BIDDING DOCUMENT

for

THE PROCUREMENT OF

Supply & Installation of Electrical equipment & Bay extension of 33/11 kV Bhiman Substation.

National Competitive Bidding (NCB)

IFB No: NEA/BPDOH/081/082-6

Contract Identification No. : NEA/BPDOH/081/082-6

NEA, Bagmati Province, Province Division Office, Hetauda

Issued on: 06-07-2025 10:00

Abbreviations

BD ... . Bidding Document

BDF ... . Bidding Forms

BDS ... . Bid Data Sheet

BOQ... ..... . Bill of Quantities

COF ... . Contract Forms

DP... ..... . Development Partners

DoLI... ..... Department of Local Infrastructure

ELI ... . Eligibility

EQC ... . Evaluation and Qualification Criteria

EXP ... . Experience

FIN ... . Financial

GCC ... . General Conditions of Contract

GoN1 ... . Government of Nepal

ICC... ..... . International Chamber of Commerce

IFB ....Invitation for Bids

ITB... ..... . Instructions to Bidders

JV ... . Joint Venture

LIT ... . Litigation

NCB... ..... . National Competitive Bidding

PAN ... . Permanent Account Number

PPA ... . Public Procurement Act

PPMO... ..... . Public Procurement Monitoring Office

PPR ... . Public Procurement Regulations

PL ... . Profit & Loss

SBD ... . Standard Bidding Document

SCC ... . Special Conditions of Contract

TS ... . Technical Specifications

VAT ... . Value Added Tax

WRQ ... . Works Requirements

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Invitation for Bids

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NEA, Bagmati Province, Province Division Office, Hetauda

Invitation for Bids No.: NEA/BPDOH/081/082-6

Date of publication: 06-07-2025 10:00

1. NEA, Bagmati Province, Province Division Office, Hetauda invites sealed bids or electronic bids from Nepalese eligible bidders for the construction of Supply & Installation of Electrical equipment & Bay extension of 33/11 kV Bhiman Substation. under National Competitive Bidding procedures.
The estimated amount for the works is Rs. (in NRs) 9631304.85 (Exclusive of VAT and Contingencies)

2. Eligible Bidders may obtain further information and inspect the bidding document at the office of NEA, Bagmati Province, Province Division Office, Hetauda, Bhutandevi-10, Hetauda, Makwanpur, Bagmati Province, Nepal or may visit PPMO website www.bolpatra.gov.np/egp.

3. Bidder who chooses to submit their bid electronically may purchase the hard copy of the bidding documents as mentioned above or may download the bidding documents for e-submission from PPMO's Web Site www. bolpatra.gov.np./egp,. Bidders, submitting their bid electronically, should deposit the cost(as specified above) of bidding document in the Project's Rajaswa (revenue) account as specified below and the scanned copy (pdf format) of the Bank deposit voucher shall be uploaded by the bidder at the time of electronic submission of the bids. Information to deposit the cost of bidding document in Bank:

   Name of the Bank: Global IME Bank Ltd.

   Name of Office: NEA, Bagmati Province, Province Division Office, Hetauda

   Office Code no:

   Office Account no: 30401010000077

   Rajaswa (revenue) Shirshak no.:

4. Pre-bid meeting shall not be held.

5. Sealed or electronic bids must be submitted to the office NEA, Bagmati Province, Province Division Office, Hetauda, Bhutandevi-10, Hetauda, Makwanpur, Bagmati Province, Nepalby hand/courier or through PPMO website www.bolpatra.gov.np/egp on or before 05-08-2025 12:00. Bids received after this deadline will be rejected.

6. The bids will be opened in the presence of Bidders' representatives who choose to attend at 05-08-2025 14:00 at the office of NEA, Bagmati Province, Province Division Office, Hetauda
Bhutandevi-10
Hetauda, Makwanpur
Bagmati Province
Nepal. Bids must be valid for a period of 90 days after bid opening and must be accompanied by a bid security or scanned copy of the bid security in .pdf format in case of e-bid, amounting to a minimum of NRs. 285000.0, which shall be valid for 30 days beyond the validity period of the bid.

7. If the last date of purchasing and /or submission falls on a government holiday, then the next working day shall be considered as the last date. In such case the validity period of the bid security shall remain the same as specified for the original last date of bid submission.

8. Evaluation and Qualification Criteria:

Conflict of Interest:

No conflicts of interest in accordance with ITB Sub-Clause 4.3.
Single Entity : must meet requirement

Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Letter of Bid

Government/DP Eligibility:

Not having been declared ineligible by government/DP, as described in ITB Sub-Clause 4.4.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Letter of Bid

Government-owned Entity:

Bidder required tomeet conditions of ITB Sub-Clause 4.5.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Forms ELI - 1, ELI - 2, with attachments

UN Eligibility:

Not having been declared ineligible based on a United Nationsresolution or Employer's country law, as described in ITB Sub-Clause 4.7.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Letter of Bid

Bidder's Participation in Bidding Process:

Bidder's Participation in not more than five (5) bidding process since 2078-12-03 i.e. March 17, 2022 as described in ITB Sub-Clause 4.8.

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : ELI-3

Other Eligibility: Firm Registration Certificate:

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

Other Eligibility: Business Registration Certificate (License):

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable

Documents:
Submission Requirements : Document attachment

Other Eligibility: VAT and PAN Registration certificate:

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

Other Eligibility: Tax Clearance certificate:

Tax clearances certificate for the F/Y .080/081 or Tax return submission evidence or evidence of tax time extension for.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

Other Eligibility: Additional requirements
General Construction Experience:

Other Eligibility: Additional requirements
General Construction Experience
Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the
last Five years prior to the applications submission deadline.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

Specific Construction Experience : Contracts of Similar Size and Nature:

Participation as Prime contractor, management contractor, or subcontractor, in at least One (1) contract within the last ten
(10) years, each with a value of at least NRS 38,53,000.00 that have been successfully or are substantially completed and that
are similar to the proposed works. The similarity shall be based on the physical size, complexity, methods, technology or
other characteristics as described in Section V, Works Requirements.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : not applicable
One Partner : must meet requirement
Documents:
Submission Requirements : Document attachment

Specific Construction Experience : Construction Experience in Key Activities:

For the above or other contracts executed during the period a minimum construction experience in
the following key activities :
(i) A minimum construction experience for Civil work and Electrical Installation in 33/11 Kv or Above Substation at least one contract of.
Single Entity : must meet all requirement
Joint Venture :
All Partners Combined : must meet all requirement
Each Partner : not applicable
One Partner : not applicable

Documents:
Submission Requirements : Document attachment

Average Annual Construction Turnover:

Minimum average annual construction turnover of NRS 1,45,00,000.00 calculated as total certified payments received for
construction contracts in progress or completed, within best three years out of last ten fiscal years.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : must meet requirement
Each Partner : must meet 25% of the requirement
One Partner : must meet 40% of the requirement
Documents:
Submission Requirements : Document attachment

Pending Litigation:

All pending litigation, arbitration or other material events impacting the net worth and/or liquidity of the bidder, if any, shall be treated as resolved against the Bidder and so shall in total not represent more than 50 (Fifty) percent of the Bidder’s net worth calculated as the difference between total assets and total liabilities.
Single Entity : must meet requirement by itself or as partner to past or existing JV
All Partners Combined : not applicable
not applicable :must meet requirement by itself or as partner to past or existing JV
One Partner: not applicable

Part - I Bidding Procedures

Section I – Instruction to Bidders

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SECTION– I: Instructions to Bidders

A. General	
1. Scope of Bid	1.1 In connection with the Invitation for Bids indicated in the **Bid Data Sheet (BDS)**, the Employer, as indicated **in the BDS**, issues this Bidding Document for the procurement of Works as specified in Section V (Works Requirements). The name, identification, and number of Contracts of the National Competitive Bidding (NCB) are provided **in the BDS.**
	1.2 Throughout this Bidding Document: (a) the term "in writing" means communicated in written form and delivered against receipt; (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and (c) "day" means calendar day.
2. Source of Funds	2.1 GoN Funded: In accordance with its annual program and budget, approved by the GoN, the implementing agency indicated **in the BDS** plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or Public Entities' own Resource Funded: In accordance with its annual program and budget, approved by the public entity, the implementing agency indicated **in the BDS** plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or DP Funded: The GoN has applied for or received financing (hereinafter called "funds") from the Development Partner (hereinafter called "the DP") indicated **in the BDS** toward the cost of the project named in the BDS. The GoN intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
	2.2 DP Funded: Payment by the DP will be made only at the request of the GoN and upon approval by the DP in accordance with the terms and conditions of the financing agreement between the GoN and the DP (hereinafter called the "Loan/Grant Agreement"), and will be subject in all respects to the terms and conditions of that Loan/Grant Agreement. No party other than the GoN shall derive any rights from the Loan Agreement or have any claim to the funds.
3. Fraud and Corruption	3.1 Procuring Entities as well as bidders, suppliers and contractors and their sub-contractors under GoN/DP-financed contracts, shall adhere to the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this; (a) the Employer adopts, for the purposes of this provision, the terms as defined below: (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party; (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an

	obligation; (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party. v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an investigation; (b) making false statements to investigators in order to materially impede an investigation; (c) failing to comply with requests to provide information, documents, or records in connection with an investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (e) materially impeding GoN/DP's contractual rights of audit or access to information; and vi) "integrity violation" is any act which violates Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of GoN/DP sanctions, retaliation against whistleblowers or witnesses, and other violations of Anticorruption Policy, including failure to adhere to the highest ethical standard. (b) the Employer will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the contract; (c) DP will cancel the portion of the financing allocated to a contract if it determines at any time that representative(s) of the GoN or of a beneficiary of DP-financing engaged in corrupt, fraudulent, collusive, or coercive practices or other integrity violations during the procurement or the execution of that contract, without the GoN having taken timely and appropriate action satisfactory to DP to remedy the situation. (d) DP will impose remedial actions on a firm or an individual, at any time, in accordance with DP's Anticorruption Policy and related Guidelines (as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate in DP-financed, -administered, or -supported activities or to benefit from an DP-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and (e) The Contractor shall permit the GoN/DP to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the GoN/DP, if so required by the GoN/DP.
	3.2 The Bidder shall not carry out or cause to carry out the following acts with an intention to influence the implementation of the procurement process or the procurement agreement :

	(a) give or propose improper inducement directly or indirectly, (b) distortion or misrepresentation of facts, (c) engaging in corrupt or fraudulent practice or involving in such act, (d) interference in participation of other competing 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 bids or interference of any kind in examination and evaluation of the bids during the period from the time of opening of the bids until the notification of award of contract.
	3.3 PPMO, on the recommendation of the Procuring Entity may blacklist a Bidder for a period of one (1) to three (3) years for its conduct including on the following grounds and seriousness of the act committed by the bidder: (a) if convicted by a court of law in a criminal offence which disqualifies the Bidder from participating in the contract, (b) if it is established that the contract agreement signed by the Bidder was based on false or misrepresentation of Bidder's qualification information, (c)if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for, or in executing, a GoN/DP-financed contract. (d) if the successful bidder fails to sign the contract.
	3.4 A bidder declared blacklisted and ineligible by the GoN, Public Procurement Monitoring Office (PPMO) and/or the DP in case of DP funded project, shall be ineligible to bid for a contract during the period of time determined by the GoN, PPMO and/or the DP. 3.5 In case of a natural person or firm/institution/company which is already declared blacklisted and ineligible by the GoN, any other new or existing firm/institution/company owned partially or fully by such Natural person or Owner or Board of director of blacklisted firm/institution/company; shall not be eligible bidder.
	3.6 Furthermore, Bidders shall be aware of the provisions of GCC (GCC 28.3 and 72.3(j).
4. Eligible Bidders	4.1 A Bidder may be a natural person, private entity, or government - owned entity—subject to ITB 4.5—or any combination of them in the form of a Joint Venture (JV) under an existing agreement, or with the intent to constitute a legally-enforceable joint venture. In the case of a JV: (a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. Maximum number of JV shall be as specified **in the BDS**. The eligibility criteria requirement of the parties to the JV shall be as specified in Section III Evaluation and Eligibility Criteria, and (b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during Contract execution.
	4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of any country

	or eligible countries mentioned **in the BDS**. A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed sub Contractors or suppliers for any part of the Contract including related services.
	4.3 A Bidder shall not have a conflict of interest. A Bidder found to have a conflict of interest shall be disqualified. if any of, including but not limited to, the following apply: (a) they have controlling partners in common; or (b) they receive or have received any direct or indirect subsidy from any of them; or (c) they have the same legal representative for purposes of this bid; or (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or improperly influence on the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or (e) a Bidder participates in more than one bid in this bidding process either individually or as a partner in a joint venture. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of ITB 4.3 (a)-(d) above, this does not limit the participation of the same subcontractor in more than one bid; or (f) a Bidder or any of its affiliated entity, participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or (g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Employer as Engineer for the Contract.
	4.4 A firm that is under a declaration of ineligibility by the GoN/DP in accordance with ITB 3, at the date of the deadline for bid submission or thereafter, shall be disqualified. A firm shall not be eligible to participate in any procurement activities under an DP-financed, -administered, or -supported project while under temporary suspension or debarment by DP pursuant to the DP's Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by the DP, or enforced by other DPs pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.
	4.5 Enterprises owned by Government shall be eligible only if they can establish that they are legally and financially autonomous and operate under commercial law, and that they are not a dependent agency of the GoN.
	4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

