर्क राख्न सकिने छ।

सि. नं.	दरभाउपत्र नम्बर	कामको बिबरण	दरभाउपत्रको मुल्य रु.	दरभाउपत्रको जमानत रु.	निर्माण कार्यको लागतअनुमान रु. (VAT सहित)	दरभाउपत्र खरिद गर्ने अन्तिम मिति र समय	दरभाउपत्र दाखिला गर्ने अन्तिम मिति र समय	दरभाउपत्र खरिद गर्ने कार्यालयको बैक र खाता नं.	बिड्बण्डु जम्मा गर्ने कार्यालयको बैक र खाता नं.	दरभाउपत्र खोलिने मिति र समय	सम्बन्धित कार्यालय
१	NEA-DMK-2074/075-02, Re-SQ	Quarter Building finishing works	१,०००/-	२५,०००/००	९,९९,०९८/६६	२०७४/११/२३गते कार्यालय समय सम्म	२०७४/११/२५ दिनको १२:०० बजे सम्म	एनआइ सीएसिया बैंक,दमक, ३४४१४२६७०५२४२००१	नविल बैंक,दमक, २२०१०१७५२०१०६५	२०७४/११/२५ दिनको १४:०० बजे	दमक वितरण केन्द्र ०२३-५८१९६९
२	NEA-DMK-2074/075-03,Re-SQ	Trussed work over Damak and Bolochowk Substation	१,०००/-	१५,०००/००	५,९९,५१७/४८					२०७४/११/२५ दिनको १४:१५ बजे	
३	NEA-DMK-2074/075-04, Re-SQ	Rural Electrification Works	१,०००/-	३७,०००/००	१४,५२,१४३/९४					२०७४/११/२५ दिनको १४:३० बजे	
४	NEA-DMK-2074/075-05, Re-SQ	Rural Electrification Works	१,०००/-	३८,०००/००	१४,८८,८४०/५८					२०७४/११/२५ दिनको १४:४५ बजे	
५	NEA-DMK-2074/075-06, Re-SQ	Rural Electrification Works	१,०००/-	३८,०००/००	१४,९०,४७४/७०					२०७४/११/२५ दिनको १५:०० बजे	
६	NEA-DMK-2074/075-07, Re-SQ	Rural Electrification Works	१,०००/-	३८,०००/००	१४,९२,१०८/८२					२०७४/११/२५ दिनको १५:१५ बजे	
७	NEA-IDC-2074/t075-04, SQ	LT Line Extension Works	१,०००/००	४७,०००/००	१६,४७,४४९/९३	२०७४/११/२३गते कार्यालय समय सम्म	२०७४/११/२५दिनको १२:०० बजे सम्म	प्राइम कमर्सियल बैंक, इटहरी, ०१६००६१७CA	नविल बैंक इटहरी ०१०६०१७५०००१२	२०७४/११/२५ दिनको १४:०० बजे	इटहरी वितरण केन्द्र ०२५-५८३४४९

नेपाल विद्युत् प्राधिकरण
विराटनगर क्षेत्रीय कार्यालय, विराटनगर। ०२१-४३६३०६

Nepal Electricity Authority
Distribution and Consumer Service Directorate
Damak Distribution Center
Damak, Jhapa
Tel. : + 977 -023-581169

Instructions to Bidder

1. Scope of Works

The Employer stated in the Invitation for Sealed Quotation invites bids for Truss shed Works over Damak and Bluechowk SS as detailed in attached specifications, drawings and the bill of quantities provided herein.

2. Eligible Bidder

This Invitation for Bids is open to all registered contractors with qualifications as described below:

a) Up to date Firm/Company Registration Certificate
b) VAT and PAN Registration Certificates
c) Tax Clearance Certificate 2073/074
d) 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 bid procurement proceedings and has not been punished for the profession or business related offence.
e) Power of Attorney
f) Other documents as needed

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3. One Bid per Bidder

Each Bidder shall submit only one quotation; A Bidder who submits more than one quotation shall cause all the quotations with the Bidder's participation to be disqualified.

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.

6. Content of Quotation Form

The Quotation Form comprise the documents listed below:

Invitation for Sealed Quotations

Instructions to Bidders

Forms of Bid, Letter of Acceptance and Agreement

General Conditions of Contract (GCC)

Special Conditions of Contract (SCC)

Technical Specification

Drawings

Bill of Quantities

Sample Forms of Securities

7. Clarification

A prospective Bidder may obtain clarification on the Quotation Form from the Employer.

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 Eligibility Information

b. Bid Security

c. Priced Bill of Quantities

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 separately 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 of **45 days** after opening of the quotation.

12. Bid Security

The Bidder shall furnish a Bid Security of **NRs. 15,000.00**. The Bid Security shall remain valid for a period of **75 days** after opening of the quotation.

The Bid Security shall be in the form of cash voucher deposited in the Bank Account of the Employer specified in the notice for "Invitation for Quotation" or a bank guarantee from a bank acceptable to the Employer.

13. Format and Signing of Bids

The bid shall be typed or written in indelible ink and shall be signed by an authorized person. Any entries or amendments including alternations, additions or corrections made shall be initialled by the same authorized person.

14. Sealing and Marking of Bids

The Bidder shall submit his bid in sealed envelopes. The envelope shall be addressed to the Employer specified in the Invitation for Quotation and shall bear the name and identification number of the quotation.

15. 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 Invitation for Quotation.

16. Late Bids

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

17.Modification and Withdrawal of Bids

Bids once submitted shall not be withdrawn or modified.

18. 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 as specified in the Invitation for Quotation.
The Employer shall prepare and provide minutes of the bid opening including the information disclosed to those present.

19. Process to be Confidential

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

20.Examination of Bids

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.

21. Evaluation and Comparison of Bids

21.1 In evaluating the Bids, the Employer shall determine for each bid the evaluated Bid Price by adjusting any corrections for errors. Bids 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

21.2 If the Bidder does not accept the corrected amount, the bid shall be rejected and the Bid Security may be forfeited.

22. Award of Contract

22.1 The Employer shall decide the award of the contract to the Bidder whose bid is within the approved estimate and who has offered the lowest evaluated Bid Price within 15 days of the opening of the quotation, provided that such Bidder has been determined to be eligible in accordance with the provisions of Clauses 2.

22.2 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, 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 25 by an 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.

23. 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 or to cancel the bidding process and reject all bids, at any time prior to the award of the contract, without assigning any reasons whatsoever and without thereby incurring any liability to the affected Bidder or Bidders.

24. Notification of Award and Signing of Agreement

24.1 The Bidder whose bid is accepted and all other participating bidders shall be notified of the award by the Employer.

24.2 The notification (hereafter called the "Letter of Acceptance") to the successful Bidder shall state the sum that the Employer shall pay the Bidder in consideration of the execution, completion, and maintenance of the works as described by the contract. Within 7 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver the Performance Security pursuant Clause 25 and sign the Agreement.

24.3 Inability of the Bidder to make an Agreement within the above stated period shall result in cancellation of the Contract Award and forfeiture of the Bidder's Bid Security, upon which the Contract shall then be awarded to the next successive successful Bidder.

25. Performance Security

The successful Bidder shall deliver to the Employer a Performance Security in cash or Bank Guarantee acceptable to the Employer equivalent to **Performance Security Amount =[(0.85 x Cost Estimate –Bid Price) x 0.5] + 5% of Bid Price.**

26.Additional Securities

The Bidder may be required to provide additional Performance Security if the Employer determines that the rate quoted by the Bidder in the Bill of Quantities, are too low for execution of the contract. In such case, the Employer shall instruct the Bidder to provide additional 8% security for signing of the Contract Agreement. Bidder's failure to do provide additional security shall result in forfeiture of the Bid Security and award of the Contract to the next lowest evaluated Bidder.

27.Corrupt or Fraudulent Practices

The Employer shall reject a bid for award if it determines that the Bidder recommended for award of contract has engaged in corrupt or fraudulent practices in competing for the contract in question.

28.Conduct of Bidders

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

28.2 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

29. Blacklisting Bidder

29.1 Without prejudice to any other right of the Employer under this Contract, GoN, Public Procurement Monitoring Office may 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 28.2,
b) if the bidder fails to sign an agreement pursuant to Sub - Clause 24.2,
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

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

Special Instruction to Bidders for e-Bidding

A) Bid submission procedure through electronically (e-submission):

i. Interested eligible bidders shall, either purchase the hard copy of the Bidding document directly from the Employer's office as specified in the Invitation for Bid (IFB) or shall download the necessary parts of bidding documents from e-procurement section in NEA's web Site http://www.eproc.nea.org.np. In case, the Bidder choose to download the bidding documents, prepare his/her bids on downloaded documents, and submit his/her bid electronically, the Bidder is required to deposit the non-refundable fee for the cost of bidding document (as specified in the bid notice) in the bank account specified in the IFB. In addition, electronic scanned copy (*.pdf format) of the Bank deposit voucher shall also be required to be submitted along with the electronic bid files.

ii. The Bidder shall fill the following documents and forms (in hard copy of issued bid documents), signed by the authorised representative and with seal of the company.
Bill of Quantity (BOQ) with rate, amount, b) Form of Bid, Qualification Information
The Bidder shall then scan the completed original documents, forms in PDF formats with appropriate filename shown in the table below. PDF (Adobe acrobat) version must be 4.0 or above.

S.No.	Document	PDF File name	Requirement	Remarks
1	Form of Bid	Bid form -1	Mandatory	
2	Bid Security (Bank Guarantee)	Bid security-2	Mandatory	
3	Company registration,	Company reg-3	Mandatory	All firms in case of JV
4	VAT/PAN registration	VAT reg-4	Mandatory For National firms	All firms in case of JV
5	Tax clearances certificate for F/Y 2073/074	Tax-5	Mandatory For National firms	All firms in case of JV
6	Power of Attorney of Bid signatory	Power of att -6	Mandatory	
7	Joint venture agreement (if any)	JV doc-7	Mandatory	
8	Qualification Information	Qualifications-8	Mandatory	
9	BOQ with rate, amount and total amount	BOQ-9	Mandatory	
10	Manufactures Authorization	Authorization-10	Mandatory	NA
11	Technical Data Sheet	TDS-11	Mandatory	NA
12	Certification Documents	Certifications-12	Mandatory	NA
13	Declaration Form	Declaration-13	Mandatory	

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

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

iv. After preparing all the required bidding documents in PDF, scan files as specified as in (ii).

v. The Bidder shall upload the PDF bid files and submit his/her complete bid online through e-procurement section of NEA's website http://www.eproc.nea.org.np within the specified date and time.

vi. The e-procurement system will accept the e-submission of bid from the date after publishing of notice and will automatically not allow the e-submission of bid after the deadline for submission of bid, as specified above.

vii. The standard time for e-submission is Nepalese Standard Time as set out in the server of MIS Department of NEA.

viii. When a bidder submits his/her 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.

ix. Bidders may submit his Substitution or Modification or Withdrawal either in hard copy or through e-submission.

x. For Substitution of Bid, the Bidder shall follow similar steps as specified in ITB Clause-22 with a Substitution letter in PDF file.

xi. 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 Authorised Representative/s of the Firm / all authorised Joint Venture partners.

xii. When a Bidder submits electronic bid by downloading the bidding documents from the NEA's webpage it is assumed that the Bidder prepares his bid by studying and examining all the Bidding documents including specifications and conditions of contract.

xiii. In case, the Bidder choose to download the bidding documents and deposit the cost of bidding document (as specified in the bid notice), such deposited amount shall be verified by the office during bid evaluation process. The bid shall be non-responsive and shall not be evaluated if the specified cost for bidding document is not deposited in the specified Employer's (revenue) account for the said document.

xiv. Proposed facility for submission of bid electronically through e-submission is to increase transparency, non-discrimination, equality of access, and open competition. The Bidders shall be fully responsible to use the e-submission facility in e-procurement section of NEA's website http://www.eproc.nea.org.np in specified procedures and in no case the Employer shall be held liable for Bidder's inability to use this facility.