	4.7 Firms shall be excluded in any of the cases, if (a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Nepal prohibits any import of goods or Contracting of works or services from that country or any payments to persons or entities in that country. (b) DP Funded: as a matter of law or official regulation, Nepal prohibits commercial relations with that country, provided that the DP is satisfied that such exclusion does not preclude effective competition for the supply of goods or related services required; (c) DP Funded: a firm has been determined to be ineligible by the DP in relation to their guidelines or appropriate provisions on preventing and combating fraud and corruption in projects financed by them.
	4.8 Maximum number of bidding process that a Bidder, and all parties constituting the Bidder can participate shall be as specified in BDS. The bidders shall be considered ineligible if number of participation in bidding process exceeds the number as specified.
5. Eligible Materials, Equipment and Services	5.1 The materials, equipment and services to be supplied under the Contract shall have their origin in any source countries as defined in ITB 4.2 above and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.
	5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.
B. Contents of Bidding Documents	
6. Sections of Bidding Document	6.1 The Bidding Document consist of Parts I, II, and III, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8. PART I Bidding Procedures Section I Instructions to Bidders (ITB) Section II Bid Data Sheet (BDS) Section III Evaluation and Eligibility Criteria (EEC) Section IV Bidding Forms (BDF) PART II Requirements Section V Works Requirements (WRQ) Section VI Bill of Quantities (BOQ) PART III Conditions of Contract and Contract Forms Section VII General Conditions of Contract (GCC) Section VIII Special Conditions of Contract (SCC) Section IX Contract Forms (COF)

	6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Document.
	6.3 The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the Invitation for Bids.
	6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document and to furnish with its bid all information and documentation as is required by the Bidding Documents. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.
7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting	7.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Employer in writing at the Employer's address indicated **in the BDS** or raise any question or curiosity during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received within the period as mentioned in ITB 7.5. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 17.2
	7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself, on its own risk and responsibility, all information that may be necessary for preparing the bid and entering into a Contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
	7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
	7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for **in the BDS.** The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. 7.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer as mentioned **in BDS**.
	7.5 The Bidder is requested, to submit any questions in writing, to reach the Employer as mentioned **in BDS**.
	7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
	7.7 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
8. Amendment of Bidding Document	8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing agenda.

	8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
	8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 19.2
C. Preparation of Bids	
9. Cost of Bidding	9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
10. Language of Bid	10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language specified **in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified **in the BDS**, in which case, for purposes of interpretation of the Bid, such translation shall govern.
11. Documents Comprising the Bid	11.1 The Bid shall comprise the following: (a) Letter of Bid; (b) completed Bill of Quantities (BoQ), in accordance with ITB 12 and ITB 13, or as stipulated **in the BDS**; (c) Bid Security, in accordance with ITB 16; (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 17.2; (e) documentary evidence of establishing the Bidder's eligibility; (f) Bids submitted by a Joint Venture shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful Bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement. The Joint Venture agreement, or letter of intent to enter into a Joint Venture including a draft agreement shall indicate at least the parts of the Works to be executed by the respective partners; and (h) any other required documents, which is not against the provision of Procurement Act/Regulation/Directives and Standard Bidding Document issued by PPMO as specified in the BDS.
	11.2 The Bidder is solely responsible for the authenticity of the submitted documents.
12. Letter of Bid and Schedules	12.1 The Letter of Bid, Schedules, and all documents listed under ITB 11, shall be prepared using the relevant forms in Section IV (Bidding Forms) and in Section VI (Bill of Quantities).The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
13. Bid Prices and Discounts	13.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Schedules shall conform to the requirements specified below.
	13.2 The Bidder shall submit a bid for the whole of the works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section VI (Bill of Quantities).

	In case of Unit Rate Contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.
	13.3 The price to be quoted in the Letter of Bid shall be the total price of the Bid, excluding any discounts offered. Absence of the total price in the Letter of Bid or the Bid Price in the Bill of Quantities shall result in rejection of the Bid.
	13.4 The Bidder shall quote any discounts and the methodology for their application in the Letter of Bid, in accordance with ITB 12.1.
	13.5 If so indicated in ITB 1.1, bids are invited for individual Contracts or for any combination of Contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 13.4, provided the bids for all Contracts are submitted and opened at the same time.
	13.6 Unless otherwise provided **in the BDS** and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Table of Adjustment Data in Section IV (Bidding Forms) and the Employer may require the Bidder to justify its proposed indices and weightings.
	13.7All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 30 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the Bidder.
14. Currency of Bid and Payment	14.1 The currency of the bid and payment shall be in Nepalese Rupees.
15. Period of Validity of Bids	15.1 Bids shall remain valid for the period specified **in the BDS** after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
	15.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 16, it shall also be extended 30 days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid and to include any additional conditions against the provisions specified in Bid Documents.
16. Bid Security	16.1 The Bidder shall furnish as part of its bid, in original form, a bid security as specified **in the BDS.** In case of e-submission of bid, the Bidder shall upload scanned copy of Bid security letter at the time of electronic submission of the bid. The Bidder accepts that the scanned copy of the Bid security shall, for all purposes, be equal to the original. The details of original Bid Security and the scanned copy submitted with e-bid should be the same otherwise the bid shall be non-responsive.

	16.2 The bid security shall be, at the Bidder's option, in any of the following forms: (a) an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law or; (b) a cash deposit voucher in the Employer's Account as specified **in BDS**. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV (Bidding Forms) or in another Form acceptable to the employer. The form must include the complete name of the Bidder. The bid security shall be valid for minimum thirty (30) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 15.2.
	16.3 Any bid not accompanied by an enforceable and substantially compliant bid security shall be rejected by the Employer as nonresponsive. In case of e- Submission, if the scanned copy of an acceptable Bid Security letter is not uploaded with the electronic Bid then Bid shall be rejected.
	16.4 The bid security of unsuccessful Bidders shall be returned within three days, once the successful bidder has furnished the required performance security and signed the Contract Agreement pursuant to ITB 34.1and 35.1.
	16.5 The bid security shall be forfeited if: (a) a Bidder requests for withdrawal or modification of its bid, except as provided in ITB 15.2: (i) during the period of bid validity specified by the Bidder on the Bid, in case of electronic submission; (ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Bid, in case of hard copy submission. (b) a Bidder changes the prices or substance of the bid while providing information pursuant to clause ITB 24.1; (c) a Bidder involves in fraud and corruption pursuant to clause 3.1; (d) the successful Bidder fails to: (i) furnish a performance security in accordance with ITB 34.1; or (ii) sign the Contract in accordance with ITB 35.1 (iii) accept the correction of arithmetical errors pursuant to clause 28.1;
	16.6 The Bid Security of a JV shall be in the name of the JV that submits the bid. If the JV has not been legally constituted at the time of bidding, the Bid Security shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.
17. Format and Signing of Bid	17.1 The Bidder shall prepare one original of the documents comprising the bid as described in ITB 11 and clearly mark it ORIGINAL". In addition, the Bidder shall submit copies of the bid in the number specified **in the BDS**, and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail. In case of e-submission of bid, the Bidder shall submit his bid electronically in PDF or web forms files as specified in ITB Clause 18.1(b),
	17.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified **in the BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be

	typed or printed below the signature. All pages of the bid, except for un amended printed literature, shall be signed or initialed by the person signing the bid.
	17.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.
D. Submission and Opening of Bids	
18. Sealing and Marking of Bids	18.1 Unless otherwise specified **in BDS**, Bidders shall submit their bids by electronic or by mail/by hand/by courier. Procedures for submission, sealing and marking are as follows: (a) Bidders submitting bids by mail, by hand or by courier i. Bidders shall enclose the original and each copy of the Bid. These envelopes containing the original and the copies shall then be enclosed in one single envelope. ii. The inner and outer envelopes shall: (aa) bear the name and address of the Bidder; (bb) be addressed to the Employer as provided **in BDS**19.1; (cc)bear the specific identification of this bidding process indicated **in BDS** 1.1; and (dd) bear a warning not to open before the time and date for bid opening. iii. If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid. (b) Bidders submitting Bids electronically shall follow the electronic bid submission procedure specified **in BDS**.
19. Deadline for Submission of Bids	19.1 Bids must be received by the Employer at the address and no later than the date and time indicated **in the BDS**. In case of e-submission, the standard time for e-submission is Nepalese Standard Time as set out in the server. The e-procurement system will accept the e-submission of bid from the date of publishing of notice and will automatically not allow the e-submission of bid after the deadline for submission of bid.
	19.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
20. Late Bids	20.1 The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 19. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
21. Withdrawal, and Modification of Bids	21.1 A Bidder may withdraw, or modify its bid after it has been submitted either in hard copy or by e-submission. Procedures for withdrawal or modification of submitted bids are as follows: (i) Bids submitted in hard Copy a) Bidders may withdraw or modify its bids by sending a written notice in a sealed envelope, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 17.2 before 24 hours prior to the last deadline of submission of bid. The corresponding modification of the bid must accompany the respective written notice. All notices must be: (aa) prepared and submitted in accordance with ITB 17 and ITB 18,and in

	addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "MODIFICATION;" and (bb) received by the Employer twenty four hour hours prior to the deadline prescribed for submission of bids, in accordance with ITB 19. ii) E-submitted bids. a) Bidder may submit modification or withdrawal prior to the deadline prescribed for submission of bids through e-GP system by using the forms and instructions provided by the system.
	21.2. Bids requested to be withdrawn in accordance with ITB 21.1 shall not be opened. In case of hard copy submission, the Bid will be returned unopened to the Bidders.
	21.3 Except in case of any modification or correction in bid document made by procuring entity, Bidder may submit request for withdrawal or modification only one time. 21.4 In case of hard copy bid, no bid may be withdrawn if the bid has already been modified; except in case of any modification or correction in bid document by procuring entity.
	21.5 Request for withdrawal or modification must be made through the same medium of submission. Request for withdrawal or modifications through different medium shall not be considered.
	21.6 The following provisions apply for withdrawal or modification of the Bids: (i) In case of bids submitted in hard copy no bid shall be withdrawn or modified in the interval between 24 hours prior to the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof. (ii) In case of e-submitted bids no bids shall be withdrawn or modified in the interval between deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.
	21.7 Once a Bid is withdrawn, bidder will not be able to submit another bid for the same bid.
22. Bid Opening	22.1 The Employer shall open the bids in public at the address, date and time specified **in the BDS** in the presence of Bidders` designated representatives who choose to attend.
	22.2 The Employer shall download the e-submitted bid files. The e-procurement system allows the Employer to download the e-submitted bid files (report) only after bid opening date and time after login simultaneously by two members of the Bid opening committee.
	22.3 Electronically submitted bid shall be opened at first in the same time and date as specified above. Electronic Bids shall be opened one by one and read out. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files shall be considered incomplete.
	22.4 Thereafter, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be Permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "MODIFICATION" shall be opened and read out with the corresponding bid. No bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read

	out at bid opening. Only envelopes that are opened and read out at bid opening shall be considered further.
	22.5 All other envelopes shall be opened one at a time, reading out: the name of the Bidder; the Bid Price(s), including any discounts and alternative bids and indicating whether there is a modification; the presence of a bid security and any other details as the Employer may consider appropriate. Only discounts and alternative offers read out at bid opening shall be considered for evaluation. No bid shall be rejected at bid opening except for late bids, in accordance with ITB 20.1.
	22.6 The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, or modification; the Bid Price, per Contract if applicable, including any discounts and alternative offers; and the presence or absence of a bid security. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.
E. Evaluation and Comparison of Bids	
23. Confidentiality	23.1 Information relating to the examination, evaluation, comparison, and recommendation of Contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
	23.2 Any attempt by a Bidder to influence the Employer in the evaluation of the bids or Contract award decisions may result in the rejection of its bid.
	23.3 Notwithstanding ITB 23.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.
24. Clarification of Bids	24.1 To assist in the examination, evaluation, and comparison of the bids, the Employer may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the prices or substance of the bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids, in accordance with ITB 28. In case of e-submission of bid, upon notification from the employer, the bidder shall also submit the original of documents comprising the bid as per ITB 11.1 for verification of submitted documents for acceptance of the e-submitted bid.
	24.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Employer's request for clarification, its bid may be rejected.
25. Deviations, Reservations, and Omissions	25.1 During the evaluation of bids, the following definitions apply: (a) "Deviation" is a departure from the requirements specified in the Bidding Document; (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
26. Determination of Responsiveness	26.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11.
	26.2 A substantially responsive bid is one that meets the requirements of the Bidding

	Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that, (a) if accepted, would: (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.
	26.3 If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
	26.4 In case of e-submission bids, the Employer evaluates the bid on the basis of the information in the electronically submitted bid files. If the Bidder cannot substantiate or provide evidence to establish the information provided in e-submitted bid through documents/ clarifications as per ITB Clause 24.1, the bid shall not be considered for further evaluation.
	26.5 In Case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such bidder's bid shall be excluded from the evaluation, if public entity receives instruction from Government of Nepal.
27. Nonconformities, Errors, and Omissions	27.1 Provided that a bid is substantially responsive, the Employer may waive any non-conformities in the bid that do not constitute a material deviation, reservation, or omission.
	27.2 Provided that a bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the bid. Failure of the Bidder to comply with the request may result in the rejection of its bid.
	27.3 Provided that a bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the methods indicated in Section III (Evaluation and Eligibility Criteria).
	27.4 If the monetary value of such non-conformities is found to be more than fifteen percent of the Bid Price of the bidder on account of minor discrepancies pursuant to ITB 27.3, such bid shall be considered non responsive and shall not be involved in evaluation.
28. Correction of Arithmetical Errors	28.1 Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis: (a) only for unit price Contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail

	and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and (c) If there is a discrepancy between the bid price in the Summary of Bill of Quantities and the bid amount in item (c) of the Letter of Bid, the bid price in the Summary of Bill of Quantities will prevail and the bid amount in item (c) of the Letter of Bid will be corrected. (d) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) ,(b) and (c) above.
	28.2 If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be disqualified and its bid security shall be forfeited.
29. Evaluation of Bids	29.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.
	29.2 To evaluate a bid, the Employer shall consider the following: (a) the bid price, excluding Value Added Tax , Provisional Sums, and the provision, if any, for contingencies in the Summary Bill of Quantities, for Unit Rate Contracts, or Schedule of Prices for lump sum Contracts, but including Day work items, where priced competitively; (b) price adjustment for correction of arithmetic errors in accordance with ITB 28.1; (c) price adjustment due to discounts offered in accordance with ITB 13.4; (d) adjustment for nonconformities in accordance with ITB 27.3; (e) application of all the evaluation factors indicated in Section III (Evaluation and Eligibility Criteria);
	29.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
	29.4 If this Bidding Document allows Bidders to quote separate prices for different Lots (Contracts), and to award multiple Contracts to a single Bidder as specified in BDS, the methodology to determine the lowest evaluated price of the Contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III (Evaluation and Eligibility Criteria).
	29.5 if the bid for an Unit Rate Contract, which results in the lowest Evaluated Bid Price is seriously unbalanced or front loaded or extremely low in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analysis, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder as mentioned in BDS to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract or may consider the bid as non-responsive.
	29.6 In case of e-submission bids, the Employer evaluates the bid on the basis of the

	information in the electronically submitted bid files. If the Bidder cannot substantiate or provide evidence to establish the information provided in e-submitted bid through documents/ clarifications as per ITB Clause 24.1, the bid shall not be considered for further evaluation. 29.7 In Case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such bidder's bid shall be excluded from the evaluation, if public entity receives instruction from Government of Nepal.
30. Comparison of Bids	30.1 The Employer shall compare all substantially responsive bids in accordance with ITB 29.2 to determine the lowest evaluated bid.
31. Employer's Right to Accept Any Bid, and to Reject Any or All Bids	31.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to Contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.
F. Award of Contract	
32. Award Criteria	32.1 The Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.
33. Letter of Intent to Award the Contract/Notification of Award	33.1 The Employer shall notify the concerned Bidder whose bid has been selected in accordance with ITB 32.1 within seven days of the selection of the bid, in writing that the Employer has intention to accept its bid and the information regarding the name, address and amount of selected bidder shall be given to all other bidders who submitted the bid.
	33.2 If no bidder submits an application pursuant to ITB 36 within a period of seven days of the notice provided under ITB 33.1, the Employer shall, accept the bid selected in accordance with ITB 32.1 and Letter of Acceptance shall be communicated to the selected bidder prior to the expiration of period of Bid validity, to furnish the performance security and sign the contract within fifteen days.
34. Performance Security	34.1 Within Fifteen (15) days of the receipt of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security as under mentioned from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in accordance with the conditions of Contract using Sample Form for the Performance Security included in Section IX (Contract Forms), or another form acceptable to the Employer. i) If bid price of the bidder selected for acceptance is up to 15 (fifteen) percent below the approved cost estimate, the performance security amount shall be 5 (five) percent of the bid price. ii) For the bid price of the bidder selected for acceptance is more than 15 (fifteen) percent below of the cost estimate, the performance security amount shall be determined as follows: Performance Security Amount =[(0.85 x Cost Estimate – Bid Price) x 0.5] + 5% of Bid Price. The Bid Price and Cost Estimate shall be inclusive of Value Added Tax.
	34.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of

	the award and forfeiture of the bid security. In that event the Employer may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily. The process shall be repeated according to ITB 33.
35. Signing of Contract	35.1 The Employer and the successful Bidder shall sign the Contract Agreement within the period as stated ITB 34.1.
	35.2 At the same time, the Employer shall affix a public notice on the result of the award on its notice board and make arrangement for causing such notice to be affixed on the notice board also of the District Coordination Committee, District Administration Office, Provincial Treasury and Controller Office and District Treasury and Controller Office. The Employer may make arrangements to post the notice into its website, if it has; and if it does not have, into the website of the Public Procurement Monitoring Office, identifying the bid and lot numbers and the following information: (i) the result of evaluation of bid; (ii) date of publication of notice inviting bids; (iii) name of newspaper; (iv) reference number of notice; (v) item of procurement; (vi) name and address of bidder making contract and (vii) contract price.
	35.3 Within thirty (30) days from the date of issuance of notification pursuant to ITB 33.1 unsuccessful bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their bids were not selected. The Employer shall promptly respond in writing to any unsuccessful Bidder who, requests for debriefing.
	35.4 If the bidder whose bid is accepted fails to sign the contract as stated ITB 35.1, the Public Procurement Monitoring Office shall blacklist the bidder on recommendation of the Public Entity.
36. Complaint and Review	36.1 If a Bidder is dissatisfied with the Procurement proceedings or the decision made by the Employer in the intention to award the Contract, it may file an application to the Chief of the Public Entity within Seven (7) days of providing the notice under ITB 33.1 by the Public Entity, for review of the proceedings stating the factual and legal grounds.
	36.2 Late application filed after the deadline pursuant to ITB 36.1 shall not be processed.
	36.3 The chief of Public Entity shall, within five (5) days after receiving the application, give its decision with reasons, in writing pursuant to ITB 36.1: (a) whether to suspend the procurement proceeding and indicate the procedure to be adopted for further proceedings; or (b) to reject the application. The decision of the chief of Public Entity shall be final.

SECTION-II

Bid Data Sheet

A. General	
ITB 1.1	The number of the Invitation for Bids is : NEA/BPDOH/081/082-6
ITB 1.1	The Employer is : NEA, Bagmati Province, Province Division Office, Hetauda
ITB 1.1	The number and identification of lots (contracts) comprising this bidding process is: : NEA/BPDOH/2081/082-6 Supply & Installation of Electrical equipment &...
ITB 2.1	The name of the Project is : Supply & Installation of Electrical equipment & Bay extension of 33/11 kV Bhiman Substation. The Development Partner(DP) is : NA The implementing agency is : NA
ITB 4.1(a)	Maximum number of partner in a joint venture shall be : 3
ITB 4.2	Ineligible countries : [NA]

B. Bidding Document	
ITB 7.1	For clarification purposes only, the Employer's address is: Attention: Jitendra Jha Address: Bhutandevi-10 Makwanpur Bagmati Province Telephone: 057524367 Facsimile number: Electronic mail address: hetauda.ro@nea.org.np
ITB 7.4	A pre bid meeting shall not take place.
ITB 7.4	A site visit shall not be organized by the Employer.
ITB 7.5	Time for request: Requests for clarification should be received by the Employer no later than 15 days prior to the deadline for submission of bids.

C. Preparation of Bids	
ITB 10.1	The language of the bid is: English / Nepali
ITB 11.1 (b)	In accordance with ITB 12 and ITB 14, the following schedules shall be submitted with the bid, including the priced Bill of Quantities for Unit Rate Contracts and Schedule of Prices for lump sum contracts: as stipulated in bid.
ITB 11.1 (i)	The Bidder shall submit with its bid the following additional documents:

	SL No	Document Name
	1	The Bid shall comprise the following: (a) Letter of Bid; (b) completed Schedules, in accordance with ITB 12 and 14, or as stipulated in the BDS; (c) Bid Security, in accordance with ITB 19; (d) alternative bids, at Bidder's option and if permissible, in accordance with ITB 13; (e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2; (f) documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the Contract; (g) Technical Proposal in accordance with ITB 16; (h) In the case of a bid submitted by a JV, the JV agreement, or letter of intent to enter into a JV including a draft agreement, indicating at least the parts of the Works to be executed by the respective partners; and (i) any other required documents, which is not against the provision of Procurement Act/Regulation/Directives and Standard Bidding Document issued by PPMO as specified in the BDS.
ITB 13.6	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.	
ITB 15.1	The bid validity period shall be Ninety (90) days.	
ITB 16.1	The Bidder shall furnish a bid security, from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law with a minimum of 285000.00 NPR, which shall be valid for 30 days beyond the validity period of the bid.	
ITB 16.2(b)	Bank Name: Nabil Bank Ltd. Bank Address: Hetauda Branch Account Name: NEA, Province No. 3 Province Division Office Account Number: 2301017500100	
ITB 17.1	In addition to the original of the bid, the number of copy/ies is/are: NA	
ITB 17.2	The written confirmation of authorization to sign on behalf of the Bidder shall indicate: (a) The name and description of the documentation required to demonstrate the authority of the signatory to sign the Bid such as a Power of Attorney; and (b) In the case of Bids submitted by an existing or intended JV, an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.	

D. Submission and Opening of Bids

ITB 18.1	Bidders shall have the option of submitting their bids by electronic only.

ITB 18.1 (b)	Electronic bid submission procedure: (a) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in this clause. i. Bidders who choose to submit their bids electronically, can view/download the bidding documents from "published bids" section of e-GP system https://bolpatra.gov.np/egp. ii. For the purpose of e-Submission, the bidder shall, at first, register in e-GP system and maintain their organization profile data and documents required during bid response preparation. The details of e-GP registration and profile management procedure are specified in Article No 9 and 10 respectively of e-GP Directives issued by PPMO, which can be downloaded from Download section of e-GP system. iii. In order to submit the bid, interested bidders shall deposit the cost of biding document in the bank and account specified in Invitation for Bid (IFB). The scanned copy (in PDF format) of the bank deposit voucher shall also be submitted along with the bid. iv. The bidders shall prepare their bids using data and documents maintained in bidder's profile, instruction provided by e-GP system and forms/format provided in the bidding document. v. Bidders may submit bids as a single entity or as a joint venture (JV). Bidder submitting bid in JV shall have to upload joint venture agreement along with partner(s) Bolpatra ID provided during bidder's registration. vi. Bidders (all partners in case of JV) shall update their profile data and documents required during preparation and submission of their bids. vii. In case of bid submission in JV, the consent of the partners shall be obtained through the confirmation link sent to the registered email address and the partners shall have to acknowledge their confirmation. viii. Bidders shall submit the required documents as specified in Section I-Instruction to Bidders, Section II-Bid Data Sheet and Section III-Evaluation and Eligibility Criteria of the bidding document. The format of the documents shall be in PDF and/or web form as provisioned in the e-GP system. ix. After providing all the details and documents, the e-GP system will generate bid response documents for the bidder. Bidders shall download, verify and confirm the bid response documents prior to bid submission. x. For verifying the authentic user, the system will send one time password (OTP) in the registered e-mail address of the bidder. System will validate the OTP and then only allow bidders to submit their bid. xi. Electronically submitted bids can be modified and/or withdrawn through the system within the bid submission deadline. xii. The bidder/bid shall meet the following requirements and conditions for e-submission of bids; aa) The e-submitted bids must be readable through PDF reader. bb) The bidders are fully responsible for using the e-GP system as per specified procedures and in no case the employer shall be held liable for bidder's inability to use the system. ac) When a bidder submits electronic bid through the e-GP System, it is assumed that the bidder has prepared the bid by studying and examining the complete set of the bidding document and e-GP instruction including the provision stipulated in e-GP Directives.
ITB 19.1	For bid submission purposes only, the Employer's address is : Attention : Jitendra Kumar Jha Address : www.bolpatra.gov.np The deadline for bid submission is : 05-08-2025 12:00
ITB 22.1	The bid opening shall take place at : Address : NEA, Bagmati Province, Province Division Office, Hetauda Bhutandevi-10 Hetauda, Makwanpur Bagmati Province Nepal Date : 05-08-2025 14:00

E. Evaluation and Comparison of Bids

ITB 29.4	Bidders are not permitted to quote separate prices for lots (Contracts), and a single Bidder will be awarded multiple lots (Contracts) based on provision of Paragraph 1.1, Multiple Contracts Section III (Evaluation and Qualification Criteria).
ITB 29.5	The amount of the performance security be increased by 8 percent of the quoted bid price.

SECTION - III
Evaluation and Eligibility Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and eligible Bidders. GoN/DP requires bidders to be qualified by meeting predefined eligibility criteria. In accordance with ITB 29, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section IV (Bidding Forms).

1 Evaluation

In addition to the criteria listed in ITB 29.2 (a) - (e) the following criteria shall apply:

2 Eligibility

2.1 Conflict of Interest

No conflicts of interest in accordance with ITB Sub-Clause 4.3.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Letter of Bid

2.2 Government/DP Eligibility

Not having been declared ineligible by government/DP, as described in ITB Sub-Clause 4.4.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Letter of Bid

2.3 Government-owned Entity

Bidder required tomeet conditions of ITB Sub-Clause 4.5.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Forms ELI - 1, ELI - 2, with attachments

2.4 UN Eligibility

Not having been declared ineligible based on a United Nationsresolution or Employer's country law, as described in ITB Sub-Clause 4.7.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Letter of Bid

2.5 Bidder's Participation in Bidding Process

Bidder's Participation in not more than five (5) bidding process since 2078-12-03 i.e. March 17, 2022 as described in ITB Sub-Clause 4.8.