B) Requirements and Conditions for e-submission of bid:

i. The Bidder shall submit his bid electronically in PDF files in the manner specified above, and submission of hard copy of "original plus one copy of bid" is not mandatory.

ii. In case, if both the electronic bid and original bid in hard copy are submitted to the Employer within the bid submission dead line, the Bidder's electronic bid and original bid in hard copy will be accepted for evaluation provided if the facts and figures in hard copy confirm to the PDF files in electronic bid. If there is any discrepancy in fact and figures in the electronic bid 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. However, for electronically submitted bid in PDF files, the Bidder shall be required to submit documents/ clarifications as specified in ITB clause within 3 days.

iii. 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 within 3 days.

iv. In addition to electronically submitted PDF files, the Bidder shall be required to submit documents and clarifications as required by the Employer. Non-submission of such documents and/or clarifications by the Bidder within specified time may cause forfeiture of Bid Security.

v. In case of major discrepancy found between electronically submitted PDF bid files and documents/ clarifications provided by the Bidder, the bid shall not be considered for further evaluation.

vi. The Bidder shall attach the Bid Security Guarantee in the format attached in the Bid Document. The Bid Security may be forfeited

a. if the Bidder does not respond and/or submit the documents and or clarifications when requested by the Employer.

b. if major discrepancy is found between e-submitted bid information and documents/clarifications provided by the Bidder during verification process as requested by the Employer

C) Bid Opening for e-submitted Bid

i. Electronically submitted bid shall be opened first at the Bid opening time.

ii. The e-procurement system allows the Employer to download the e-submitted bid files from the Bidders only after the time for opening the bids.

iii. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files (not complying with the ITB Clauses) shall be considered incomplete and rejected for further bid evaluation.

iv. After opening of e-submitted bids files, all files shall be printed and recorded at the time of bid opening.

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

D) Bid Evaluation and Comparison Process for e-submitted Bid

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

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

D) Qualification Information

In case of e-Bidding, the Bidder is required to submit the documents to prove minimum qualification requirements only and not the detail documents.

E) Bid Security Format

Form of Bid security shall include the provision as ‘This Bank Guarantee shall not be withdrawn or released merely upon return of the original Guarantee by the Bidder unless notified by the Employer for the release of the Guarantee

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

Notes on Forms of Bid, Eligibility Information, Letter of Acceptance and Agreement

The Agreement shall incorporate any corrections or modifications to the bid resulting from corrections of errors, acceptable deviations or any other mutually-agreeable changes allowed for in the General Conditions.

The bid which the contractor has submitted to the Employer becomes part of the contract documents.

All the information with regard to the preparation of bid to meet the Employer's requirements shall be provided before issuing the bidding documents.

The contractor shall provide the remaining information by completing the form.

Bid

We have examined the documents listed in Instruction to Bidders, Clause 4 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 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 : _____ Authorised to sign on behalf of (organisation name): _____

Designation: _____

Office Stamp of the Organisation: _____

1. Eligibility Requirements:

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

a. Constitution or legal status of Bidder: [attach copy]
b. Up to date Registration Certificate: [attach copy]
c. Pan Registration Certificate: [attach copy]
d. Up to date Tax Returns/ Clearance: [attach copy]
e. Power of Attorney: [attach copy]
f. Place of registration: [insert]
g. 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 bid procu8rement proceedings and has not been punished for the profession or business related offence.
h. Principal Place of business: [insert

Letter of Acceptance

[Letterhead of the Employer]

Date: _____

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

This is to notify you that your Quotation (Bid) dated *[date]* for execution of the *[name of the Contract and identification number, as given in the Invitation for Quotation]* for the Contract Price of *[insert the amount in Nepalese Rupees in numbers and words]* as corrected and modified[1] 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* Section VIII Sample Forms of Securities, *, consisting of a Bank Guarantee in an approved format or cash deposit voucher in favour of the Employer in the Employer's Bank account [enter account details].*

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

Please convey our 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: _____

[1] *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 witnesseth 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 _____

Section IV. General Conditions of Contract (GCC)

1. 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, 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 Quotation**" 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 stated in the SCC 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 6.3), 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**" means the sum stated in the Letter of Acceptance as payable to the contractor and adjusted with any Variation Orders and Other Adjustments upon completion of the works and the remedying of any defects therein 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 10.3

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 5.1.

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

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

1.1.21 "**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.

1.1.22 "**Variation**" means any change which is a result of unforeseen circumstances that arise as a result of instruction by the Employer/ Engineer under Sub-Clause 9.1.

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

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

1.1.25 "**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.

1.1.26 "**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 13.1.

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 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. Employer's Liabilities

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

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

f. 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

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

h. any failure of the Employer,

i. 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,

j. any delay or disruption caused by any Variation,

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

l. 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

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

6. Time for Completion

6.1 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.

6.2 Programme

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

6.3 Extension of Time

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.

6.4 Liquidated Damages for Delay

If the contractor fails to complete the Works within the Time for Completion, the contractor's 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.

7. Taking-Over

7.1 Completion

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

7.2 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 8, clear the Site.

8. Remedying Defects

8.1 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.

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.

8.2 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 9.2.

9. Variations and Claims

9.1 Right to Vary

The Employer may instruct Variations.

9.2 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 or

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

9.4 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.

9.5 Variation and Claim Procedure

The contractor shall submit the Employer an itemised make-up of the value of Variations and claims within 7 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.

10. Contract Price and Payment

10.1 Valuation of the Works

The Contract Bill of Quantities and the approved Variation quantities shall be used to calculate the valuation of the works completed .The contractor shall be paid for the quantity of work done at the rate in the Bill of Quantities or rate agreed pursuant to clause 9.2 for varied works.

10.2 Payments Certificates

The Contractor shall submit to the Employer monthly statements of the estimated value of the works completed less the cumulative amount certified previously. The Employer shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor

10.3 Payments

The Employer shall pay to the contractor the amount certified less retention at the rate stated in the SCC within 30 days of the date of each certificate.

10.4 Payment of Retention

One half of the retention shall be repaid by the Employer to the contractor within 30 days upon expiry of Defects Liability Period-and the Employer has certified that the notified defects have been corrected.
The remainder of the retention shall be paid by the Employer to the contractor within 7 days after submission of evidence document from the concerned Internal Revenue Office that the contractor has submitted his Income Returns

10.5 Advance Payment

a The Employer may make advance payment to the contractor of the amounts stated in the SCC within 30 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 will not be charged on the advance payment.

b. The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the contractor, following the schedule of completed percentages of the Works as indicated in SCC

10.6 Local Taxation & Value Added Tax

a. The prices quoted by the Contractor shall include all taxes that may be levied in accordance to the laws and regulations in being in Nepal.

b. The Contract is not exempted from value added tax. The Contractor shall pay VAT in the concerned VAT office within time frame specified in VAT regulation.

11. Termination of Contract

11.1 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.

11.2 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.

11.3 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.

11.4 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.

11.5 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 9.4,

b. any sums to which the Employer is entitled,

c. if the Employer has terminated under Sub-Clause 11.1 or 11.3, 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 11.2 or 11.4, 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 30 days of the notice of termination.

12. Risk and Responsibility

12.1 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 7.2. 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.

12.2 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 9.4,

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.

13. Resolution of Disputes

13.1 Adjudication

If any dispute shall arises out of or in connection with the Contract, including any valuation or other decision of the Employer, then the parties shall attempt to settle such dispute amicably. However if the dispute is not settled amicably then the dispute shall be referred to the Adjudicator. The adjudicator shall be any person agreed by the Parties. In case of disagreement the Employer shall request Nepal Council of Arbitration (NEPCA) for appointment of the Adjudicator.

13.2 Amicable Settlement

If either Party is dissatisfied with the decision of the adjudicator attempt shall be made to resolve the dispute amicably.

14.Conduct of Bidders

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

14.2 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 :

h) give or propose improper inducement directly or indirectly,

i) distortion or misrepresentation of facts

j) engaging or being involved in corrupt or fraudulent practice

k) interference in participation of other prospective bidders.

l) 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,

m) 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..

n) contacting the Employer wit 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

15. Blacklisting Bidder

15.1 Without prejudice to any other right of the Employer under this Contract, GoN, Public Procurement Monitoring Office may blacklist a bidder for his conduct up to three years on the following grounds and seriousness of the act committed by the bidder:

g) if it is proved that the bidder committed acts pursuant to the Sub - Clause 14.2,

h) if the bidder fails to sign an agreement pursuant to Instruction to Bidders Sub - Clause 24.2,

i) 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 ,

j) if convicted by a court of law in a criminal offence which disqualifies the bidder from participating in the contract.

k) if it is proved that the contract agreement signed by the bidder was based on false or misrepresentation of bidder's qualification information,

l) other acts mentioned in the Bidding Data

15.2 A firm declared blacklisted and ineligible by the GON 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

[Note: with the exception of the items for which the Employer's requirements have been inserted, the Bidder shall complete the following information before submitting his bid.]

Item	Clause	Data
Documents forming the Contract listed in the order of priority **Document** (delete if not applicable) a. The Agreement b. Special Conditions of Contract c. General Conditions of Contract d. The Technical Specifications e. The Drawings f. The Bill of Quantities g. ……..(if any) h. ……..(if any)	1.1.1	Document Identification
Time for Completion	1.1.12	**90** days from date of agreement
Law of Contract	1.4	Aarthik Prasashan Biniyamabali 2068 NEA & Applicable Law of Nepal
Language	1.5	English or [in Nepali version]
Provision of Site	2.1	On the commencement date
Authorised person	3.1	Centre Chief
Name and address of Employer's representative (if known)	3.2	
Performance security (if any): Amount: Form:	4.4	**Performance Security Amount =[(0.85 x Cost Estimate –Bid Price) x 0.5] + 5% of Bid Price.**
Time for the submission of programme	6.2	Within 7 days of the commencement date
Liquidated Damages for Delay	6.4	0.05% of the Contract Price per day up to a maximum of 10%of sum stated in the Agreement
Period for notifying defects	8.1	**180** days calculated from the Work completion date
Percentage of retention	10.3	5% of each payment made to the Contractor
Advance Payment	10.5(a)	N/A
Deduction of Advance Payment	10.5(b)	N/A

Section VI. Specification

A CONCRETE WORK

SCOPE

This Section covers the materials, design of mixes, mixing, transport, placing, compaction and curing of concrete (plain and reinforced), either cast-in-situ or pre-cast and mortar required in the civil engineering and building construction works. It also covers reinforcement for concrete.

DEFINITIONS

Structural concrete is any class of concrete which is used in reinforced, pre-stressed or un-reinforced concrete construction which is subject to stress.

Non-structural concrete is composed of materials complying with the Specification but for which no strength requirements are specified and which is used only for filling voids, blinding foundations and similar purposes where it is not subjected to significant stress.

A pour refers to the operation of placing concrete into any mould, bay or formwork, etc. and also to the volume which has to be filled. Pours in vertical succession are referred to as lifts.

MATERIALS FOR CONCRETE

(1) General

The Contractor shall submit to the Engineer full details of all materials which he proposes to use for making concrete. No concrete shall be placed in the works until the Engineer has approved the materials of which it is composed. In accordance with Clause 403, approved materials shall not thereafter be altered or substituted by other materials without the consent of the Engineer.

(2) Cement

Cement shall comply with the requirements of Clause 413.