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : existing or intended JV must meet requirement
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : ELI-3

2.6 Other Eligibility: Firm Registration Certificate

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

2.7 Other Eligibility: Business Registration Certificate (License)

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

2.8 Other Eligibility: VAT and PAN Registration certificate

Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

2.9 Other Eligibility: Tax Clearance certificate

Tax clearances certificate for the F/Y .080/081 or Tax return submission evidence or evidence of tax time extension for.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

2.10 Other Eligibility: Additional requirements
General Construction Experience

Other Eligibility: Additional requirements
General Construction Experience
Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last Five years prior to the applications submission deadline.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : must meet requirement
One Partner : not applicable

Documents:
Submission Requirements : Document attachment

2.11 Specific Construction Experience : Contracts of Similar Size and Nature

Participation as Prime contractor, management contractor, or subcontractor, in at least One (1) contract within the last ten (10) years, each with a value of at least NRS 38,53,000.00 that have been successfully or are substantially completed and that
are similar to the proposed works. The similarity shall be based on the physical size, complexity, methods, technology or other characteristics as described in Section V, Works Requirements.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : not applicable
Each Partner : not applicable
One Partner : must meet requirement
Documents:
Submission Requirements : Document attachment

2.12 Specific Construction Experience : Construction Experience in Key Activities

For the above or other contracts executed during the period a minimum construction experience in
the following key activities :
(i) A minimum construction experience for Civil work and Electrical Installation in 33/11 Kv or Above Substation at least one contract of.
Single Entity : must meet all requirement
Joint Venture :
All Partners Combined : must meet all requirement
Each Partner : not applicable
One Partner : not applicable
Documents:
Submission Requirements : Document attachment

2.13 Average Annual Construction Turnover

Minimum average annual construction turnover of NRS 1,45,00,000.00 calculated as total certified payments received for construction contracts in progress or completed, within best three years out of last ten fiscal years.
Single Entity : must meet requirement
Joint Venture :
All Partners Combined : must meet requirement
Each Partner : must meet 25% of the requirement
One Partner : must meet 40% of the requirement
Documents:
Submission Requirements : Document attachment

2.14 Pending Litigation

All pending litigation, arbitration or other material events impacting the net worth and/or liquidity of the bidder, if any, shall be treated as resolved against the Bidder and so shall in total not represent more than 50 (Fifty) percent of the Bidder’s net worth calculated as the difference between total assets and total liabilities.
Single Entity : must meet requirement by itself or as partner to past or existing JV
All Partners Combined : not applicable
not applicable :must meet requirement by itself or as partner to past or existing JV
One Partner: not applicable

Following contracts shall not be counted for this purpose

a) The contracts which were invited or accepted before 2078-12-03 B.S or March 17, 2022 A.D

b) The contracts which have been invited after 2078-12-03 B.S i.e March 17, 2022 A.D and accepted but the work acceptance report has been approved according to Rule 117 of PPR.

c) The contracts that are running under all types of foreign assistance

SECTION-IV

Bidding Forms

This Section contains the forms which are to be completed by the Bidder and submitted as part of its Bid.

Letter of Bid

The Bidder must accomplish the Letter of Bid in its letterhead clearly showing the Bidder's complete name and address.

Date: .....

Name of the contract: .....

Invitation for Bid No.: .....

To: …….....

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) Clause 8;

(b) We offer to execute in conformity with the Bidding Documents the following Works:

(c)The total price of our Bid, excluding any discounts offered in item (d) below is: [Insert one of the options below as appropriate] or when left blank is the Bid Price indicated in the Bill of Quantities

Option 1, in case of single contract: Total price is: [insert the total price of the Bid in words and figures];

Or

Option 2, in case of multiple lots (contracts): (i) Total price of each lot (contracts): [insert the total price of each lot in words and figures]; (ii) Total price of subject contract [say Lot1] and Lot2 [another contract] [insert the total price in words and figures]; (iii) Total price of subject contract [say Lot1]and Lot3 [another contract] [insert the total price in words and figures]; Total price of subject contract [say Lot1], Lot2 [another contract], Lot3 [another contract], ……..[insert the total price in words and figures];

(d) The discounts offered and the methodology for their application for subject contract [single contract] are:…….. [For Bidding Documents not provisioning multiple contracts]

Add following if Bidding Document provisions applicability of multiple contracts

The discounts offered and the methodology for their application for subject contract [say Lot1] and Lot2 [another contract] are:……..

The discounts offered and the methodology for their application for subject contract [say Lot1] and Lot3 [another contract] are:……..

The discounts offered and the methodology for their application for subject contract [say Lot1], Lot2 [another contract] and Lot3 [another contract],……,
are:……..

[Note:

1. Formulate possible combinations depending upon the number of lots under Bidding Process and modify accordingly Paragraph (c) and (d)]

(e) Our bid shall be valid for a period of ……..***[insert validity period as specified in ITB 15.1]*** days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(f)If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document;

(g) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries or any countries [insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a consortium or association, and the nationality of each Subcontractor and Supplier];

(h) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3;

(i) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.3;

(j) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;

(k) We are not a government owned entity/We are a government owned entity but meet the requirements of ITB 4.5;[1]

(l) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed;

(m) We declare that, we have not been black listed as per ITB 3.4 and no conflict of interest in the proposed procurement proceedings and we have not been punished for an offense relating to the concerned profession or business.

(n) We declare that we have not running contracts more than five (5)[1] in accordance with ITB 4.8.

(o) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive; and

(p) If awarded the contract, the person named below shall act as Contractor's Representative:

(q) We agree to permit the Employer/DP or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by the Employer.

Name: .....

In the capacity of .....

Signed ……...

Duly authorized to sign the Bid for and on behalf of ……

Date ……....

[1] Note: Following contracts shall not be counted for this purpose

a) The contracts which were invited or accepted before 2078-12-03 B.S or March 17, 2022 A.D

b) The contracts which have been invited after 2078-12-03 B.S i.e March 17, 2022 A.D and accepted but the work acceptance report has been approved according to Rule 117 of PPR.

c) The contracts that are running under all types of foreign assistance

1 Use one of the two options as appropriate.

Table of Price Adjustment Data[2]

[To be used if Price Adjustment is applicableas per GCC 53.1]

Code	Index Description	Source of Index*	Base Value and Date	Employer's Proposed Weighting Range (coefficient)	Bidder's Proposed Weighting (coefficient)**
1	**2**	**3**	**4**	**5**	**6**
	Non - adjustable (A)			0.15	0.15
	Labor (b)				
	Materials (c)				
	Equipment usage (d)				
		Total			**1.00**

*Normally following source of index shall apply. Public Entity shall choose applicable Index for each item.

(a) Labor: "National Salary and Wage Rate Index"- "Construction Labor" of Nepal Rastra Bank
or
rate fixed by District Rate Fixation Committee

(b) Material:"National Wholesale Price Index" - Construction Materials" of Nepal Rastra Bank

(c) Equipment usage:

"National Wholesale Price Index"-"Machinery and Equipment" of Nepal Rastra Bank

or

"Fuel" Price fixed by Nepal Oil Corporation.

** Bidders proposed weightings should be within the range specified by the Employer in column - 5

[2] Non-compliance of the data (stipulated by the bidder in this table) with requirements described here shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

Table of Price Adjustment Data[3]

[To be used if Price Adjustment is applicable as per GCC 53.6]

Code	Construction Material*	Unit	Base Price (NRs/Unit) (Ex-factory)	Source (Factory)**
1	2	3	4	5

* Major construction materials to be specified by Employer in column - 2.

** Base Price and source normally to be specified by Employer (or alternatively informed to be proposed by bidder) in column 4 and5.

Note:
The base prices of the construction materials shall be taken as of 30 days before the deadline for submission of the Bid as quoted by the Bidder and verified by the Employer. For the purpose of calculation of price adjustment, the Ex-factory price of the same source shall be taken into consideration.

[3] Non-compliance of the data (stipulated by the bidder in this table) with requirements described here shall not be grounds for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

Bid Security

Bank Guarantee

Bank's Name, and Address of Issuing Branch or Office

(On letterhead paper of the Bank)

Beneficiary: ..... ***name and address of Employer*** …….

Date: ……...

Bid Security No.: .....

We have been informed that . ……. ***.[insert name of the Bidder]*** (hereinafter called "the Bidder") intends to submit its bid (hereinafter called "the Bid") to you for the execution of ……... ***name of Contract*** . …… under Invitation for Bids No. …… ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we…… . ***name of Bank***. …….. hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of . . ……...***amount in figures*** ……. (. …….. ***.amount in words*** ……..) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

(a) has withdrawn or modifies its Bid:

(i) during the period of bid validity specified by the Bidder on the Letter Bid, in case of electronic submission

(ii) from the period twenty-four hours prior to bid submission deadline up to the period of bid validity specified by the Bidder on the Letter of Bid, in case of hard copy submission; or

(b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or

(c) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the performance security, in accordance with the ITB.

(d) is involved in fraud and corruption in accordance with the ITB

This guarantee will remain in force up to and including the date ……***number***……days after the deadline for submission of Bids as such deadline is stated in the instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not letter than the above date.

This Bank guarantee shall not be withdrawn or released merely upon return of the original guarantee by the Bidder unless notified by you for the release of the guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

. . .Bank's seal and authorized signature(s) . . .

Note:

The bid security of ……..……. has been counter guaranteed by the Bank ……..……... ...…… on ……....……..……. (Applicable for Bid Security of Foreign Banks).

Bidder's Information Format

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Bidder’s Information

Form ELI - 1: Bidder’s Information Sheet

Bidder's Information	
Bidder's legal name	
In case of JV, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following original documents.	
1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm or JV named in above, in accordance with ITB 17.2. 3. In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. 4. In case of a government-owned entity, any additional documents not covered under 1 above required to comply with ITB 4.5.	

Form ELI - 2: JV Information Sheet

Each member of a JV must fill in this form

JV / Specialist Subcontractor Information	
Bidder's legal name	
JV Partner's or Subcontractor's legal name	
JV Partner's or Subcontractor's country of constitution	
JV Partner's or Subcontractor's year of constitution	
JV Partner's or Subcontractor's legal address in country of constitution	
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following original documents.	
1. articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm named above, in accordance with ITB .2. 3. In the case of government-owned entity, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5.	

Form ELI - 3: Bidder's Running Contracts****

Each member of a JV must fill in this form

	Bidder's Running Contracts				
Name of office	**Contract Identification no.**	**Source of Fund***	**Date of issuance of Letter of Acceptance**	**Status of contract****	**Date of Issuance of Taking Over Certificate*****

* Mention GON funded or DP funded or Other PE (Insert name) funded

** Mention "Yet to sign" if contract is not signed, "Running" if contract has been signed and contract is running and "Substantially completed" if taking over certificate has been issued.

*** Insert date of issuance of taking over certificate if the awarded contract has been substantially completed and taking over certificate has been issued.

****Note: Following contracts shall not be counted for this purpose

a) The contracts which were invited or accepted before 2078-12-03 B.S or March 17, 2022 A.D

b) The contracts which have been invited after 2078-12-03 B.S i.e March 17, 2022 A.D and accepted but the work acceptance report has been approved according to Rule 117 of PPR.

c) The contracts that are running under all types of foreign assistance

Price Adjustment : Table A - Local Currency

Sl No.	Index Description	Source of Index	Base Value	Base Date	Employer's Proposed Weighting coefficient Range from	Employer's Proposed Weighting coefficient Range to	Bidder's Proposed Weight
						Total	1

Part - II

REQUIREMENTS

Table of Clauses

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Scope of Work ……..

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SECTION-V

Works Requirements

This Section contains the Specification, the Drawings, and supplementary information that describe the Works to be procured.

Part - II

WORK REQUIREMENTS

Table of Clauses

Section – VI: Works Requirements

1. **Scope of Work**
2. **Technical Specifications**
3. **Specifications of Civil & Building Works**
4. **Inspection, Testing & Commissioning**

SECTION - VI

Works Requirements

This Section contains the Scope of works, Technical Specification, Technical Data Sheets, Inspection, Testing & Commissioning and other information that describe the Works to be procured.

Scope of Work

1. Description of the Project:

1.1 General:

The main components of the **33/11 kV Substation Rehabilitation Project** include **Engineering, Design, Supply, Install, Testing, Commissioning, Operation and Metering, Protection & Control Switchgears , Transportation of Electrical Equipment and Civil Construction works as specified in BOQ for Rehabilitation of existing 33/11 kV Bhiman (Sindhuli District) Substations under Distribution and Consumer Services Directorate (DCSD).**

The scope includes Design, Supply, Delivery, Installation/Erection, Testing and commissioning/Charging of 36 kv Disconnecting switches, Lightning Arrestors, Control Cables, Control & Relay Panels and other 33/11 kV Substation switchgears with related civil construction as required at various existing substations. This scope also includes dismantling works and accessories, removing to nearby spaces in the substations, and loading , unloading and transportation of electrical equipment from Madi , Chitwan to Bhiman , Sindhuli as necessary.

1.2 This Tender Document covers the construction/rehabilitation of existing substation works and all the necessary civil, structural, mechanical and electrical works, including the design, supply, manufacturing, delivery, erection, construction, commissioning, trial operation and test of the equipment, works and materials with operation and maintenance as specified or referred to in the technical specifications of this Tender Document.

1.3 If any discrepancies in the specifications and drawing are found, shall be discussed and rectified before or at the time of final approval of drawings.

1.4 The bidders are requested to visit site(s) at its own to get the general idea about substation location and quote the price accordingly.

1.5 The Contractor shall have adequate manpower to execute the works at site(s) to complete the work within the scheduled time.

1.5.1 Equipment and Materials:

The Contractor to his designated store area shall deliver all equipment and materials. Such materials shall be delivered, unloaded and placed in stores in an acceptable manner and approved by the Employer or his authorized representative.

1.5.2 Erection:

When a substation area has been completed and accepted by the Employer, the Contractor will make an inventory of the assemblies erected, and submit it to the Employer for approval and final payment.

Before the Taking-Over of the works, the Contractor shall clean up all areas in which he has worked, place all unused materials in the designated stores and settle any claims, which may have resulted from his work and occupancy of the area. He shall then remove all equipments, vehicles, manpower and facilities, which, he has brought in except those which may be specifically exempt by the Employer.

1.6 Contract Scope:

This section outlines all major work to be carried out by the Contractor at existing substations. All engineering design and materials shall be subject to the Employer/Employer's Representative approval.

2. Special Requirements of the Project

2.1 General

2.1.1 This specification covers the general requirements for design, manufacture, assembly, shop test, delivery, field, test, dismantling and installation commissioning of works for substation equipment.

2.1.2 Any deviation from this specification or the Technical Specification shall be clearly stated with reasons.

2.2 Conditions of Service

2.2.1 All plant and equipment supplied under this Contract shall be suitable for the following system and site conditions.

(a) System electrical parameters

(1)	System voltage	33kV and 11kV
(2)	Number of phase	3
(3)	Frequency	50Hz

(b) Climatic conditions

(1) Ambient temperature

- Maximum 55 deg. C
- Minimum 0 deg. C
- Annual average 32 deg. C

(2) Wind velocity

- Maximum 34.4m/sec

(3) Relative humidity

- Maximum 98%
- Minimum 40%

(4) Monsoon season June-August

(5) Precipitation

- Maximum 1,000 mm/month
- Minimum Zero/month

(c) Altitude of site 600m to 2000m from sea level

(d) Seismic force O. 5G

(e) Isokeraunic level 50

The information in this Sub-Clause is given solely for the general assistance of Bidders and no responsibility for it will be accepted nor will any claim based on this article be considered. The Bidder is advised to survey the Sites covered under this Contract to acquaint himself with site conditions.

2.2.2 The Contractor shall be responsible for surveying, borings, geologic and subsoil conditions for all foundations, and for the precise location of each substation in the project.

2.2.3 All necessary soil tests to determine the earth resistivity, the design of the ground grid and all foundations shall be performed by the Contractor at each substation site.

2.2.4 The Contractor shall locate, and record on the construction drawings, all interfacing utility lines or other obstructions.

Damage to existing line equipment and structures shall be repaired by the Contractor at his expense.

2.3 Codes and Standards

2.3.1 All plants and equipment supplied under this Contract shall conform to or be of higher quality than the latest applicable standard as listed in the following:

IEC - International Electro technical Commission
ANSI - American National Standard Institute
BS - British Standard
NEMA - National Electrical Manufacturers Association
IEEE - Institute of Electrical and Electronics engineers
ASTM - American Society of Testing and Materials
ASME - American Society of Mechanical Engineers
IPCEA - Insulated Power Cable Engineers Association
ISO - International Organization for Standardization
ASCE - American Society of Civil Engineers
ACI - American Concrete Institute
NEC - National Electrical Code (ANSI CI)
ISI - Indian Standard Institute

2.3.2 If the Specifications contained in this Contract conflict in any way with any of the reference standards, the Specifications shall take precedence. If there are conflicts between different specified reference standards covering the same material or equipment, the standard which will provided the highest quality and most suitable application as determined by the Employer/Employer's Representative shall prevail.

2.3.3 References to standards or to equipment of a particular manufacturer shall be regarded as followed by the words “or equivalent” except as otherwise noted. The Contractor may propose alternative standards, or equipment, which shall be equal to those, specified. If the Contractor for any reason proposes alternatives to or deviations from the above standards, or desires to use equipment not covered by the above standards, the Contractor shall state the exact nature of the change, the reason for making the change, and shall submit, for the approval, relevant specifications of the equipment in the original language, and in case that these specifications are written in language other than English, the English version shall be attached and shall govern. The decision of the Employer/Employer's Representative in the matter of equality will be final.

2.4 Scope of Works

2.4.1 The scope of works under this Contract shall include installation of the 33/11 kV substation equipments, field test, civil work, Transportation of Electrical Equipment and commissioning of all equipment necessary for rehabilitation of existing substations. The work includes but is not limited to the following:

(a) Lattice type steel structures for transmission line incoming/outgoing, supporting structures, all nuts, bolts and miscellaneous steel required for mounting and installation of all the equipment and materials furnished.

Support structure for 33 kV (Disconnecting switch) shall be the part of the switch itself. That is to say extra payment shall not be made.

Support structure of 33kV vacuum circuit breaker (VCB) shall also be the part of the circuit breaker. No extra payment shall be made for this.

Steel structure excluding above items shall cover under heading of galvanized steel structure for gantry and support as mentioned in the price schedule. Any specifically mentioned items shall not come under this steel structure.

(b) Outdoor type 33kV VCB, switchgears including circuit breakers, disconnecting switches, power fuse, instrument transformers, lighting arresters, insulators and bus materials complete with all fittings and connectors.

(c) Cables, wires, ground rods, fittings and connectors for the entire, grounding and static protection systems for each substation.

(f) All panels for control, metering, relaying, alarms, recording of events, etc. required for operation and protection of the entire substation.

(g) Cables and wires complete with terminal lugs and accessories for control, metering, relaying, alarms, carrier, and communication. AC and DC station power and lighting, and any other cables and wires required to interconnect all equipment of the entire substations.

(j) All civil works including foundation and cable duct.

2.4.2 The Contractor shall submit detailed drawings, instruction and maintenance books, and spare parts lists with recommended stock quantities for the equipment furnished, prepare and submit detailed engineering, design and construction drawings pertaining to all mechanical and electrical equipment and installations in each

substation. The drawings to be furnished by the Contractor for each individual substation shall include, but not be limited to the following:

(a) Single line and three-line diagram for existing substation and proposed up-gradation

(b) General layout of substation and property plan layout

(c) 33kV electrical layout and elevations, plans and details

(d) Structural erection and fabrication drawings

(e) Substation grounding calculation, plans, elevations and details

(f) Foundation layouts, plans and elevations indicating top of foundations, details for anchor bolt installation, including all data required for civil works.

(g) Cable trench, duct and conduit layout plan, elevation and details

(h) Calculation and coordination of protection relays.

(i) Instruction books, spare parts lists, material lists and any other documents pertaining to each substation and required for construction, operation, maintenance and repair.

All the instructions, manuals and relevant information in the drawings must be in English.

Unless otherwise specifically mentioned, the drawings and data pertaining to the Works shall be according to this clause.

a) General

All drawings shall be prepared in AutoCAD and the Contractor shall submit 3 sets of such electronic drawing files in USB Flash Drive to the Employer and the Consultant.

b) The Contractor shall submit the drawings and data to the Employer for approval in the following manner and designated deadlines.

2.4.2.1 Drawings: Titles, scales and Sizes

The title of the drawing, Contract Number, the signature of the Contractor's engineer and the date shall appear in the bottom right-hand corner of each drawing in the following format:

Project Name:

Contract No…….

Name of the Substation …….

Item No…….

Brief Description ……

In general the scales of the drawings shall be 1:200. The Contractor, however, can prepare and submit drawing in any other appropriate scales with the prior approval of the Employer. The Contractor shall use any one of the following sizes for the preparation of drawings as appropriate:

A0	841 x 1189 mm	(33.11 x 46.81 in)
A1	594 x 841 mm	(33.39 x 33.11 in)
A2	420 x 594 mm	(16.54 x 23.39 in)
A3	297 x 420 mm	(11.69 x 16.54 in)
A4	210 x 297 mm	(08.27 x 11.69 in)

2.4.2.2 Employer's approval

The Employer will approve each drawing within thirty-five (35) days after receipt at his office. One print of each of the drawings submitted for approval will be returned by the Employer or Employer's Representative, marked either "APPROVED", "APPROVED EXCEPT AS NOTED", or "RETURNED FOR CORRECTION".

(a) The notations "APPROVED", or "APPROVED EXCEPT AS NOTED" will authorize the Contractor to proceed with the manufacturing drawings, subject to the corrections, if any indicated thereon. The notation "RETURNED FOR CORRECTION" shall require the Contractor to make the necessary revisions on the drawings and submit for approval within thirty-five (35) days in the same manner as before. Approval of the Contractor's drawings shall not in any way relieve the Contractor of any part of his obligation to meet all the requirements of the Contract or of the responsibility for the correction of the drawings.

(b) Reproducible: Reproducible of all final approved drawings shall be made on USB Flash Drives.

(c) All final as-built drawings shall be supplied in USB Flash Drives and three sets in hard copy.

2.4.3 The Contractor shall provide spare parts and tools for each substation as specified in this specification.

2.4.4 Furnish qualified supervision and construction personnel for the installation, testing, commissioning and final system testing and checking out of the equipment listed above and detailed in the Schedule of Materials. The work shall be performed in close cooperation and collaboration with the Employer/Employer's Representative.

2.4.5 Coordination of the substation work with the installation of others shall be the responsibility of the Contractor. The Employer will furnish the information needed to coordinate the substation work with the other work.

2.5 Assistance by the Employer

The Employer will give assistance to the Contractor as much as possible in the following; this however will be without any obligations, legal or otherwise.

(a) Facilitating access to all locations involved in carrying out the works.

(b) General guidance to the Contractor for all negotiations with the Authorities in Nepal.

2.6 Variation in Quantities of Work

The Quantities listed in the Prices Schedules represent the estimated quantities for tender purpose only. The Contractor agrees to make no claim for anticipated profits or for alleged losses because of any difference between the quantities actually furnished and installed and the estimated quantities as indicated in this Tender Document.

2.7 Time Schedule and Progress Report

2.7.1 Within 30 days from the date of signing of the Contract, the Contractor shall submit to the Employer/Employer's Representative a time schedule and progress chart covering work to be done at each manufacturing plant and installation at site. The Contractor shall show the several salient features of the work.

2.7.2 The proposed project period is as specified in the General Condition of Contract. Failure to meet these dates may result the Employer to enforce the provisions of "Liquidated Damages" to the Contractor. The Bidder shall submit the project schedule prepared by PERT/CPM with the Tender.

2.7.3 The Contractor shall submit the actual progress and the estimated earnings at the end of every month. Three (3) numbers of copies shall be furnished to the Employer/Employer's Representative with the monthly report.

2.7.4 The time schedule will be subject to review by the Employer/Employer's Representative for compliance with the Contract Documents and shall be revised if necessary by the Contractor to bring it into such compliance.

The schedule shall be reviewed and revised if necessary at intervals not to exceed four weeks. In addition, the Employer/Employer's Representative shall be advised promptly of any proposed changes in the schedule.

2.7.5 The Contractor shall prepare and submit monthly to the Employer/Employer's Representative a report covering the progress on design, manufacturing and installation work at the Site during the month of record. The reports shall be accompanied by suitable illustrations and photographs and by copies or working schedules as necessary to effectively evaluated and document the progress of the work. The reports shall cover at least the following activities:

(a) Manufacturing status of equipment at each factory
(b) Shipping status
(c) Arrival of equipment and schedule for arrival of other required equipment
(d) Installation of Contractor's equipment at the Site
(e) Performance record of critical items of Contractor's equipment
(f) Quantitative progress on work at the Site
(g) Scheduled progress for work at the Site
(h) Description of conditions encountered that have affected the progress of the Works adversely and of action taken to alleviate the conditions and regain the anticipated progress.
(I) Description of matters, which the Contractor anticipates, will require contract interpretation, engineering decisions, or policy determinations.
(j) Numbers of employees in various categories at the Site and projected numbers for the following three months.
(k) Schedule showing the progress of planned and actual for each salient activities of the work.

The Contractor shall submit the report by end of the following month.

2.7.6 The employer has provided a time schedule for the execution of the work with this document. The contractor may revise the schedule of different items but the total completion time shall remain the same.

2.8 Drawings and Data

2.8.1 The Contractor shall prepare and furnish to the Employer/Employer's Representative such drawings, calculations, and data on materials and equipment (hereinafter in this provision called data) as are required

for the proper control and completion of the work, including but not limited to those drawings, data and calculations specifically required elsewhere in the Technical Specifications.

2.8.2 The Metric System shall be used and notations shall be in English. Drawings, calculations, and data shall be furnished as specified. All drawings and data will be subject to review by the Employer/Employer's Representative conformity with the Technical Specifications and Contract Drawings and upon meeting review requirements shall become Employer.

2.8.3 Within 30 days from the date of signing of the Contract, the Contractor shall prepare and furnish to the Employer/Employer's Representative a schedule for submission of all drawings and data. Each drawing to be submitted for the work of the Contract shall be listed on the schedule, and the schedule shall contain separate columns for scheduled submitted dates and actual submittal dates. The schedule will be reviewed by the Employer/Employer's Representative and the Contractor shall correct any defects noted therein. The schedule shall at all times present a complete plan for orderly submission of such drawings and data and shall be updated and resubmitted monthly showing actual submittal dates and revised scheduling. The Contractor shall promptly notify the Employer/Employer's Representative of any occurrence requiring substantial revision of the schedule giving a detailed explanation of the cause of the revision. Revised schedules will be revised and corrected in the same manner as the original schedule.