Cement shall be free flowing and free of lumps. It shall be supplied in the manufacturer's sealed unbroken bags or in bulk. Bagged cement shall be transported in vehicles provided with effective means of ensuring that it is protected from the weather.

Bulk cement shall be transported in vehicles or in containers built and equipped for the purpose.

Cement in bags shall be stored in a suitable weatherproof structure of which the interior shall be dry and well ventilated at all times. The floor shall be raised above the surrounding ground level not less than 30cm and shall be so constructed that no moisture rises through it.

Each delivery of cement in bags shall be stacked together in one place. The bags shall be closely stacked so as to reduce air circulation with min gap of 500mm from outside wall. If pallets are used, they shall be constructed so that bags are not damaged during handling and stacking. Stack of cement bags shall not exceed 8 bags in height. Different types of cement in bags shall be clearly distinguished by visible markings and shall be stored in separate stacks.

Cement from broken bags shall not be used in the works. Cement in bags shall be used in the order in which it is delivered.

Bulk cement shall be stored in weather proof silos which shall bear a clear indication of the type of cement contained in them. Different types of cement shall not be mixed in the same silo.

The Contractor shall provide sufficient storage capacity on site to ensure that his anticipated program of work is not interrupted due to lack of cement.

Cement which has become hardened or lumpy or fails to comply with the Specification in any way shall be removed from the Site.

All cement for any one structure shall be from the same source as far as possible.

All cement used in the works shall be tested by the manufacturer. The manufacturer shall provide the results of tests as given in Table 600.1 and 600.2 for each supply and for the last six months of his production. The Contractor shall supply two copies of each certificate to the Engineer

**denotes the requirements of High Strength Portland Cement.*

Each set of tests carried out by the manufacturer on samples taken from cement which is subsequently delivered to site shall relate to no more than one day's output of each cement plant.

The Contractor shall constitute, from each delivery and each type of cement and not less than one samples for every 200 tons or part of it, representative samples to be tested when instructed by the Engineer in a laboratory acceptable to him, in case of the concrete mixes do not comply with the requirements of this Specification.

Cement which is stored on site for longer than one month shall be tested in such laboratory for every 200 tons or part thereof and at monthly intervals thereafter

The Contractor shall keep full records of all data relevant to the manufacture, delivery; testing and the cement used in the works and shall provide the Engineer with two copies thereof.

(3) Fine Aggregate

Fine aggregate shall be clean hard and durable and shall be natural sand, crushed gravel sand or crushed rock sand complying with IS 383. AH the material shall pass through a 4.75 mm IS sieve and the grading shall be in accordance with IS 383. In order to achieve an acceptable grading, it may be necessary to blend materials from more than one source.

The deviation from the initial fineness modulus shall be no more than ± 0.30 for ordinary concrete and ± 0.20 for high quality concrete

However, in respect of the presence of deleterious materials the fine aggregate shall not contain iron pyrites, iron oxides, mica, shale, coal or other laminar soft or porous materials or organic matter unless the Contractor can show by comparative tests on finished concrete as set out in Clause 617 and as per the direction of the Engineer, that the presence of such materials does not affect the properties of the concrete.

(4) Coarse Aggregate

Coarse aggregate shall be clean hard and durable crushed rock, crushed gravel or natural gravel corresponding to the following classesClass A: Aggregate shall consist of crushed igneous or quartzite rock from an approved source.

Class B: Aggregate shall consist of crushed quarry rock other than Class A from an approved source. Class C: Aggregate shall consist of natural or partly crushed gravel, pebbles obtained from an approved gravel deposit. It may contain a quantity of material obtained from crushing the oversize stone in the deposit provided such material is uniformly mixed with the natural uncrushed particles.

Class D: Aggregate shall consist entirely of crushed gravel. The crushed gravel shall be produced from material retained on a standard sieve having an opening at least twice as large as the maximum size of aggregate particle specified.

Class E: Aggregate shall consist of an artificial mixture of any of the above classes of aggregate the.

The use of Class E aggregate and the relative proportions of the constituent materials shall be approved by the Engineer.

Coarse aggregate shall be supplied in the nominal size called for in the contract and shall be of the grading as single sized aggregate or graded aggregate of nominal size 40 mm, 20 mm, 12.5 mm and 10 mm in accordance with IS 383.

Other properties shall be as set out below:

Flakiness Index. When tested in accordance with IS 2386 Part 1, the Flakiness Index of the coarse aggregate shall be as set out hereunder:

For ordinary concrete : not more than 25

For high quality concrete : not more than 15

If the Flakiness Index of the coarse aggregate varies by more than five units from the average value of the aggregate used in the approved trial mix, then a new set of trial mixes shall be carried out if the workability of the mixes has been adversely affected by such variation.

Water Absorption: The aggregate shall not have a water absorption of more than 2 per cent when tested as set out in IS 2386 Part 3.

Los Angeles Abrasion (LAA): The aggregate shall have LAA not more than 45% for ordinary concrete, and not more than 35% for high quality concrete, when tested in accordance with IS 2386 Part 4.

Aggregate Crushing Value (ACV): The aggregate shall have ACV not more than 30% for pavement structure and not more than 45% for other structure when tested in accordance with IS 2386 Part 4.

Alkali Aggregate Reactivity: The aggregate shall comply with IS 383/3.2 notes when tested in accordance with IS 2386 Part 7.

(5) Testing Aggregates

(a) Acceptance Testing

The Contractor shall deliver to the Engineer samples containing not less than 50 kg of any aggregate which he proposed to use in the works and shall supply such further samples as the Engineer may require. Each sample shall be clearly labeled to show its origin and shall be accompanied by all information called for in IS 2386 Part 1 to 8. Tests to determine compliance of the aggregates with the requirements of Sub-clause 2003 (3) and (4) shall be carried out by the Contractor in a laboratory acceptable to the Engineer. If the tested materials fail to comply with the Specification, further tests shall be made in the presence of the Contractor and the Engineer. Acceptance of the material shall be based on the results of such tests.

All the materials shall be accepted if the results of not less than three consecutive sets of test executed in accordance with IS 2386 (Part 1-8) show compliance with the Sub-clauses 2003 (3) and (4).

b) Compliance Testing/Process Control Testing

The Contractor shall carry out routine testing of aggregates for compliance with the Specification during the period that concrete is being produced for the works. The tests set out below shall be performed on aggregates from each separate source on the basis of one set of tests for each day on which aggregates are delivered to site provided that the set of tests shall represent not more than 100 tons of fine aggregate and not more than 250 tons of coarse aggregate, and provided also that the aggregates are of uniform quality.

Grading : IS 2386 Part 1

Silt, Clay Contents and Organic Impurities: IS 2386 Part 2

If the aggregate from any source is variable, the frequency of testing shall be increased as instructed by the Engineer.

In addition to the above routine tests, the Contractor shall carry out the following tests at the stated frequencies:

Chloride Content: As frequently as may be required to ensure that the proportion of chlorides in the aggregates does not exceed the limit stated in the Specification. Sulphate Content and Alkali Aggregate Reactivity; As frequently as may be required according to the variability of sulphate content and alkali reactivity assessed from the laboratory tests carried out during the concrete mix design.

(6) Delivery and Storage of Aggregates

Aggregates shall be delivered to site in clean and suitable vehicles. Different type or sizes of aggregates shall not be delivered in one vehicle.

Each type or size of aggregate shall be stored in a separate bin or compartment having a base such that the contamination of aggregate is prevented. Dividing walls between bins shall be substantial and continuous so that no mixing of types or sizes occurs.

The storage of aggregates shall be arranged in such a way that drying out in hot weather is prevented in order to avoid sudden fluctuations in water content. Storage of fine aggregates shall be arranged in such way that they can drain sufficiently before use in order to prevent fluctuations in water content of the concrete.

(7) Water for Concrete and Mortar

Water shall be clean and free from harmful matter and shall comply with the requirements of IS 456. Brackish water containing more than 1000 ppm chloride ion or 2000 ppm sulphate ion shall not be used for mixing or curing concrete.

The Contractor shall carry out tests in compliance with IS 456 to establish compliance with Specifications.

(8) Admixtures

(a) General

The use of admixtures in concrete may be required under the contract to promote special properties in the finished concrete or may be proposed by the Contractor to assist him in compliance with the Specification. In all cases the Contractor shall submit to the Engineer full details of the admixture he proposes to use and the manner in which he proposes to add it in the mix. The information provided shall include:

(i) The typical dosage, the method of dosing, and the detrimental effects of an excess or deficiency in the dosage.

(ii) The chemical names of the main active ingredients in the admixture.

(iii) Whether or not the admixture contains chlorides, and if so the chloride ion content expressed as a percentage by weight of admixture.

(iv) Whether the admixture leads to the entrainment of air when used at the manufacturer's recommended dosage, and if so the extent to which it does so.

(v) Details of previous uses of the admixture in Nepal.The chloride ion content of any admixture shall not exceed 1 per cent by weight of the admixture nor 0.02 per cent by weight of the cement in the mix.Admixtures shall not be mixed together without the consent of the Engineer.Calcium chloride or admixtures containing calcium chloride shall not be used in pre-stressed concrete. Admixtures may be supplied as liquid or as powder. They shall be stored in sealed and undamaged containers in a dry, cool place. Admixtures shall be dispensed in liquid form and dispensers shall be of sufficient capacity to measure at one time the full quantity required for each batch.

(b) Workability Agents

Workability agents shall comply with BS 5075 and shall not have any adverse effect on the properties of the concrete.

TABLE 600.4 MINIMUM CEMENT CONTENT

Classes of concrete	Minimum cement content in kg per m concrete of compacted		
	Moderate exposure	Intermediate exposure	Severe exposure
M15/40, M15/20	150	200	225
M20/40, M20/20	250	300	325
M25/20, M25/40	300	325	350

Note: The minimum cement contents shown in the above table are required in order to achieve impermeability and durability. In order to meet the strength requirements in the Specification higher contents may be required.
The categories applicable to the works are based on the factors listed hereunder: Moderate exposure :Surface sheltered from severe rain, buried concrete.
Intermediate exposure :Surface exposed to severe rain; alternate wetting and drying; traffic; corrosive fumes; heavy condensation.
Severe exposure :Surface exposed to water having a pH of 4.5 or less, groundwater containing sulphate.

(5) Quality Control of Concrete Production

(a) Sampling

For each class of concrete in production at each plant for use in the works, samples of concrete shall be taken at the point of mixing or of deposition as instructed by the Engineer, all in accordance with the sampling procedures described in BS 1881 and with the further requirements set out below.
Six 150 mm or 200 mm cubes as appropriate shall be made from each sample and shall be cured and tested in accordance with BS 1881 three at seven days and the other three at 28 days. Where information samples are required, such as for post-tensioning operations, three additional cubes shall be made.
The minimum frequency of sampling of concrete of each grade shall be as following:
For 1-5 m^3 quantity of work -1 no. of sample
For 5-20 m^3 quantity of work - 2 no. of sample
For 20 m^3 and more quantity of work - 3 no. of sample plus one additional for each 20m^3 or part thereof.
At least one sample shall be taken from each shifts of work.
Until compliance with the Specification has been established the frequency of sampling shall be three times that stated above and not less than 3 samples/day for each class of concrete in production at each plant or such lower frequency as may be instructed by the Engineer.

(b) Testing

(i) The slump of the concrete shall be determined for each batch from which samples are taken and in addition for other batches at the point of production and deposition or at the frequency instructed by the Engineer.
The slump of concrete in any batch shall not differ from the value established by the trial mixes by more than 25 mm or one third of the value whichever is the less.
(ii) The air content of air entrained concrete in any batch shall be within 1.5 times of the required value and the average value of four consecutive measurements shall be within the required value expressed as a percentage of the volume of freshly mixed concrete.
(iii) Early Works: Until such time as sufficient test results are available to apply the method of control described in (iv) below, the compressive strength of the concrete at
28 days shall be such that no single result (average of 3 cubes) is less than the characteristic strength fck as shown in Table 600-3 under the
heading "early works test cubes" and also that the average of three consecutive results is not less than f_{ck} +4 as shown in Table 600-3 under the same heading.
The 7-day cube result may be used as an early strength indicator, at the discretion of the Engineer.
(iv) When at least 20 consecutive results on tested batches are available for any class of concrete mixed in any one plant, no single result shall be less than f_{ck} +4 (N/mm^2) and also the average of any group of three consecutive results shall not be less than f_{ck}+4 (N/mm^2).
In addition the Coefficient of Variation shall be less than the figure given below:

Where the

Number of batches	Maximum coefficient of variation	
	Ordinary concrete	High quality concrete
After 20 tested batches After 50 tested batches	18% 15%	15% 12%

Coefficient of Variation = (Standard Deviation of
the results/Average value of the result) (v) Failure to comply with Requirements:
If any one result in a group of three consecutive results is less than fCk-4 (N/mm_), but the other results of group satisfy the strength requirement, then only the batch from which the failed result was obtained shall be deemed not to comply with the Specification.
If the average strength of the group is less than the strength requirement then all the batches between those represented by the first and the last result shall be deemed not to comply with the Specification, and the Contractor shall immediately adjust the production procedure or the mix design subject to the agreement of the Engineer to

restore compliance with the Specification. If adjustment of the mix design is agreed, the Contractor shall again be required to comply with Sub-clauses 2004 (3) and 2004 (4).

The Contractor shall take necessary action to remedy concrete which does not comply with this Specification. Such action may include but not necessarily confined to the following :

- Increasing the frequency of sampling until control is again established.
- Carrying out non destructive testing such as ultrasonic measurements, load tests or other appropriate methods,
- Cutting test cores from the concrete and testing in accordance with BS 1881
- Carrying out strengthening or other remedial work to the concrete where possible or appropriate.
- Removing the concrete.
- Accepting as sub standard

MIXING CONCRETE

Before any batching, mixing, transporting, placing, compacting and finishing and curing the concrete ordered or delivered to site, the Contractor shall submit to the Engineer full details including Drawing of all the plant which he proposes to use and the arrangements he proposes to make.

Concrete for the works shall be batched and mixed in one or more plants or concrete mixer unless the Engineer agrees to some other arrangement. If concrete mixers are used, there shall be sufficient number of mixtures including stand by mixers.

Batching and mixing plants shall be complying with the requirements of IS 1791 and capable of producing a uniform distribution of the ingredients throughout the mass. Truck mixers shall comply with the requirements of IS 4925 and shall only be used with the prior approval of the Engineer. If the plant proposed by the Contractor does not fall within the scope of IS 1791 it shall have been tested in accordance with IS 4634 and shall have a mixing performance within the limits of IS 1791.

All mixing operations shall be under the control of an experienced supervisor.

The aggregate storage bins shall be provided with drainage facilities arranged so that the drainage water is not discharged to the weigh hoppers. Each bin shall be drawn down at least once per week and any accumulations of mud or silt shall be removed.

If bulk cement is used, the scale and weight hopper for cement shall be distinct from the scale and weight hopper for aggregates.

Cement and aggregates shall be batched by weight. Water may be measured by weight or volume.

The weighing and water dispensing mechanisms shall be maintained in good order. Their accuracy shall be maintained within the tolerances described in IS 1791 and not more than plus or minus one percent, and checked against accurate weights and volumes when required by the Engineer.

The weights of cement and of each size of aggregate and the weight or volume of water as indicated by the mechanism employed shall be within a tolerance of plus or minus three per cent of the respective weight per batch agreed by the Engineer.

The Contractor shall provide standard test weights at least equivalent to the maximum working load used on the most heavily loaded scale and other auxiliary equipment required for checking the satisfactory operation of each scale or measuring device. Tests shall be made by the Contractor in the presence of the Engineer during the site trials described in Sub-clause 604 (4) and then at intervals to be determined by the Engineer but not less than once per three months. The Contractor shall furnish the Engineer with copies of the complete results of all check
tests and shall make any adjustments, repairs or replacements necessary to ensure satisfactory performance.

The nominal drum or pan capacity of the mixer shall not be exceeded. The turning speed and the mixing time shall be as recommended by the manufacturer, but in addition, when water is the last ingredient to be added, mixing shall continue for at least one minute after all the water has been added to the drum or the pan.The blades of pan mixers shall be maintained within the tolerances specified by the manufacturer of the mixer and the blades shall be replaced when it is no longer possible to maintain the tolerances by adjustment.

Mixers shall be fitted with an automatic recorder registering the number of batches discharged.

The water to be added to the mix shall be reduced by the amount of free water contained in the coarse and fine aggregates. This amount shall be determined by the Contractor by a method agreed by the Engineer immediately before mixing begins each day and thereafter at least once per hour and for each delivery of aggregates during concreting. When the correct quantity of water, determined as set out in the Specification, has been added to the mix, no further water shall be added, either during mixing or subsequently.

Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before any fresh concrete is mixed. Mixers shall be cleaned out before changing to another type of cement.

TRANSPORTATION OF CONCRETE

The concrete shall be discharged from the mixer and transported to the works by means which shall prevent adulteration, segregation or loss of ingredients, and shall ensure that the concrete is of the required workability at the point and time of placing. The loss of slump between discharge from the mixer and placing shall be within the tolerances specified in Sub-clause 604 (5) (b) (i).

The capacity of the means of transport shall not be less than the full volume of a batch.

The time elapsing between mixing transporting placing and compaction altogether of a batch of concrete shall not be longer than the initial setting time of the concrete. If the placing of any batch of concrete is delayed beyond this period, the concrete shall not be placed in the works.

607 PLACING OF CONCRETE

(1) Consent for Placing

Concrete shall not be placed until the Engineer's consent has been given in writing. The Contractor shall give the Engineer at least two full working day notice of his intention to place concrete.

If concrete placing is not commenced within 24 hours of the Engineer's consent the Contractor shall again request consent as specified above.

Preparation of Surface to Receive Concrete

Excavated surfaces on which concrete is to be deposited shall be prepared as set out in Section 500. Existing concrete surfaces shall be prepared as set out in Clause 612. Before deposition of further
concrete they shall be clean, hard and sound and shall be wet but without any free-standing water.

Any flow of water into an excavation shall be diverted through proper side drains to a sump or be removed by other suitable method which will prevent washing away the freshly deposited concrete or any of its constituents. Any under drain constructed for this purpose shall be completely grouted up when they are no longer required by a method agreed by the Engineer.

Unless otherwise instructed by the Engineer surfaces against which concrete is to be placed shall receive prior coating of cement slurry or mortar mixed in the proportions similar to those of the fines portion in the concrete to be placed. The mortar shall be kept ahead of the concrete. The mortar shall be placed into all parts of the excavated surface and shall not be less than 5 mm thick.

If any fissures have been cleaned out they shall be filled with mortar or with concrete as instructed by the Engineer.

The amount of mortar placed at one time shall be limited so that it does not dry out or set before being covered with concrete.

Placing Procedures

The concrete shall be deposited as nearly as possible in its final position. It shall be placed so as to avoid segregation of the concrete and displacement of the reinforcement, other embedded items or formwork. It shall be brought up in layers approximately parallel to the construction joint planes and not exceeding 300 mm in compacted thickness unless otherwise permitted or directed by the Engineer, but the layers shall not be thinner than four times the maximum nominal size of aggregate.

When placing on a nearly horizontal surface, placing shall start at the lower end of the surface to avoid de-compaction of concrete.

Layers shall not be placed so that they form feather edges nor shall they be placed on a previous layer which has taken its initial set. In order to comply with this requirement, another layer may be started before initial set of the preceding layer.

All the concrete in a single bay or pour shall be placed as a continuous operation. It shall be carefully worked round all obstructions, irregularities in the foundations and the like so that all parts are completely full of compacted concrete with no segregation or honey combing. It shall also be carefully worked round and between water stops, reinforcement, embedded steelwork and similar items which protrude above the surface of the completed pour. All work shall be completed on each batch of concrete before its initial set commences and thereafter the concrete shall not be disturbed before it has set hard. No concrete that has partially hardened during transit shall be used in the works and the transport of concrete from the mixer to the point of placing shall be such that this requirement can be complied with.

Concrete shall not be placed during rain which is sufficiently heavy or prolonged to wash mortar from coarse aggregate on the exposed faces of fresh concrete. Means shall be provided to remove any water accumulating on the surface of the placed concrete. Concrete shall not be deposited into such accumulations of water.

In dry weather, covers shall be provided for all fresh concrete surfaces which are not being worked on. Water shall not be added to concrete for any reason.

When concrete is discharged from the place above its final deposition, segregation shall be prevented by the use of chutes, down pipes, trunking, baffles or other appropriate devices.

Forms for walls shall be provided with openings or other devices that will permit the concrete to be placed in a manner that will prevent segregation and accumulations of hardened concrete on the formwork or reinforcement above the level of the placed concrete.

When it is necessary to place concrete under water the Contractor shall submit to the Engineer his proposals for the method and equipment to be employed. The concrete shall be deposited either by bottom-discharging watertight containers or through funnel-shaped tremies which are kept continuously full with concrete in order to reduce to a minimum the contact of the concrete with the water. Special care shall be taken to avoid segregation.

If the level of concrete in a tremie pipe is allowed to fall to such extent that the water enters the pipe, the latter shall be removed from the pour and filled with concrete before being again lowered into the placing position. During and after concreting under water, pumping or de-watering in the immediate vicinity shall be suspended if there is any danger that such work will disturb the freshly placed concrete.

(4) Interruptions to Placing

If the concrete placing is interrupted for any reason and the duration of the interruption cannot be forecast or is likely to be prolonged, the Contractor shall immediately take the necessary action to form a construction joint so as to eliminate as far as possible feather edges and sloping top surfaces and shall thoroughly compact the concrete in accordance with Clause 2008. All work on the concrete shall be completed before elapse of initial setting time and it shall not thereafter be disturbed until it is hard enough to resist damage. Plant and materials to comply with this requirement shall be readily available at all time during concrete placing.

Before concreting is resumed after such an interruption the Contractor shall cut out and remedy all damaged or un-compacted concrete, feather edges or any undesirable features and shall leave a clean sound surface against which the fresh concrete may be placed.

If it becomes possible to resume concrete placing without contravening the Specification and the Engineer consents to a resumption, the new concrete shall be thoroughly worked in and compacted against the existing concrete so as to eliminate any cold joints.

In case of long interruption concrete shall be resumed as directed by Engineer.

(5) Dimensions of Pours

Unless otherwise agreed by the Engineer, pours shall not be more than two meters high and shall as far as possible have a uniform thickness over the plan area of the pour. Concrete shall be placed to the full planned height of all pours except in the circumstances described in Sub-clause 607 (4).

The Contractor shall plan the dimensions and sequence of pours in such a way that cracking of the concrete does not take place due to thermal or shrinkage stresses.

(6) Placing Sequence

The Contractor shall arrange that the intervals between successive lifts of concrete in one Section of theworks are of equal duration. This duration shall not be less than three days or not more than seven days under temperate weather conditions unless otherwise agreed by the Engineer.

Where required by the Engineer to limit the opening of construction joints due to shrinkage, concrete shall not be placed against adjacent concrete which is less than 21 days old.