2.8.4 Neither the review nor lack of review of any drawings, calculation or data shall waive any of the specification or Contract drawings, or responsibility for correctness of the drawings, calculations or data and defective work, materials, and equipment may be rejected notwithstanding conformance with drawings, calculations and data reviewed by the Employer/Employer's Representative. The Employer/Employer's Representative shall have the right to require the Contractor to make any changes in the design which may be necessary, to make the apparatus conform to the requirements and intent of the specifications, with no additional cost to the Employer.

2.8.5 Any drawing changed by the Contractor during the development of his design after review by the Employer/Employer's Representative shall be submitted for approval.

2.9 Quality Control

2.9.1 The Contractor shall provide and maintain a Quality Control Plan (QCP) to ensure compliance with quality standards of the Technical specification, the Contractor shall furnish to the Employer/Employer's

Representative six (6) copies of his complete quality control procedures, manual, and a description of the quality control organization.

2.9.2 The Employer/Employer's Representative will monitor the Contractor's methods, procedures and processes for compliance with the QAP and the quality standards of these specifications Failure of the Contractor to effectively maintain the quality control program throughout all phases of the work will be considered a failure to prosecute the work with the diligence required by the Contract Documents.

2.10 Painting

2.10.1 All sheet steel work shall be phosphated in accordance with the following procedure and in accordance with BS 2569 and BS 5493.

2.10.2 Oil, grease, dirt shall be thoroughly removed by emulsion cleaning.

2.10.3 Rust and scale shall be removed by pickling with dilute acid followed by washing with running water, rinsing with slightly alkaline hot water and drying.

2.10.4 After phosphating, through rinsing shall be carried out with clean water, followed by final rinsing with dilute dichromate solution and even drying.

2.10.5 The phosphate coating shall be sealed by the application of two coats of stoving type zinc chromate primer. The first coat may be 'flash dried" while the second coat shall be stoved.

2.10.6 After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. Touch up shall be applied after completion of tests. All panels should have same color. The color for the finishing paint shall be approved by the Employer/Employer's Representative.

2.10.7 The final finished thickness of paint film on steel shall not be less than 100 microns.

2.10.8 Finished painted surface of panels shall present at aesthetically pleasing appearance free from runs and drips.

2.10.9 A small quantity of finishing paint shall be supplied for minor touching up required at site after the installation of the panels.

2.11 Packing and Shipment

2.11.1 The Contractor shall prepare all materials and equipment for shipment in such manner as to protect them from damage in transit and in storage prior to installation. Materials that might otherwise be lost shall be boxed or wired in bundles.

2.11.2 All finished surfaces or ferrous metals, including screw threads that will be exposed during shipment or while awaiting installation shall be cleaned and shall be given a heavy uniform coating of rust-preventive compound devices subject to damage shall be suitably wrapped or otherwise protected from damage.

2.11.3 Each complete field assembly shall be given an identification number or letter, and each part of each field assembly which is not permanently connected in shop assembly shall be legibly marked. Except on bolts and other small parts, all such marks shall be made with oil-resistant paints. Diagrams showing all such markings shall be supplied. Each place of subassembly separately packed for shipment shall be labeled or tagged with the specification number and the mark number of such piece or the numbers of the parts grouped in such subassembly, or contained in the package. The individual substation name shall be clearly and legibly marked on each package and crate.

2.11.4 The spare parts shall be packed separately from other articles. Packages of spare parts shall be clearly identified and shall be accompanied by a list of contents, which set forth directions for storing.

2.11.5 The Contractor shall prepare a packing list for each and every shipment made. In the case of several packages included in a single shipment, more than one package may be included on one packing list, providing all required information is shown for each package.

The following information shall be provided for each package:

(a) Description of package, i.e. box, crate, drum, bundle etc.
(b) Package number
(c) General description of contents corresponding to the invoice
(d) Equipment number where applicable
(e) Gross, tare and net weights in kilograms

2.11.6 Painting of Control Building :

It shall cover the followings:

a. Two coat of cement paint shall be inside and outside of the control building. The color choice shall be of the owner.
b. The paint shall be from reputed manufacturer. The Contractor shall have to take the written consent from the owner for the maker of the paint to be used; failing to do so may lead to nonpayment. Please note that thinner shall not be allowed for diluting the metal or wood prima, enamel paint i.e. paint shall be used without diluted.

c. One coat of wooden prima and two coats of enamel point shall be used for wooden parts of window and door. Same shall hold for grill of window.

d. Repairing of patches inside and outside of control building. The ratio of mortar shall be 1:4.

e. Replacement of broken glass, wooden panel and damaged hinges and locks etc.

f. The repairing of the door, window shall be in such way when closed there shall not be free flow of air. That is to say, the repairing shall be suitable for air conditioning.

2.12 Tools and Appliances

The Bidder shall supply complete, new and unused sets of all special tools or gages, which will be required for normal operation and maintenance. The Bidder shall furnish the list of tools and appliances in the Tender Document. To the Greatest extent possible, the tools for each specific operation shall be stored in a single, locked, portable, steel box suitably and clearly marked for convenient identification. These shall be the part of equipments.

2.13 Spare Parts

2.13.1 The Bidder shall propose recommended spare parts required for three years maintenance in addition to the spare parts specified in the price schedule of Tender Document and shall include a price list of these parts in a separate sheet of paper. The price of such spare parts proposed by the bidder shall not be taken into account for financial evaluation. Sufficient information shall be provided to permit the Employer/Employer's Representative to estimate spare parts requirements.

2.13.2 All spare parts supplied under the Contract shall be strictly interchangeable with the parts for which they are intended to be replaced and shall be treated and packed for long storage under the climatic conditions prevailing at the site. Each spare part shall be clearly marked or labeled on the outside of its packing with its description and purpose, and when more than one spare part is packed in a single case or other container, a general description of its contents is to be shown on the outside of such cases or container and a detailed list enclosed inside. All cases, containers and other packages must be suitably marked and numbered for purpose of identification.

2.13.3 All cases, containers or other packages are liable to be opened at the site for such examinations as the Employer/Employer's Representative may consider necessary and all such opening and subsequent repacking shall be at the expense of the Contractor.

2.13.4 All spare parts must be delivered to Site in advance of the trial operation. The Contractor shall ultimately prepare and deliver five (5) copies of the final consolidated spare parts list, arranged specifications-wise.

2.13.5 It shall be in the interest of the Contractor to organize the delivery and systematic storage of spare parts before the trial operation to obviate post erection difficulties and delays. Any spare part consumed by the Contractor before Performance Certificate shall be replaced without any cost to the Employer.

2.14 Technical Requirements

2.14.1 Electrical auxiliary power supply

The electrical auxiliary and control power source shall be as follows:

(a) AC auxiliary power source

- 3 phase, 4-wire, 50Hz. 400/230V
- 1 phase, 50Hz, 230V

(b) DC control power source: 110V

2.14.2 Wiring

The equipment to be provided as part of this Contract shall be fully wired in accordance with the following general requirement.

(a) All wiring shall be carried out in general purpose 600 volt grade PVC copper wire complying with the requirements of IEC. The wire core size shall not be less than 2.5sqmm. All wire cores shall be multi stranded and flexible.

(b) Wires shall be neatly bunched and adequately supported so as to prevent sagging and strain on termination.

(c) All inter panel wiring between panels that directly adjoin one another shall be made through suitable holes in the common panel side sheets. All inter panel wiring shall start and terminate on terminal blocks; direct wiring between other items of equipment will not be acceptable.

(d) Joints or splices in panel and inter panel wiring not be acceptable.

(e) The wiring of panels, cubicles or kiosks shall be identical.

(f) All wire termination shall be made with compression type connectors. Wires shall not be spliced or tapped between terminal points.

(g) Not more than two wires shall be connected to any terminal at each end. If necessary, a number of terminals shall be jumpered together to provide additional wiring points.

(h) Wiring leads and cable cores shall be permanently marked a both ends with an approved type of marking device having black letters and numbers impressed on a white background.

2.14.3 Terminal Blocks

(a) Multiway terminal blocks complete with screws, nuts, washers and marking strips for terminal identification shall be furnished for terminating the internal wiring and outgoing cables.

(b) Control terminals shall be washers head screw type, each suitable for connection of at least two numbers copper conductor cables of requisite cross-section at each end through compression type (solderless) lugs. Screw type terminals with screw directly impinging on conductor or any other of terminal, which does not accept compression type lugs, are not acceptable. The successful Bidder shall have to take prior approval of the terminals to be used in the block from the Employer/Employer's Representative.

(c) Each terminal shall be marked with designations obtained from schematic diagrams.

At least 20% spare terminals shall be provided in the terminal blocks.

2.14.4 Nameplate

(a) Nameplates or rating plates shall be stainless steel and shall be engraved in English language. Instruction plates, warning signs and any marking whatever on the equipment and parts and accessories thereof shall be in English.

(b) The switch handles shall be carved with the function number or word colored in white.

(c) The details of the matters to be shown on the nameplates, etc. shall be indicated in the drawings for approval.

2.14.5 Switchyard Surface Cleaning:

The scope of works under this heading comes as following:

1. Taking out grass from its root, So that the chances of sprouting are minimized. The realignment and levelin existing switchyard gravel.

2.14.6 Surface Dressing with Crushed Stone:

It covers the followings:

1. Filling up by gravel in the patch
2. Filling up the in the switchyard if it not.
3. Crushed stone to be used shall be 40 mm size and depth of 15 cm.

2.14.7 Switchyard Painting:

It shall cover the followings:

a. One coat of red oxide point and two coat of Aluminum point
b. The point shall be from reputed manufacturer. The contractor shall have to take the prior written acceptance from the owner for the manufacturer of the point.
c. Thinner shall not be used.
d. Painting of transformer and equipment shall be by spray gun.
e. Special care shall be taken to avoid spray on bushing and name plate
f. Painting shall be done on the followings:
g. Gantry / Steel Structure, Transformer and other equipment's.
h. Galvanized steel structure shall not be pointed.

2.14.8. Repairing of Cable Trench (outdoor):

It shall cover the followings:

a. Repairing / replacement of cable trench slab.
b. Repairing of any damaged or likely to be damaged part of cable trench.
c. Repairing of patch works.
d. Repairing / replacement of cable support tray or angle etc.
e. The repairing shall look line new one.

2.14.9 Repairing of Cable Trench (Indoor):

a. Same as in item No 2.14.8.
b. If there is no cover over the cable trench, it shall have to be supplied / constructed by the contractor
c.

3 Construction and Installation Works:

It shall include construction, erection, assembly, installation, testing and commission of the equipments and steel structure. After the construction and installation works the equipments shall run trouble free and smooth.

3.1 Foundation Works:

It shall include the following:

a. Foundation works shall be per the specification provided.

3.2 Clamp:

Clamp to be used for fixing the channel to the pole shall be made of mild steel strip of 500mm x 5 mm section. This shall be hot dip galvanized. The zinc costing shall be 610 gram per square meter.

3.3 Trolley of VCB:

Not Applicable.

3.4 Galvanization:

All the steel structures used as support to the equipments, gantry and column shall be galvanized through the process as prescribed in IS/ IEC standard but the zinc coating shall be 610 gram per square meter (85 micron).

3.5 Lightning Mast

The Lightning Mast shall be designed, supplied and installed as per the standard practices and as per the site conditions. The design details of the Lightning Mast shall be submitted to the owner for approval.

3.6 Minor Items and Works:

While reinforcing / constructing substations under this contract, minor items like shifting of switchyard lighting poles, shifting of gantry structure, dismantling of existing wall/ fence, equipment shifting and relocating the switch yard steel fencing, interconnection of new and old earthing system, shifting of electrical equipment from one place to another inside and outside the switch yard or in control room etc. which are not mentioned in the price schedule shall have to be done for completing the substations electrically and mechanically sound. These items and works may include labor and materials. It is not practical to mention such minor items specifically in the price schedule. The cost of such items and works shall be included and spread up in the different items of construction and installation works as mentioned in the price schedule. No extra payment shall be made to the contractor for such minor items and works. So the bidders are requested to send an expert to each substation to assess the requirements of such items and works for completing the substation technically sound and to submit the bid accordingly.

4 Environmental Mitigation Measures

4.1 Physical Environment

The following mitigation measures shall be undertaken to reduce the adverse impacts on the physical environment during construction of the substation.

(i) Changes in land use and landscape: The construction activities will be planned properly. The construction material will be stored at the designated places and the haphazard dumping of the construction spoils will be strictly prohibited. Discharge of cement slurry, garbage and other solid wastes generated by the construction activities and workforce will be avoided where possible.

(**ii) Disposal of the construction spoils:** The excavated material will not be left haphazardly. It will be leveled on the ground. Further, the disposal material of substation will be carried out within the acquired land for substation.

(**iii) Stockpiling of the construction materials:** The Contractor will have to negotiate with the owner of the property for the use of their premises even if it is for the short period.

(iv) Nuisance to the nearby properties: Although some nuisances may be unavoidable, the Contractor will have to minimize such nuisance. The Contractor will have to work in close-coordination with the local community while working in the settlement areas.

(v) Impact on the infrastructure: The Contractor shall ensure that there will be no interference with the existing infrastructure including utility facilities during contraction.

(vi) Change in air quality: Though change in water quality is unlikely during construction activity, sprinkling of water shall be carried out by the Contractor at least once a day during dry season.

4.2 Biological Environment

None

4.3 Socio-economic and cultural Environment

In the construction phase following mitigation measures shall be adopted to minimize the impacts:

(i) Loss of farmland and other category of land: Any damage to the farmland by the construction activity will have to be restored and rehabilitated.

(ii) Occupational safety and hazard: The Contractor will provide appropriate training in handling equipment and machinery to the workers and laborers before contraction. All workers employed by the Contractors shall be insured against accident.