Contraction gaps in concrete shall be of the widths and in the locations as shown on the Drawing and they shall not be filled until the full time interval shown on the Drawing has elapsed.

COMPACTION OF CONCRETE

Concrete shall be fully compacted throughout the full extent of the placed layer. It shall be thoroughly worked against the formwork and around any reinforcement and other embedded item, without displacing them. Care shall be taken at arises or other confined spaces. Successive layers of the same pour shall be thoroughly worked together.

Concrete shall be compacted with the assistance of mechanical immersion vibrators, unless the Engineer agrees another method.

Immersion and surface vibrators shall operate at a frequency of between 70 and 200 hertz. The Contractor shall ensure that vibrators are operated at pressures and voltages not less than those recommended by the manufacturer in order that the compactive effort is not reduced.

A sufficient number of vibrators shall be operated to enable the entire quantity of concrete being placed to be vibrated for the necessary period and, in addition, stand-by vibrators shall be available for instant use at each place where concrete is being placed.

Vibration shall be continued at each point until the concrete ceases to contract, air bubbles have ceased to appear, and a thin layer of mortar has appeared on the surface. Vibrators shall not be used to move concrete laterally and shall be withdrawn slowly to prevent the formation of voids.

The vibrators shall be inserted vertically into the concrete to penetrate the layer underneath at regular spacing which shall not exceed the distance from the vibrator over which vibration is visibly effective and some extent of vibration is overlapped.

Vibration shall not be applied by way of reinforcement nor shall the vibrators be allowed to touch reinforcement, sheathing ducts or other embedded items.

CURING OF CONCRETE

(1) General

Concrete shall be protected during the first stage of hardening from loss of moisture and from the development of temperatures differentials within the concrete sufficient to cause cracking. The methods used for curing shall not cause damage of any kind to the concrete.

Curing shall be continued for as long as may be necessary to achieve the above objectives but not less than seven days or until the concrete is covered by successive construction whichever is the shorter period.

The above objectives shall be dealt with in Sub-clauses 609 (2) and 609 (3) but nothing shall prevent both objectives being achieved by a single method where circumstances permit.

The curing process shall commence as soon as the concrete is hard enough to resist damage from the process. In the case of large areas or continuous pours, it shall commence on the completed Section of the pour before the rest of the pour is finished.

(2) Loss of Moisture

Exposed concrete surfaces shall be closely covered with impermeable sheeting, properly secured to prevent its removal by wind and the development of air spaces beneath it. Joints in the sheeting shall be lapped by at least 300 mm.

If it is not possible to use impermeable sheeting, the Contractor shall keep the exposed surfaces continuously wet by means of water spray or by covering with a water absorbent material which shall be kept wet, unless this method conflicts with Sub-clause 609 (3).

Water used for curing shall be of the same quality as that used for mixing.

Formed surfaces may be cured by retaining the formwork in place for the required curing period.

If instructed by the Engineer, the Contractor shall, in addition to the curing provisions set out above provide a suitable form of shading to prevent the direct rays of the sun reaching the concrete surfaces for at least the first four days of the curing period.

(3) Limitation of Temperature Differentials

The Contractor shall limit the development of temperature differentials in concrete after placing by any means appropriate to the circumstances including the following:

(a) Limiting concrete temperatures at placing as set out in Sub-clause 2011 (2);
(b) Use of low heat cement for mass concreting, subject to the agreement of the Engineer;
(c) Leaving formwork in place during the curing period. Steel forms shall be suitably insulated on the outside;
(d) Preventing rapid dissipation of heat from surfaces by shielding from wind.

610 PROTECTION OF FRESH CONCRETE

Freshly placed concrete shall be protected from rainfall and from water running over the surface until it is sufficiently hard to resist damage from these causes.

Concrete placed in the works shall not be subjected to any loading including traffic until it has attained at least its characteristic strength as defined in Clause 604.

617 MEASUREMENT

(1) Concrete

Concrete laid in place as specified in the Drawing or directed by the Engineer shall be measured in cubic meter separately for each class. No deduction shall be made in the measurement for:

a) bolt holes, pockets, box outs an cast in components provided that the volume of each is less than 0.15 cubic meters;

b) mortar beds, fillets, drips, rebates, recesses, grooves, chamfers and the like of 100 mm total width or less;

c) reinforcement

(2) Blinding Concrete/Non Structural Concrete

Blinding concrete laid in place shall be measured in cubic meter. No deduction shall be made for openings provided that the area of each is less than 0.5 square meters. Blinding concrete over hard material shall be measured as the volume used provided that the maximum thickness of 150 mm allowed for over break is not exceeded.

618 PAYMENT

(1) Concrete

Every class of concrete shall be paid as per respective contract unit rate. In addition to those specified in Clause 112 the respective rate shall also include the cost of:

a) admixtures and workability agents including submission of details unless specified. b) class of UF1,2 or 3 surface finish.

c) laying to sloping surfaces not exceeding 15° from the horizontal and to falls. d) formwork to lean concrete.

e) placing and compacting against excavated surfaces where required including any additional concrete to fill over break and working space.

f) complying with the requirements of Clauses 2001 to 2013,1806 and 1807.

B FORM WORK

SCOPE AND DEFINITIONS

This section covers the preparation, construction and removal of formwork for concrete structures. It also covers the quality requirements for surface finish on formed and unformed surfaces.

Definitions used in this Clause and other relevant Clauses of this Section and other relevant Sections of these Specifications are as follows:

- Formwork means the surface against which concrete is placed to form a face. All the immediate supports necessary to retain the surface in position while concrete is placed, shall be treated an integral part of formwork.
- A formed face is one which has been cast against formwork.
- An unformed surface means a horizontal or nearly horizontal surface which is not cast against formwork.
- An exposed face is one which will remain visible when construction has been completed.

GENERAL

Form works shall include all temporary or permanent forms required for forming the concrete together with all temporary construction for their support.

Form works shall be designed and erected by the Contractor so that concrete can be properly placed and compacted in a manner that the hardened concrete conforms to the required shape, position, and level subject to the specified tolerances and standards of finish. It shall be assembled with adequate nails and /or nuts and bolts. It shall consist of wooden boards, sheet metals, and any other suitable material that prevent loss of grout when the concrete is vibrated.

Special care shall be taken to maintain the stability of the form works and the tightness of the joints particularly during concrete vibrating operations.

The formworks shall be as specified in the BOQ with adequate ribs for the beam, column and slabs. The Engineer shall approve the material and position of any ties passing through the concrete. The whole or part of the tie shall be capable of being removed such that any remaining part shall be embedded in the concrete by at least the specified thickness for reinforcement cover. Any holes formed by removal of ties shall be filled with concrete or mortar of approved composition.

Form works at top shall be provided where the slope of the formed surface exceeds one in four.

Before each concrete operation commences, form works shall be cleaned of all rubbish and other foreign particles.

Concrete operations shall not commence until the erected form works has been inspected and approved. The Contractor shall give at least 48 hours notice for such inspection. On rejection for any reason, the Engineer shall require another 48 hours to inspect the rectified errors.

The inside surface of forms shall be coated with an approved material to prevent the adhesion of concrete. Such material shall be applied strictly in accordance with the manufacturer's instructions and shall not come in contact with the reinforcement or anchors.

FORMWORK FOR CONCRETE

(1) Construction of Formwork

Joints in formwork for exposed faces shall, unless otherwise specified, be evenly spaced and horizontal or vertical and shall be continuous in a regular pattern.

All joints in formwork shall be water tight. Where reinforcement projects through formwork, the form shall fit closely round the bars.

Formwork shall be so designed that it may be easily removed from the work without damage to the faces of the concrete. It shall also incorporate provisions for making minor adjustments in position, if required, to ensure the correct location of concrete faces. Due allowance shall be made in the position of all formwork for movement and settlement under the weight of fresh concrete.

Surfaces at slopes less than 20° may be formed by screeding. Surfaces at slopes between 20° and 30° shall generally be formed if the Contractor can demonstrate to the satisfaction of the Engineer that such slopes can be screeded with the use of special screed boards to hold the concrete in place during vibration.

Horizontal or inclined formwork to the upper surface of concrete shall be adequately secured against uplift due to the pressure of fresh concrete. Formwork shall also be tied down or otherwise secured against floating within the body of the concrete.

The internal and external angles on concrete surfaces shall be formed with fillets and chamfers of the sizes shown on the Drawing unless otherwise instructed by the Engineer.

Supports for formwork may be bolted to previously placed concrete provided the type of bolt used is acceptable to the Engineer. If metal ties through the concrete are used in conjunction with bolts, the metal left in shall not be close to the face of the concrete by less than 50mm.

Formwork shall not be re-used after it has suffered damage which is sufficient to impair the finished surfaces of the concrete.

Where circumstances prevent easy access within the form, temporary openings shall be provided through the formwork for cleaning and inspection.

Shear keys of the size and shape as indicated on the Drawing shall be provided in all construction joints.

Where pre-cast concrete elements are specified for use as permanent formwork, or proposed by the Contractor and agreed by the Engineer, they shall comply with the requirements of formwork as specified in the Specifications in respect of surface finish, strength and rigidity. Such elements shall be set true to line and level within the tolerances prescribed for the appropriate class of finish in Clause
906 and fixed so that they cannot move when concrete is placed against them.

(2) Preparation of Formwork

Before any reinforcement is placed into position within formwork, the latter shall be thoroughly cleaned and then dressed with a release agent. The agent shall be either a suitable oil incorporating a wetting agent, an emulsion of water suspended in oil or a low viscosity oil containing chemical agents. The Contractor shall not use an emulsion of oil suspended in water nor any release agent which causes staining or discoloration of the concrete, air holes on the concrete surface, or retards the set of the concrete or affects the strength of concrete.

In order to avoid color differences on adjacent concrete surfaces, only one type of release agent shall be used in any one section of the works.

In cases where it is necessary to fix reinforcement before placing formwork, all surface preparation of formwork shall be carried out before it is placed into position. The Contractor shall not allow reinforcement or pre-stressing tendons to be contaminated with formwork release agent.
Before placing concrete all dirt, construction debris and other foreign matter shall be removed completely from within the placing area.
Before concrete placing commences, all wedges and other adjusting devices shall be secured against movement during concrete placing and the Contractor shall maintain a watch on the formwork during placing to ensure that no movement occurs. If any movement noticed, the formwork shall be set right immediately.

(3) Removal of Formwork

The Contractor shall give 24 hours notice of his intentions to strike any form works. Forms shall be removed without shock vibrations or other damage to the concrete.
Formwork shall be carefully removed without shock or disturbance to the concrete. No formwork shall be removed until the concrete has gained sufficient strength to withstand any stresses safely to which it may thereby be subjected.
The minimum periods which shall elapse between completion of placing concrete and removal of forms are given in Table 18-1 and apply to ambient temperatures higher than 10°C. At lower temperatures or if cement other than ordinary Portland are involved, the Engineer may instruct longer periods.
Alternatively, formwork may be removed when the concrete has attained the strength set out in Table
900.1, provided that the attained strength is determined by making test cubes and curing them under the same conditions as the concrete to which they refer.
Compliance with these requirements shall not relieve the Contractor of his obligation to delay removal of formwork until the removal can be completed without damage to the concrete.
If the Contractor wishes to strip formwork from the underside of arches, beams and slabs before the expiry of the period for supports set out above, it shall be designed so that it can be removed without disturbing the supports. The Contractor shall not remove supports temporarily for the purpose of

stripping formwork and subsequently replace them.
As soon as the formwork has been removed, bolt holes in concrete faces other than construction joints which are not required for subsequent operations shall be completely filled with mortar sufficiently dry to prevent any slumping at the face. The mortar shall be mixed in the same proportions as the fine aggregate and cement in the surrounding concrete and with the same materials and shall be finished flush with the face of the concrete.
After removal of the formwork, the date of casting of concrete shall be marked on the surface of related concrete by water proof paint/marker for estimation of curing time.

TABLE 900.1: MINIMUM TIME FOR FORM WORKS

Form work	Normal Weather (days)	Cold Weather (days)	Strength to be attained
1.Vertical or near vertical faces of mass concrete	24 hours		0.2 f_{ck}
2. Beam sides, walls and unloaded columns	48 hours	1.5:	0.3 f_{ck}
3. Sophist of slabs and beams : a. Spans up to 3m b. Spans over 3m to 6m c. Spans over 6m to 12m d. Spans over 12m	 4 days 11 days 14 days 21 days	 7 days 17 days 24 30	f_{ck} f_{ck} f_{ck} f_{ck}

Note: f_{ck} is the Characteristic Strength for the class of concrete used.

SURFACE FINISH ON FORMED SURFACES

Classes of Finish
The surface finish to be achieved on formed concrete surfaces shall be as shown on the Drawing and are defined hereunder:-

(1) Class F1 Finish

This finish is for surfaces against which backfill or further concrete will be placed. Formwork may be sawn boards, sheet metal or any other suitable material which will prevent the loss of laitance from the concrete being placed.

(2) Class F2 Finish

This finish is for surfaces which are permanently exposed to view but the highest standard of finish is not required. Forms to provide a Class F2 finish shall be faced with wrought thickened tongued and grooved boards with square edges arranged in a uniform pattern and close jointed or with suitable sheet material. The thickness of boards or sheets shall be such that there shall be no visible deflection under the pressure exerted by the concrete placed against them.
Joints between boards or panels shall be horizontal and vertical unless otherwise directed. In this type of finish pitting, fins, surface discoloration and other minor defects shall be remedied at the time and by methods agreed by the Engineer.

(3) Class F3 Finish

This finish is for surfaces which will be in contact with water flowing at high velocity, and for surfaces prominently exposed to view where good appearance is of special importance. To achieve this finish, which shall be free of board marks, the formwork shall be faced with plywood or equivalent material in large sheets. The sheets shall be arranged in an approved uniform pattern. Wherever possible, joints between sheets shall be arranged to coincide with architectural features or changes in direction of the surface.

All joints between panels shall be vertical and horizontal unless otherwise directed. Suitable joints shall be provided between sheets to maintain accurate alignment in the plane of the sheets. Unfaced wrought boarding or standard steel panels will not be permitted for Class F3 finish. The Contractor shall ensure that the surface is protected from rust marks, spillages and stains of all kinds.

(4) Curved Surfaces

For curved surfaces where F2 or F3 finishes are called for, the formwork face shall be built up of splines cut to make a tight surface which shall then be dressed to produce the required finish.

Alternatively single curvature surfaces may be faced with plastic or plywood linings attached to the backing with adhesive or with escutcheon pins driven flush. Linings shall not bulge, wrinkle or otherwise deform when subjected to temperature and moisture changes.

(5) Tolerances

All parts of formed concrete surfaces shall be in the positions shown on the Drawing within the tolerances set out in Table 900.2.

In cases where the Drawing call for tolerances other than those given in Table 18.2 the Drawing shall rule.

Where pre-cast units have been set to a specified tolerance, further adjustments shall be made as necessary to produce a satisfactory straight or curved line. When the Engineer has approved the alignment, the Contractor shall fix the units so that there is no possibility of further movement.

TABLE 900.2: TOLERANCES

Class of finish	Tolerances in mm (See Note)		
	A	B	C
F1 F2 F3	10 5 2	10 10 5	+ 25 to-10 ± 15 ± 10

Note: The tolerances A, B and C given in the table are defined as follows:

A is an abrupt irregularity in the surface due to misaligned formwork or defects in the face of the formwork.

B is a gradual deviation from a plane surface as indicated by a straight edge 3 m long. In the case of curved surfaces the straight edge shall be replaced by a correctly shaped template.

C is the amount by which the whole or part of a concrete face is displaced from the correct positions shown on the Drawing.

MEASUREMENT

Except as stated below, formwork shall be measured in square meter of formwork actually in contact with the finished face of the concrete. No deduction shall be made in the measurement for openings, pipes, ducts and the like, provided that the area of each is less than 0.50 square meters. Unless otherwise stated, if the volume or area of concrete has not been deducted when measuring the concrete, formwork to form box or the void shall not be measured.

Formwork required for lean concrete, to form construction joints and shear keys for future concrete and other construction surfaces shall not be measured and the costs shall be included in the rates for other work.

Formwork to contraction and expansion joints shall be measured in square meter on one face only. The rates shall include for the costs stated below and for forming recesses for sealant and channels for grout.

The measurement of formwork is inclusive of the measurement for formwork finished surface, shoring, staging, scaffolding and other accessories required for erection and removal of the formwork.

908 PAYMENT

The formwork shall be paid as per the contract unit rate. In addition to those specified in Clause 112 the rates for formwork shall include the cost of submission of details, transportation and use of all materials for formwork, erection including provision of supports, fillets and chamfers 75 mm and less in width, bolts, ties, fixings, cutting to waste, drilling or notching the formwork for reinforcement where required, working around pipes, ducts, conduits and waterstops, temporary openings, cleaning, dressing, removal of formwork, filling bolt holes and any remedial work and for complying with Clauses 607, 609, 612, and Section 900 including all incidental works required to complete the work as per Specification.

The payment for unformed surfaces of concrete shall be deemed included in the contract unit rate of the relevant concrete.

C REINFORCEMENT

(1) General

Reinforcement as plain bars and deformed bars and steel fabric shall comply with the following Indian Standards.

IS 1786 for high strength deformed steel bars and wires. IS 1566

for steel mesh fabric.

IS 432 mild steel and medium tensile steel bars.

All reinforcement shall be from an approved manufacturer and, if required by the Engineer, the Contractor shall submit the ISI certification mark or other test certificate from the manufacturer acceptable to the Engineer. The Contractor shall furnish all information as manufacturer's certificate, invoice, and other relevant details to ensure the quality of steel.

The reinforcements shall have no crack, scale or rust or foreign particles that will destroy or reduce the bond. The bars shall be accurately bent and formed to the dimension indicated in the Drawings. The Contractor shall prepare bending schedules for each structure and calculate the weight of the reinforcement. The schedule of bars and the calculations shall be submitted to the Engineer for approval.

Binding wire used to bind reinforcements shall be annealed galvanized binding wire of 20 gauge.

The sampling and frequency of testing shall be as set out in the NS 84-2042 and NS 191-2045. All reinforcement not complying with the Specification shall be removed from site.

(2) Storage of Reinforcement

All reinforcement shall be delivered to site either in straight lengths or cut and bent. No reinforcement shall be accepted in long lengths which have been transported bent over double.

Any reinforcement which is likely to remain in storage for a long period shall be protected from the weather so as to avoid corrosion and pitting. All reinforcement which has become corroded or pitted to an extent which, in the opinion of the Engineer, will affect its properties shall either be removed from site or may be tested for compliance with the appropriate Indian Standard in accordance with Sub- clause 614 (1) at the Contractor expense.

Reinforcement shall be stored at least 150mm above the ground on a clean area free of mud and dirt and sorted out according to category, quality and diameter.

(3) Bending Reinforcement

Unless otherwise shown on the Drawing, bending and cutting shall comply with IS 2502.

The Contractor shall satisfy himself as to the accuracy of any bar bending schedules supplied and shall be responsible for cutting, bending, and fixing the reinforcement in accordance with the Drawing.

Bars shall be bent mechanically using appropriate bar benders. Bars shall be bent cold by the application of slow steady pressure. At temperatures below 5°C the rate of bending shall be reduced if necessary to prevent fracture in the steel.

Bending reinforcement inside the forms shall not be permitted except for mild steel bars of diameter less or equal to 12 mm, when it is absolutely necessary.

After bending, bars shall be securely tied together in bundles or groups and legibly labeled as set out in IS 2502.

(4) Fixing Reinforcement

Reinforcement shall be thoroughly cleaned. All dirt, scale, loose rust, oil and other contaminants shall be removed before placing it in position. If the reinforcement is contaminated with concrete from previous operations, it shall be cleaned before concreting in that Section.

Reinforcement shall be securely placed and fixed in position as shown in the drawing or directed by theEnginer.

Unless otherwise agreed by the Engineer, all intersecting bars shall be either tied together with not less than 1.6 mm diameter soft annealed iron wire and the end of the wire turned into the body of the concrete, or shall be secured with a wire clip of a type agreed by the Engineer.

Spacer blocks shall be used for ensuring that the correct cover is maintained on the reinforcement. Blocks shall be as small as practicable and of a shape agreed by the Engineer. They shall be made of mortar mixed in the proportions of one part of cement to two parts of sand by weight. Wires cast into the block for tying in to the reinforcement shall have not less than 1.6 mm diameter and shall be soft annealed iron.

Alternatively another type of spacer block may be used subject to the Engineer's approval. All reinforcement shall be checked of shape, size, diameter and number where necessary. Reinforcement shall be rigidly fixed so that it remain intact during placing of concrete. Any fixers made to the formwork shall not remain within the

space to be occupied by the concrete being placed.

No splices shall be made in the reinforcement except where shown on the Drawing or agreed by the Engineer. Splice lengths shall be as shown on the Drawing or directed by the Engineer. Reinforcement shall not be welded except where required by the contract or agreed by the Engineer. Ifwelding is employed, all welded splices shall be full penetration butt welds complying with the procedures set out in IS 2751 or IS 9417 as applicable. Mechanical splices shall not be used unless the Engineer agrees otherwise. Acceptance for welded or mechanical splices of approved design shall be based on qualification tests to be carried out by the Contractor prior to start of the work. Construction control testing as instructed by the Engineer shall be also carried out.

The Contractor shall ensure that reinforcement left exposed in the works shall not suffer distortion, displacement or other damage. When it is necessary to bend protruding reinforcement aside temporarily, the radius of the bend shall not be less than four times the bar diameter for mild steel bars or six times the bar diameter for high yield bars. Such bends shall be carefully straightened without leaving residual kinks or damaging the concrete round them before concrete placing. In no circumstances heating and bending of high yield bars shall be permitted.

Bars complying with IS 1786 or other high tensile bars shall not be bent after placing in the works.

617 MEASUREMENT

Reinforcement

All types of reinforcement shall be measured in metric ton/Kg.

Only that reinforcement which is required and placed in work as per Drawing or as directed by the Engineer shall be measured. In addition, other reinforcement not shown on the Drawing but directed by the Engineer such as splices, chairs, hangers and the like shall also be measured.

Rolling margin or cutting waste shall not be measured. Length along centre line of the individual reinforcement of each type placed as described above shall be measured including their hooks, and bents, if any. An average weight of at least 5 samples each one meter length shall be determined by the laboratory approved by the Engineer. The weight of each type of the reinforcement shall be determined by multiplying average weight of the respective reinforcement by its length.

(5) Fabric Reinforcement

Fabric reinforcement laid as per Drawing or as directed by the Engineer shall be measured in square meter. No allowance shall be made for laps and wastage.

618 PAYMENT

(3) Reinforcement

The reinforcement shall be paid at contract unit rate. In addition to those specified in Clause 112 the rate shall also include compensation for the cost of providing , cutting to length, splice lengths additional to those shown on the Drawing, laps, bending, hooking, waste incurred by cutting, cleaning, spacer blocks, provision and fixing of chairs or other types of supports, welding, fixing the reinforcement in position including the provision of wire or other material for supporting and tying the reinforcement in place, bending reinforcement aside temporarily, and straightening, placing and compacting concrete around reinforcement and for complying with Clause 614.