(iii) Loss of standing crops: The Contractor shall make compensation for the loss of standing crops due to project activities.

(iv) Employment of project affected people: Priority will be given to the project affected people while hiring workers and laborers during project construction. Nepal being a signatory to the International Convention against the Child Labor, the Contractor shall not employ child labor in construction.

TECHNICAL SPECIFICATION
(Electrical Equipment)

1 33 kV Disconnecting Switch

1.1 General

This specification covers the design, manufacture, assembly, shop test, supply, delivery, installation works and field test of disconnecting switches complete with all accessories for efficient and trouble-free operation as specified herein under.

The equipment specified in this Section shall conform to the latest edition of the appropriate IEC specifications and/or other recognized international standards. In particular:

IEC 60129 High-voltage alternating current disconnectors and earthing switches

IEC 60529 Degree of protection provided by enclosures

Manufacturer of Disconnecting Switch shall hold valid ISO 9001quality certificate (including design).

1.2 Equipment to be furnished

1.2.1 The equipment to be furnished shall strictly be in accordance with the specifications and the Price Schedule.

1.3 Design Requirements

1.3.1 The disconnecting switches shall be used for the 33kV. 50Hz, 3 phase system. Earth switches shall be provided on disconnecting switches wherever called for. Complete disconnecting switches with all the necessary items for successful operation shall be supplied.

1.3.2 The equipment shall be installed outdoor in a hot, humid climate. All equipment, accessories and wiring shall be provided with tropical finish to prevent fungus growth.

1.3.3 The maximum temperature rise in any part of the equipment at specified rating shall not exceed the permissible limits as stipulated in relevant standards. The de-rating of the equipment shall be made taking 45 deg. C as an ambient temperature of the site, if it is designed for any lower ambient temperature.

1.3.4 The rated peak short circuit current or the rated short time current carried by the equipment shall not cause:

(a) Mechanical damage to any part of the equipment

(b) Separation of Contacts

(c) Insulation damage of "Current Carrying Part."

1.3.5 The grounding switch shall be capable of making to a dead short circuit without damage of the equipment or endangering operator.

The disconnecting switches shall be centre break or center rotating with contact blades moving through horizontal plane.

1.3.6 The rating, the accessories to be furnished and the schedule of equipment are detailed in Appendices.

1.3.7 The disconnecting switches shall be able to carry the rated current continuously and rated short time current for three seconds without exceeding the temperature limit specified in the relevant standard.

1.3.8 The disconnecting switches shall be capable of withstanding the dynamic and thermal effects of maximum possible short circuit current at the point of its installation.

1.4 Construction Features

1.4.1 The 3-pole disconnecting switches shall be gang operated type so that all the poles make and break simultaneously.

1.4.2 The disconnecting switches shall be designed for upright mounting on steel structure. The disconnecting switches shall be provided with a galvanized steel base provided with holes and designed for mounting on a lattice/pipe support structure. Disconnecting switches to be mounted on gantry structure shall include necessary steel channels, bolts, nuts, etc. The position of movable contact system (main blades) of each of the disconnecting switches and earthing switch shall be indicated by a mechanical indicator at the lower end of the vertical rod of shaft for the disconnecting switches and earthing switch. The indicator shall be of metal and shall be visible from operating level.

1.4.3 The disconnecting switches shall have padlocking arrangement in both "open" and "closed" positions.

1.4.4 All current carrying parts shall be non-ferrous metal or alloy. All live parts shall be designed to avoid sharp points and edges.

1.4.5 All metal parts shall be of such material and treated in such a way as to avoid rust, corrosion and deterioration due to atmospheric conditions. Ferrous parts shall be hot-dip galvanized.

1.4.6 Bolt nuts, pins, etc. shall be provided with appropriate locking arrangement such as locknuts, spring washers, key etc.

1.4.7 Bearing housing shall be weatherproof with provision for lubrication. The design, however, shall be such as not to require frequent lubrication.

1.4.8 All bearings in the current path shall be shorted by flexible copper conductor of adequate size (minimum-70sqmm) to allow the specified fault current through it without injury.

1.4.9 The design of linkages and gears be such so as to allow one man to operate the handle with ease for disconnecting switches and earth switch.

1.4.10 Main contacts

The main contacts shall be of silver-plated copper alloy and controlled by powerful springs designed for floating and pressure point contact.

The contacts shall have sufficient area and pressure to withstand the electromagnetic stresses developed during short circuit without excessive heating liable to pitting or welding.

Contacts shall be adjustable to allow for wear, shall be easily replaceable and shall have minimum movable parts and adjustments.

The moving blade shall be made of electrolytic copper tube or aluminum tube of liberal section. Rotating feature of the blade at the end of tube travel for contact wiping shall be provided.

Arcing horns shall be provided to divert the arc from main contacts to the separating horns after the main contacts have opened. Arcing horns shall be renewable type.

1.4.11 Insulators and terminals

Insulators shall be post type; brown glazed and composed of stacked units.

The porcelain used for insulators shall be manufactured by wet process and shall be homogeneous and free from cavities and other flaws.

Caps and pins shall be of the highest quality malleable iron or forged steel and smoothly galvanized.

Arcing horn as required shall be furnished.

All insulators of identical ratings shall be interchangeable.

The terminals of the disconnecting switch shall be provided with terminal connectors.

1.5 Operating Mechanism

1.5.1 Disconnecting switches for 33kV.

The operating mechanism for 33 kV disconnecting switches shall be motor operated. The driving motor of the motor operated disconnecting switch shall be suitable for operating on 400/230 V AC supply. The mechanism shall also be equipped with dependable manual operating device for emergency operation when the power operating mechanism is inoperative.

The control shall be such that the disconnecting switch can be opened or closed from local as well as remote. LOCAL/REMOTE selector switch and OPEN/STOP/CLOSE push buttons shall be provided at the local "Mechanism Box" for local electrical operation. The LOCAL/REMOTE selector switch shall be lockable type.

Starters, relays and limit switches shall be provided as required for operation, indication and interlocks. All electrical controls shall be suitable for 110V DC.

The disconnecting switch shall be provided with a minimum number of eight (8) normally closed and eight (8) normally open electrically separated (Voltage free) auxiliary contacts for system interlock in addition to the auxiliary contacts required for its own indication and operational requirements so as to have a trouble free operation of the system. The contacts shall be convertible type so that normally open contact may be converted to normally closed contact and vice-versa at site. The auxiliary contacts shall be suitable for 0.5A, 110V DC inductive breaking duty.

All auxiliary contacts shall be wired up to terminal block in local mechanism box. All auxiliary contacts shall be silver plated and shall have positive wiping action when closing.

The auxiliary contacts shall be adjustable type to suit the following requirements.

a) Signaling of "closed position" shall not take place unless main power contacts have reached a position so that rated normal and short time current can be carried safely.
b) Signaling of "open position" shall not take place unless the main power contacts are at a safe isolating distance.

The operating device, auxiliary switches and all other devices shall be housed in a weatherproof box of sheet steel / aluminum alloy construction. The enclosure protection of the mechanism box shall be IP-55W as per IEC. The thickness of the sheet steel shall be at least 2mm. In the case of aluminum alloy, the operating box shall be of robust design. The box shall have gasket-hinged door with lock and key. The box shall be suitable for fixing on disconnecting switch steel structure. A 4mm thick removable gland plate shall be provided at the bottom of the box for cable entry. The box shall be mounted at a safe working clearance from the live parts of switches. Thermostat-controlled space heater with ON-OFF switches rated 230V, 1 phase, 50Hz shall be provided to prevent condensation within the mechanism box.

1.5.2 Grounding Switches

The grounding switch shall be triple pole manually and gang operated. The mechanism shall be such that one operator alone shall be able to operate without undue effort. Electrical and mechanical interlocking shall be provided for the safe operation of grounding switch.

Where grounding Switches are specified these shall include the complete operating mechanism and auxiliary contacts. The grounding Switches shall form an integral part of the disconnecting switches and shall be mounted on the base

frame of the disconnecting switches. Grounding Switches shall be suitable for local operation only. The grounding Switches shall be constructional interlocked with the disconnecting switches so that the grounding Switches can be operated only when disconnecting switches is open and vice versa.

The grounding switch shall be capable of withstanding the electrical and mechanical stresses developed by a short circuit current as specified. The cross-section of the flexible copper connection between rotating shaft and structure shall be capable to allow specified fault through it without injury but of minimum size 150 mm2.

Arrangement shall be provided to padlock the grounding switch in open and closed positions.

The operating handle shall be such that it can be operated easily from standing height from ground level. Grounding of handle through copper flexible conductor of adequate size shall be provided.

Each grounding switch shall be provided with four (4) normally closed and four (4) normally open contacts for remote indication and interlocking purpose.

All the auxiliary contacts and interlocking coils shall be housed in a mechanism box. The box shall be suitable for fixing on grounding switch steel structure. A 4mm thick removable gland plate shall be provided at the bottom of the box for cable entry.

Auxiliary contacts shall be suitable for 0.5A, 110V DC inductive breaking duty. The auxiliary coils shall be suitable for 110V DC supply.

3. 6 Assembly

Each disconnecting switches along with its base frame and operating mechanism shall be completely assembled and checked at manufacturer's works for correct alignment and operation prior to dispatch.

All parts and accessories shall have appropriate match marks and part number for identification at site.

3.7 Tests

3.7.1 Type and routine tests on the equipment and components shall be in accordance with latest revision of IEC Standards or equivalent standards.

Each switch shall include but not limited to the following tests:

(a) Routine tests

- Power frequency voltage dry test
- Measurement of resistance of main circuit
- Control and secondary wiring check test
- Mechanical operation test

(b) Design tests

- Insulator test
- Dielectric test, including impulse withstand test
- Radio influence test

- Short-time current test
- Voltage drop test the voltage drop across one complete phase of a switch shall be measured when carrying rated current.
- Temperature Rise Test

If type tests have been previously conducted on identical disconnecting switch, the Contractor may furnish the certified copies of such previous reports instead of performing tests. The Bidder shall submit copy of design test report from accredited testing laboratory for the disconnecting switch of the offered model along with the bid.

3.7.3 Field tests

After installation at Site, the disconnecting switches shall be subjected but not limited to the following field tests:

(a) Construction inspection

(b) Measurement of insulation resistance

(c) Mechanical operation test

3.8 Drawings, Data and Manuals

3.8.1 The following drawings and data shall be furnished with the Tender.

(a) General arrangement drawing with different sections showing constructional features.

(b) Technical leaflets on disconnecting switches offered explaining the function of various parts, principle of operation and special features (if any).

(c) Typical type test results on identical equipment offered in the Tender.

3.8.2 The various drawings, data and manuals shall be submitted for approval and afterwards for final distribution in quantities and in procedures as set-up elsewhere. The various drawings and data to be furnished shall include:

(a) Outline dimensional drawings of the equipment showing general arrangement and location of fittings.

(b) Transport/shipping dimensions with weights.

(c) Foundation and anchor bolt details including loading condition.

(d) Assembly drawing for erection at site with part numbers and schedule of materials.

(e) Electrical schematic and wiring diagram.

(f) Any other relevant drawings and data necessary for erection, operation and maintenance.

(g) Instruction manual and data sheets.

(h) Any other bove.

3.9 Spare Parts

For each type of disconnecting switch, the spare parts shall be provided in required quantities as listed in Price Schedule.

Further spare parts as recommended by the manufacturer shall also be included in the Price Schedule.

APPENDIX 3.1

TECHNICAL PARTICULARS OF 33kV DISCONNECTING SWITCH
(WITH GROUNDING SWITCH)

1.	Type	3-pole, single throw, outdoor
2.	Quantity required	As per Price Schedule
3.	Voltage ratings	
(a)	Nominal system voltage	33 kV
(b)	Rated maximum voltage	36 kV
4.	Frequency	50 Hz
5.	Insulation levels	
(a)	Basic impulse level (BIL)	170 kV
(b)	Power frequency withstand voltage (1 min.)	75 kV
6.	Current ratings	
(a)	Continuous current	800 A
(b)	Short time current (1 seconds)	25 kA
(c)	Peak short time current	32 kA
(d)	Making current of grounding switch	32 kA
7.	Operating mechanism	Motor operated (both local and remote operation) and manual

2. Lightning Arrester

2.1 General

This specification covers the design, manufacture, factory test, delivery, field test and installation of lightning arresters, complete with all accessories.

The equipment specified in this Section shall conform to the latest edition of the appropriate IEC specifications and/or other recognized international standards. In particular:

IEC 60099-4 Metal-oxide Surge arrester without gap for ac system

IEC 60099-5 Surge arrester - Selection and application recommendations

IEC 60529 Degree of protection provided by enclosures

Manufacturer of Lightning Arrestor shall hold valid ISO 9001(including design) quality certificate.

2.2 Equipment to be furnished

2.2.1 The equipment to be furnished shall strictly be in accordance with the specifications and the Price Schedule.

2.3 Design Requirements

2.3.1 The lightning arresters shall be station type, single pole, gap less type rated voltage 30kV for 33kV system. The nominal discharge current shall not be less than 10kA.

2.3.2 The active part of the lightning arresters shall be accommodated in porcelain insulators which are suitably reinforced to prevent explosion of an arrester.

2.3.3 Pressure relief device shall be provided for the safe discharge of internal pressure.

2.3.4 The lightning arresters shall be mounted on galvanized steel structure. Terminal connectors for both line and ground terminals shall be furnished.