100 GENERAL

All the Work shall be done according to the Bill of quantities, drawings and instructions of the Project Engineer on behalf of Division Office and the Contractor shall arrange to test materials and/or portions of the Work at his own cost in order to prove their soundness and sufficiency. If after any such test, and in the opinion of the Project

CIVIL WORKS

The Work shall be carried out according to these Specifications whether specifically mentioned elsewhere or not. No extra in any form will be paid unless it is definitely stated as an item in the Bill of Quantities.

Whenever the Specifications are not given or when the Specifications are ambiguous, the relevant Nepal Standard or Indian Standards or British Standards and further amendments will be considered as final and binding.

All Works shall be carried out simultaneously with electrical, plumbing, sanitary and other services and in co-operation with the Contractors the above services. The Work shall be carried on till it is completed satisfactorily along with the completion of other essential services. The building Contractor shall keep the other Contractors informed of the

proposed programme of Work, well in advance, so that the building Work is not hindered. The Contractor shall further cooperate with other Contractors in respect of any facility required by them e.g. making holes in shuttering for sanitary, pipes, electric conduits, fan hook etc. However, no extra payment shall be admissible to him for such reasonable assistance and facilities afforded to other Contractors and the building Contractors shall be deemed to have taken these factors into consideration while quoting his rates.
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 drawings.

The source of materials stated in the Specifications is those from which materials are generally available. However, materials not conforming to Specifications shall be rejected even if they come from the stated sources. The Contractor should satisfy himself that sufficient quantity of materials of acceptable Specification is available form the stated or other sources.
The requirements of Specifications under (A) GENERAL and (B) MATERIALS shall be fulfilled by the Contractor without extra charges i.e. the item rates quoted shall be deemed to have taken these Specifications into account.

GENERAL:

1. Office accommodation and WC :

The Contractor shall provide at his own expense adequate temporary accommodation and toilet facilities for his Workmen and keep the same in good conditions. This may be done to suit Site conditions with the approval of Project Engineer. The above mentioned temporary structures shall be removed on the completion of Works at Contractor's own cost. All materials shall belong to the Contractor.

2. Boards:

A board of size approximately 1.5m x 1.0m shall be made and put at an approved place on the Site. This board shall be painted in approved colour with names of (a) The proposed construction and Owner (b) The Contractor (c) Consultant. This shall be provided by Contractor at his own expense.
Engineer, any Work or position of Work is found to be defective or unsound, the Contractor shall pull down or re-execute the same at his own cost. Such rejected materials shall be removed from the Site immediately.

4. Preparing and cleaning the Site:

The Site described and shown on the plans plus 6 M (20ft.) all around the building shall be cleared of all obstructions, loose stones and materials, rubbish of all kinds as well as brushwood. All holes or hollows whether originally existing or produced by removal of loose stone or brushwood shall be carefully filled up with earth, well rammed and levelled off as directed. Also the Contractor shall dress the Site 6 M (20ft.) all around the buildings after completions, maximum cutting or filling being 30cm (12 inches). This shall be as per bill of Quantities.

5. Trees:

No trees, saplings shall be removed/cut without prior permission of the Project Engineer. If any tree has to be cut, this shall form an extra item. For the purpose of the Specification, a tree shall be defined as growth whose circumference of the trunk at 30cm (1'-0") from the base is not less than 90cm (3'-0") in height.

6. Measuring Materials:

Materials requiring measuring shall be measured separately in boxes of appropriate sizes before being mixed as directed by Project Engineer.

7. Temporary Protections:

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 from damage. Nothing extra shall be paid for on this matter.

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 Project Engineer.

9. Leave clean:

On completion, all Work must be cleaned down, rubbish removed and the Works and land cleared of rubbish, surplus materials, debris and other accumulations and everything left in a clean and orderly conditions.

10. Samples:

Samples of each class of Work required and materials shall be submitted by the Contractor for the approval of the Project Engineer and after such approval, these samples shall be deposited at a place chosen by the Project Engineer. The Contractor will be required to perform all Work under the Agreement in accordance with these approved samples.

11. Provisional Items:

All provisional Work items in the schedule shall be carried out at the discretion of the Project Engineer, and may or may not form part of the Agreement. If such provisional items are carried out by the Contractor, the rates shall be settled as for extra items as stated in the conditions of Agreement.

12. Storage:

Safe, dry and proper storage shall be provided for all materials, particularly cement. For installed at the Site of Work the Project Engineer may reduce the capacity of storage.

13. Water:

Water shall be clean and free from oil, waste, acid or other organic matter in solution or suspension. Water shall be from municipal main or tank or well water. Storage for the water shall be of sufficient size and as directed by the Project Engineer. The Contractor shall make his own arrangements for water supply.

14. Earth:

Earth for filling and terracing shall be free from all rubbish, organic or vegetable growth including roots, weeds etc. All clods shall be first broken-down.

15. Sand:

Sand shall be clean from river and of approved quality and free from salt, earth, dust or other impurities. If required by the Project Engineer, it shall be washed with clean water and not more than 5% of fine materials (clay, dust and silt) will be allowed, as tested by the settlement in water. The sand may contain particle size up to 5mm and should be well graded. Coarse sand for concrete Work shall be from local rivers or from any other place as approved by the Project Engineer and shall conform to cement concrete specification.

16. Portland Cement:

N.S. or I.S. mark awarded Ordinary Portland Cement should be used. Cement shall of fine quality with its chemical composition, consistency, tensile and compressive strength, soundness, setting time according to I.S. It should be free from lumps. It should be stored in a weatherproof building on a floor at least 30cm high from floor level. It should be stacked 60cm clear from the walls, and stored in such manner that permits easy access for inspection. It should also be stacked in not more than 6 layers high to prevent bursting of bottom bags. The Project Engineer may order testing of cement if required. In no case cement of grade less than 43 shall be used.

17. Stone:

Stone for rubble masonry shall be of the best of its kind. It shall be strong, angular, and free from flakes and must be of quality approved by the Project Engineer. No earthy or discoloured, weather or water worn stone shall be used.

18. Cement Mortar:

Cement mortar shall be of proportions specified for each type of Work. It shall be composed of Portland Cement and Sand. The ingredients shall be accurately gauged by measure and shall be well and evenly mixed together; care being taken not to add more water than is required. No mortar that has begun to set shall be used. If hand mixing is allowed then it shall be done in brick tanks. The gauged materials shall be put in the tank and mixed dry. Water will then be added and the whole mixed again until it is homogeneous and of uniform colour. Required quantity of cement shall be mixed at one time and shall not be such as to exceed mortar amount that can be consumed within 30 minutes of its mixing.

19. Aggregate:

Aggregate shall be from hard stone of size as specified under item of Work. In general 30mm (1.25") maximum gauge aggregate shall be used for mass concrete in foundation and 19mm (3/4") and down gauge i.e. 13mm (1/2”) in average, graded aggregate broken from stone crusher or pebbles for RCC Work. The Project Engineer shall approve the quality of the aggregate and if not shall be deported from the Site. The aggregate shall be brought to the Site from same approved quarry and crusher, in any condition if Contractor wants to change the quarry, the further approval shall require. In general, the other specification relating to aggregate shall follow standard practice of Department of Urban Development and Building Construction.

20. Bricks:

All bricks shall be of first class quality, approved by the Project Engineer. The bricks shall be free from grit and other impurities such as lime, iron and other deleterious salts, well burnt, copper coloured, sound, hard, square with sharp edges and shall give ringing sound when struck with a mallet. Machine made bricks shall be of best quality. Chimney made local bricks shall be of first class quality available, satisfying above-mentioned properties. Every lot the quality of the bricks shall be checked by the Project Engineer to ensure the quality of it.

21. Telia Bricks:

Telia bricks or tiles shall be of first class quality, having smooth, hard surface, regular in shape, sizes and uniform thickness and good colour. The tiles should be thoroughly burnt having sharp and square edges. They should be free from cracks, flaws and chips. They shall show a fine grained, dense texture and be free from lumps of lime, lamination, cracks, air holes, soluble salts, causing efflorescence or other defects which may in any way impair their strength, durability, appearance and usefulness for the purpose intended. They shall not have any part under-burnt.

They shall give a clear, metallic ringing sound when struck. All tiles shall have to be approved by the Project Engineer. Any tile not found up to the Specification shall be removed from the Site immediately at Contractor's own cost, representative samples of tiles to be used shall be submitted to the Project Engineer and his approval should be taken before bulk purchase. All tiles supplied shall confirm to the approved samples in all respect.

22. Steel:

The reinforcement shall be cold twisted deformed steel or TMT as per schedule, as approved by the Project Engineer. The reinforcement shall be free from fillings, loose rust, mill scale, paint, oil, grease, adhering earth or any other material that, in the opinion of the Project Engineer may impair the bond between the concrete and the reinforcement or that causes corrosion of the reinforcement or disintegration of the concrete.

Test certificates may be required from the suppliers, and in addition, the Contractor must undertake tensile and bending tests on random samples of the reinforcement delivered to the Site. All steel, which is represented by a sample,

which fails to reach the minimum requirements as per standard code of practice is to be removed from the Site immediately.

24. Scaffolding:

Scaffolding shall consist of well seasoned Sal wood planks or water proof plywood or steel plate with necessary battens, planks and metal props with accessories. All the scaffolding members shall be checked before installation for their strength and stiffness and tied up properly. It shall be fixed and tied together. In case of finished Work such as plastering, painting and distempering, no part of the scaffolding should touch the structure. Where ladders are used, gunny bags shall be tied up at the ends to prevent any damage to Work by sliding or tipping.

26. Test of Materials:

The Contractor shall at his own cost arrange and carry out the tests of materials to be used in the Works or any other tests as deemed necessary by the Project Engineer.

Work items:

1. EARTHWORK IN EXCAVATION IN FOUNDATION:

The Contractor shall examine the Site and ascertain for himself the nature thereof and the types of materials to be excavated.

1.1. Earthwork in excavation in the site development:

Due to uneven topography of the Site, the levelled ground shall be prepared with the formation level as indicated in the drawings or to such lesser or greater extent as the Project Engineer may advice. Excavated earth shall or shall not be placed within the premises of the project boundary. The Project Engineer may direct the Contractor to place excavated earth at particular filling area or to be dispose off.

The side slope in the excavated area must be maintained in the ratio of 2 Horizontal is to 1 vertical or as per drawing and must be 3 meter away from the edge of building.

1.2. Earthwork in Excavation in Foundation:

Foundation trench shall be due to the exact width and depth and levels as indicated in the drawings or to such lesser or greater extent as the Project Engineer may advice. Sides of trenches shall be vertical. In case the soil does not permit vertical sides, the Contractor shall protect side with timber shoring. Excavated earth shall not be placed within 1.5 meter of the edge of the trench. The Project Engineer may direct the Contractor to place excavated earth at a particular Site up to 30 meter away from the building. The bottom of the trench shall be perfectly levelled both longitudinally and transversely. The bed shall be lightly watered and well-rammed with mechanical vibrator. Excess digging if done through mistake shall be filled with 1:4:8 concrete. Water, if any accumulated in the trench, shall be baled out and all necessary precaution taken to prevent surface water from entering the trench.

Soft and defective spot in the trench shall be dug out and removed and filled with concrete or materials prescribed by the Project Engineer. If rocks or boulders are found during excavation, they should be removed and the bed trench shall be levelled and made hard by consolidating the earth, at no extra cost. Above mentioned items or any variation thereof from the Bills of Quantities shall be measured and valued by the Engineer as a variation. After the completion of foundation masonry, the remaining portion of the trench not filled by masonry shall be filled up with earth in layers of 15cm, watered and well-rammed. Such filling shall be free from rubbish, refuse matters and clods, surplus earth, if any shall be removed and site shall be levelled and dressed.

Trenches shall be measured as per drawings and rate shall be for complete Work including trench filling, for 30 meter lead and 1.5 meter lift including all tools and plants required for the completion of the work, removal of boulders, side shoring, pumping, and filling in voids by mass concrete (1:4:8) under (4) above etc.

No excavation or foundation work shall be filled in or covered up before the inspection and approval of the Project Engineer. The starting level for excavation shall be deemed to be ground level or such level as may be specified by the Project Engineer, before the commencement of the Work.

2. CONCRETE WORKS:

2.1. Code of Practice for Reinforced Concrete Work:

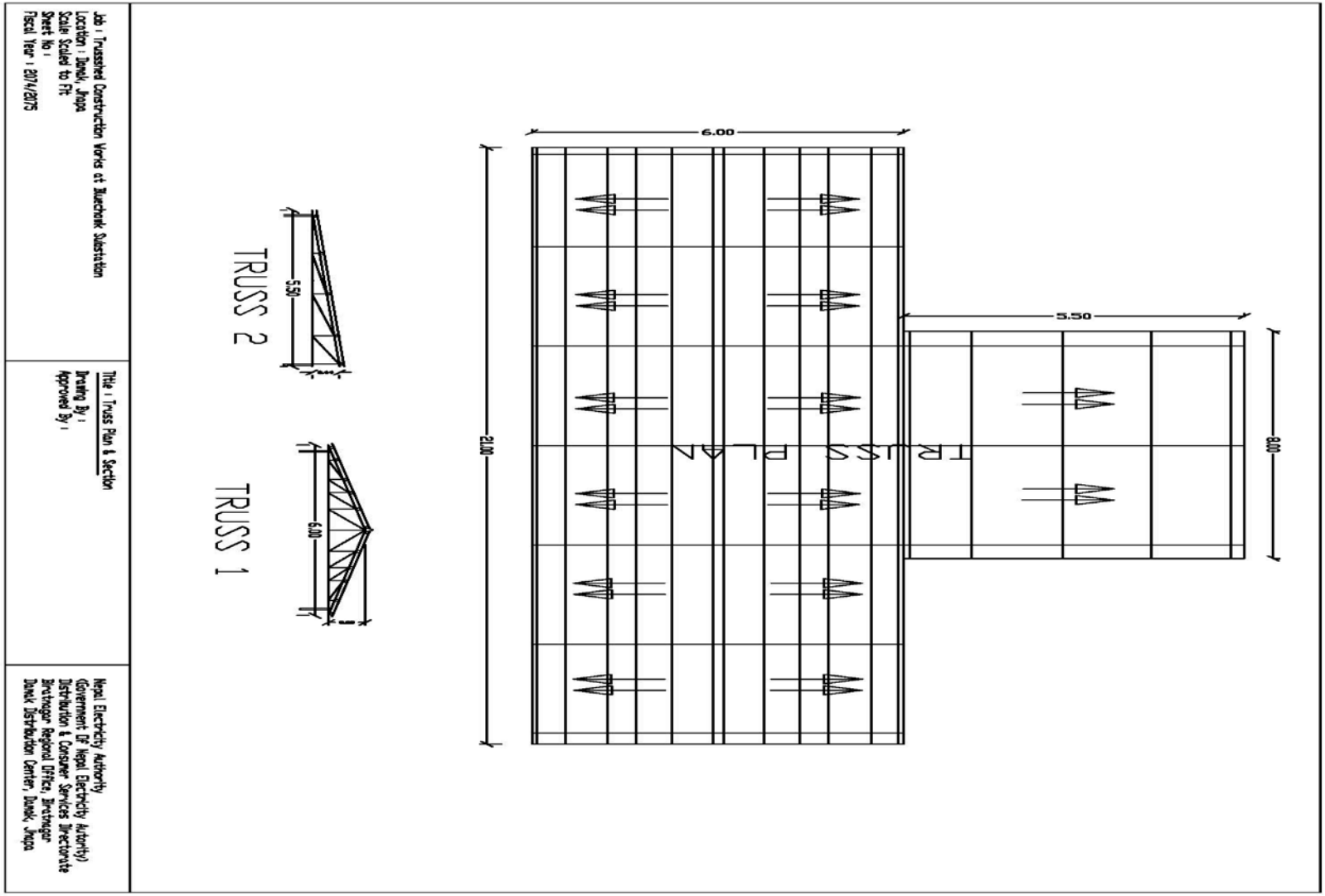
All Workmanship, materials and tests in connection with reinforced concrete Work are to be in conformity with Code of Practice where not inconsistent with these preambles. Generally a competent person shall be employed whose first duty will be to supervise all stages in the preparation and placing of concrete. All cubes shall be made and Site tests carried out under his direct supervision.

All materials, which have been damaged, contaminated or have deteriorated, or which do not comply in any way with the requirements of the Specification shall be rejected and shall be immediately removed from the Site. No materials shall be stored or stacked on suspended floors without the Project Engineer's prior approval. Sample of all materials may be asked to submit for approval of the Project Engineer. All condemned materials are to be removed from the Site within 24 hours.

Any cement which has failed the tests or which has been damaged by water or contaminated in any way on the Site shall immediately be put into bags and removed from the Site. Fine aggregates and sand shall be clean, coarse, hard siliceous material and equal at all times to the samples which shall be deposited with and approved by the Project Engineer.

M11	**Black Pipe Tubular Truss**	Tubes shall be designated by their nominal bore. These shall be light, medium or heavy as specified depending upon the wall thickness. Tubes shall be clean finished and reasonably free from scale. They shall be free from cracks, surface flaws, laminations and other defects. The ends shall be cut clean and square with axis of tube, unless otherwise specified. Wall thickness of tubes used for construction exposed to weather shall be not less than 4 mm and for construction not exposed to weather it shall be not less than 3.2 mm where structures are not readily accessible for maintenance, the minimum thickness shall be 5 mm. **Fabrication** The component parts of the structure shall be assembled in such a manner that they are neither twisted nor otherwise damaged and be so prepared that the specified cambers, if any, are, maintained. The tubular steel work shall be painted with one coat of approved steel primer after fabrication. All fabrication and welding is to be done in an approved workshop. ***Straightening :*** All material before being assembled shall be straightened, if necessary, unless required to be of curvilinear form and shall be free from twist. ***Bolting :*** Washers shall be specially shaped where necessary, or other means used to give the nuts and the heads of bolts a satisfactory bearing. In all cases, where the full area of the bolts is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts bolted together and washers of appropriate thickness shall be provided to allow the nuts to be completely tightened. ***Welding :*** Where welding is adopted, it shall be as specified. ***Caps and Bases for Columns :*** The ends of all the tubes, for columns transmitting loads through the ends, should be true and square to the axis of the tubes and should be provided with a cap or base accurately fitted to the end of the tube and screwed, welded or shrunk on. The cap or base plate should be true and square to the axis of the column. ***Sealing of Tubes :*** When the end of a tube is not automatically sealed by virtue of its connection be welding to another member the end shall be properly and completely sealed. Before sealing, the inside of the tubes should be dry and free from loose scale. ***Flatened Ends :*** In tubular construction the ends of tubes may be flattened or otherwise formed to provide for welded. Riveted or bolted connections provide that the methods adopted for such flattening do not injure the material. The change of sections shall be gradual. **Hoisting and Erection:** Tubular trusses shall be hoisted and erected in position carefully, without damage to themselves, other structure, equipment and injury to workman. The method of hoisting and erection proposed to be adopted shall be got approved from the Engineer-in-charge. Thecontractor shall however be fully responsible, for the work being carried out in a safe and proper manner without unduly stressing thevarious members. Proper equipment such as derricks, lifting tackles, winches, ropes etc. shall be used. **Measurements** The work as fixed in place shall be measured in running metres correct to a centimeter on their weights calculated on the basis of standard tables correct to the nearest kilogram unless otherwise specified. Weight of cleats, brackets, packing pieces bolts nuts,washers distance pieces separators diapharam gussests, fish plates, etc. shall not be measured separately. No deduction shall be made for skew cuts. **Rate** The rate shall include the cost of labour and materials involved in all the operations described above including application of one coat of approved steel primer, i.e. red oxide zinc chrome primer.

Section VII. Drawings


Job : Trussshed Construction Works at Bhadrapur Substation
Location : Damak, Jhapa
Scale: Scaled to Fit
Sheet No :
Fiscal Year : 2074/2075
Title : Truss Plan & Section
Drawing By :
Approved By :
Nepal Electricity Authority
(Government Of Nepal Electricity Authority)
Distribution & Consumer Services Directorate
Biratnagar Regional Office, Biratnagar
Damak Distribution Center, Damak, Jhapa
TRUSS 2
TRUSS 1
5.50
6.00
6.00
21.00
5.50
8.00

Section VIII. Bill of Quantities

Nepal Electricity Authority
(Government Of Nepal Undertaking)
Distribution and Consumers Services Directorate
Biratnagar Regional Office
Damak Distribution Center, Damak, Jhapa

"Bill Of Quantity"

JOB : Trussshed Construction Works Over Damak SS and Bluechowk SS. *Fiscal Year = 2074/2075*

LOCATION : Damak, Jhapa

S.N	***Description of Works***	***Unit***	***Quantity***	***Rate***		***T.Amount***	***Remarks***
				In Numbers	***In Words***		
A	**Truss Works at Damak SS**						
1	Site clearence before and after completion works,Dismantaling of existing slab for foundation of Truss and Surface cleaning of slab as per instruction of Site Incharge.	Job	1.00				
2	Mild steel truss including purlins of approved steel sections, including necessary cleat angles, gussets, base plates, anchoring, hooks, prefinished Eaves Board and applying two coats of enamel painting over primer on cleaned surface of steel, all complete.	Kg	845.73				
3	Providing & fixing CGI sheets (size, shape and pitch of corrugation as approved by Engineer) 26 guage medium all complete as instruction of site Engineer.	m2	78.00				
4	Providing & fixing Ridge of 0.5 mm colour plain sheet with accessories all complete as instruction of site Engineer.	m	12.00				
				Sub Total (A)			

B	**<u>Truss Works at Bluechowk SS</u>**						
1	Site clearence before and after completion works,Dismantaling of existing slab for foundation of Truss and Surface cleaning of slab as per instruction of Site Incharge.	Job	1.00				
2	Mild steel truss including purlins of approved steel sections, including necessary cleat angles, gussets, base plates, anchoring, hooks, prefinished Eaves Board and applying two coats of enamel painting over primer on cleaned surface of steel, all complete.	Kg	1,667.39				
3	Providing & fixing Colour CGI sheets (size, shape and pitch of corrugation as approved by Engineer) 26 guage medium all complete as instruction of site Engineer.	m2	130.82				
4	Providing & fixing Ridge of 0.5 mm colour plain sheet with accessories all complete as instruction of site Engineer.	m	21.10				
5	1:2:4 PCC for Foundation in line & level all complete as per instruction of Engineer	m3	0.41				
6	Providing & fixing Gutter of 0.5 mm colour plain sheet , 150mm width & 400mm depth in 40x3 mm iron bracket plain with accessories all complete as instruction of site Engineer.	m	42.20				
				Sub Total (B)			
				Total (A) + (B)			
				VAT @ 13 %			
				Grand Total			
	Grand Total in Words :						

Section IX. Forms of Securities

Bid Security (Bank Guarantee)

Whereas, *[name of Bidder]* (hereinafter called "the Bidder") has submitted his Quotation (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]* 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]

_____

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 _____

Date _____