2.3.5 Surge monitoring device consisting of surge counter, etc., along with insulating bases for mounting at the bottom of the arrester, shall be furnished.

2.4 Test

2.4.1 All routine tests shall be performed on each piece of arrester as per IEC. In addition, the following tests shall be carried out.

(a) Construction test

(b) Insulation resistance test and leak current test

2.4.2 Type Test certificates on similar equipment shall be submitted by the bidder as per IEC specifications and/or other recognized international standards and routine test certificate carried out for following tests shall be furnished for approval of the Employer/Employer's Representative.

(a) Voltage withstand test

(b) Impulse voltage characteristic test

(c) Discharge voltage characteristic test

(d) Discharge current withstand test

(e) Duty cycle test

(f) Pressure relief test

(g) Contamination test

2.5 Drawings and Data

2.5.1 The following documents shall be furnished along with the Tender.

(a) Standard catalog identifying the models and ratings being furnished.

(b) Outline drawings including dimensions

2.5.2 The following drawings and data shall be furnished in required number of copies after award of contract for approval of Employer/Employer's Representative.

(a) All updated documents furnished with the Tender.

(b) Outline drawings including dimensions

(c) Foundation and anchor details including dead load

(d) Transport/shipping dimensions with weight

(e) Any other relevant data, drawings and information

2.6 Nameplate

Each lightning arrester shall be provided with a nameplate of weather resistant material fitted in a visible position showing the following items as a minimum.

(a) Manufacturer’s name

(b) Manufacturer’s serial number and type designation

(c) Year of manufacture

(d) Rated voltage

(e) Nominal discharge current

APPENDIX 2.1

TECHNICAL PARTICULARS OF 30kV LIGHTNING ARRESTER

1.	Type	Outdoor, station type
2.	Quantity required	As per Price Schedule
3.	Mounting	Pedestal
4.	Rated frequency	50 Hz
2.	System voltage	33 kV
6.	Rated voltage	30 kV
7.	Impulse withstand voltage (BIL)	170 kV
8.	Power frequency withstand voltage	70 kV
9.	Nominal discharge current	10 kA
10	Surge Counter	shall be the ISO 9001 holding company

3. CONTROL AND RELAY PANEL

3.1 General

3.1.1 This specification covers Study, Design, Manufacture, Assembly Factory Test, Supply, Delivery, Installation works and Field Test and Commissioning of Control and Relay Panels as specified herein under. The panel shall be used for the protection of the following:

Manufacturer of Control, Protection Equipment, and Relays shall hold valid ISO 9001quality certificate (including design).

Transformer Protection equipment/ relays as required shall have to be supplied and installed accordingly.

3.1.2 It is not the intent to specify completely herein all details of Design and Construction of Equipment supplied. However, the equipment supplied shall conform, in all respects, to high standards of Engineering, Design and Workmanship and be capable of performing in continuous commercial operation up to Contractor's guarantee in a manner acceptable to the Employer who will interpret the meaning of Drawings and Specifications and shall have the power to reject any work or material which in his judgment are not in full accordance therewith.

The Bidder shall submit his proposed Control Panel Arrangement & Layout. The Bidder is warned that the available space in the existing control rooms is very limited and the panels shall be of such size to fit in available space. However, the Contractor shall carry out detail system study of protection system of Integrated Power System with special regard to existing substations in the vicinity of the proposed works. Based on this study, the Contractor shall design a relaying scheme for the substations, prepare a detail relay schedule and recommend relay-setting values for relay co-ordination with existing ones and make all necessary adjustments in the relay settings of neighboring substations as well.

The cost of any relocation of equipment in the control room and outdoor switchyard necessary to complete the specified works shall be included in his bid price and no additional payment will be made for such work.

3.1.3 The indication and annunciation schemes for existing substations shall be compatible with the existing system as far as possible.

3.1.4 **Manufacturers for Protection Equipment**

All protection relays like over current, earth fault, differential, definite time over current etc shall be of numerical type and shall be from following manufacturers or equivalent.

a)	AREVA	b)	Fuji
c)	CGELEC	d)	Reyrolle / Easun Reyrolle
e)	ABB	f)	Siemens
g)	Toshiba	h)	Mitsubishi

In case of equivalency, the manufacturer must submit the authentic documents from internationally recognized testing agency establishing that the offered product is equivalent to above referred make.

3.2 Equipment to be furnished

3.2.1 Control and Relay panels shall be more or less of the color matching with the existing one.

3.2.2 In addition to the above, the following shall be supplied:

(a) Floor channel seals, vibration damping pads, kick plates, earthing pads and holding down bolts and nuts.

(b) Special tools and tackles.

3.3 Construction Features

3.3.1 The Panel Dimensions specified are tentative only and it is the responsibility of Bidder to ensure that all the equipment required can be properly accommodated in the respective space. The panels shall also be of a size & type which can be easily accommodated within the space of existing Panels & existing control room without the necessity for expansion of the control room. Such oversized panels will not be accepted.

3.3.2 The 33 kV panel shall be of Simplex type or Duplex type as per the layout of the respective Substation.

Simplex panel consist of a vertical front panel with equipment mounted thereon and having wiring access from rear for control relay panels. In case of panel having width more than 800 mm, double leaf-doors shall be provided. Doors shall have handles with either built-in locking facility or will be provided with pad-lock.

In case, the Panels are Duplex type, it shall comprise two vertical front and rear panel sections connected back-to-back by formed sheet steel roof tie members and a central corridor in between. The corridor shall facilitate access to internal wiring and external cable connections. Both ends of the corridor shall be provided with double leaf doors with lift off hinges.

Doors shall have handles with built-in locking facility. Separate cable entries shall be provided for the front and rear panels. However, interconnection between panels shall be by means of inter panel wiring at the top of the panels.

3.3.3 Panels shall be completely metal enclosed and shall be dust, moisture and vermin proof. Panel enclosures shall provide a degree of protection not less than IP 54 as per IEC.

3.3.4 Panels shall be free standing, floor mounting type and shall comprise rigid welded structural frames enclosed completely with specially selected smooth finished, cold rolled sheet steel of thickness not less than 3mm for front and rear portions and 2mm for sides, top and bottom portions. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation.

3.3.5 All doors, removable covers and panels shall be gasket all around with synthetic rubber gaskets Neoprene/EPDM generally conforming to provision of IS 11149. However, XLPE gaskets can also be used for fixing protective glass doors. Ventilation louvers, if provided, shall have screens and filters. The screens shall be made of either brass or GI wire mesh.

3.3.6 Design, materials selection and workmanship shall be such as to result in neat appearance inside and outside with no welds, rivets or bolt heads apparent from outside, with all exterior surfaces true and smooth.

3.3.7 Panels shall be suitable for floor mounting. Metal sills in the form of galvanized steel channels properly drilled shall be furnished along with anchor bolts and necessary hardware for mounting to a concrete floor. Any irregularity between the sills and flooring shall be sealed to prevent entry of dust, moisture and vermin. Panels shall have additional rolled channel plinth at the bottom with smooth bearing surface. The panels shall be fixed on the sills with intervening materials. The type of anti-vibration strips which shall be supplied by the Contractor shall be subject to the approval of the Employer.

3.3.8 Cable entries to the panels shall be from the bottom unless otherwise specified. The bottom plates of the panels shall be fitted with removable plates of adequate size for holding the cables using cable connectors to seal from dust and moisture. All cable connectors required shall be provided by the Contractor and shall be screwed type and shall be

suitable for PVC armored cables. Cable gland plate fitted on the bottom of the panel shall be connected to earthing of the panel/station through a flexible braided copper conductor rigidly.

Control and relay panel enclosure protection class shall be of IP 54. When in closed position there shall not be any chances of entering lizards, mousse etc. inside the panel.

Control/Relay panels, if required to incorporate the provisions for Substation Automation System (SAS) as specified in the relevant chapter, shall be completely equipped and wired with necessary devices/equipment for control and other signals to be used for such systems. Relay panels of modern modular construction would also be acceptable.

3.4 (A) Component Mounting

3.4.1 All equipment on front of panel shall be mounted flush or semi-flush. In case of semi-flush mounting, only flange or bezel shall be visible from the front.

3.4.2 Equipment shall be mounted such that removal and replacement can be accomplished individually without interruption of service to adjacent equipment. Equipment mounted inside the panel shall be so located that terminals and adjacent devices are readily accessible without the use of special tools. Terminal markings shall be clearly visible.

3.4.3 Cut-outs and wiring for free issue items, if any, shall be according to corresponding equipment manufacturer's drawings. Cut-outs, if any, provided for future mounting of equipment shall include cover plates.

3.4.4 The centerline of switches, push buttons and indicating lamps shall be not less than 750mm from the bottom of the panel. The centerline of relays with targets and/or requiring adjustment, motors, test switches, and recorders shall be not less than 450mm from the bottom of the panel. No components shall extend below 200mm.

It will be preferable if existing panel layout is used to give uniform appearances.

3.4.5 The centerline of switches, push buttons and indicating lamps shall be matched to give a neat and uniform appearance. Likewise, the top lines of all meters, relays and recorders, etc. shall be matched.

3.4.6 No equipment shall be mounted on the doors without prior approval of the Employer.

3.4.7 In the existing substation, panels shall be as far as possible matched with the existing panels in the control room in respect of Dimensions, Color, Appearance, Size and Arrangement of equipment on the front.

3.4.8 The standard phase arrangement when facing the front of the switch-board shall be R-S-T from left to right, from top to bottom, and front to back. All relays, instruments, other devices, buses and equipment involving three phase circuit shall be arranged and connected in accordance with the standard phase arrangement.

3.4 (B) Panel Internal Wiring

Panels shall be supplied complete with interconnecting wiring provided between all electrical devices mounted and wired in the panels and between the devices and terminal blocks for the devices to be connected to equipment outside the panels. When panels are arranged to be located adjacent to each other all inter panel wiring and connections between the panels shall be furnished and the wiring shall be carried out internally.

All wiring shall be carried out with 650V grade, single core, stranded copper conductor wires with PVC insulation. The minimum size of the multi-stranded copper conductor used for internal wiring shall be as follows:

a) All circuits except current transformer circuits and voltage transfer circuits meant for energy metering - one 1.5mm sq. per lead.
b) All current transformer circuits one 2.5 sq.mm lead.
c) Voltage transformer circuit (for energy meters): Two 2.5 mm sq per lead.

All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring gutters & troughs shall be used for this purpose.

Auxiliary bus wiring for AC and DC supplies, voltage transformer circuits, annunciation circuits and other common services shall be provided near the top of the panels running throughout the entire length of the panels.

Wire termination shall be made with solder less crimping type and tinned copper lugs, which firmly grip the conductor. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wire and shall not fall off when the wire is disconnected from terminal blocks. All wires directly connected to trip circuit breaker or device shall be distinguished by the addition of red coloured unlettered ferrule.

Longitudinal troughs extending throughout the full length of the panel shall be preferred for inter panel wiring. Inter-connections to adjacent panel shall be brought out to a separate set of terminal blocks located near the slots of holes meant for taking the inter-connecting wires.

Contractor shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.

3.5 Mimic Diagrams

3.5.1 Mimic diagrams shall be provided on panels as required. Mimic diagrams shall be screwed on to panels and shall be made of anodized aluminum or plastic of approved fast color material which can be easily cleaned. The width of the mimic bus shall be subject to approval of the Employer.

3.5.2 The colors for the various voltages in the mimic diagram shall be as per the existing colors.

3.5.3 When semaphore indicators are used for disconnecting switch positions, they shall be so mounted in the mimic that the disconnecting switch's 'close' position shall complete the continuity of the mimic. Similarly, when control switches of stay-put type are mounted in the mimic, the 'close' position of the switch shall complete the mimic.

3.6 Annunciators

3.6.1 Annunciators of the visual and audible type shall be provided on the panels when called for in the equipment lists, if enclosed. Annunciators shall be suitable for operation for the voltages specified.

3.6.2 Annunciators shall be of facia type with 35mm x 50mm (minimum) translucent plastic window for each alarm point. Annunciator facia plates shall be engraved in block letter with respective alarm inscriptions, which will be furnished to Contractor by Employer. Alarm inscriptions shall be engraved on each window in not more than three lines and size of the lettering shall be not less than 3mm. The inscriptions shall be visible only when the respective light is lighted. If any other type of Annunciators are to be used, prior approval from the Owner should be taken before manufacturing.

3.6.3 The annunciators shall be suitable for operation with normally open fault contacts which close on a fault. When specified in bill of materials, some of the annunciator points shall be suitable for operation with normally closed faults contacts which open on a fault. It shall be possible at site to change annunciators from "open to fault" to "close to fault" and vice versa. Annunciators shall be suitable for accepting fleeting faults of duration not less than 15 milliseconds.

3.6.4 Annunciators shall be compact self-contained units with associated relays mounted behind the facia units. In case the associated relays cannot be housed behind the annunciator facia units, these shall be mounted and wired in a separate panel which shall be included in the offer. However, the latter arrangement is not preferred due to additional space requirement and wiring interconnections. Alarm relays and facia units shall be interchangeable.

3.6.5 Annunciator facia units shall be suitable for flush/semi-flush mounting on panels. Replacement of individual facia inscription plates and lamps / LED / LCD shall be possible from front of the panels.

3.6.6 One alarm buzzer common to annunciators on all the panels shall be provided. Similarly, "Sound Cancel", "Acknowledge", "Reset" and "Lamp Test" push buttons common to annunciators on all the panels shall be provided. These common devices shall be located in a particular panel as determined by the Employer.

3.6.7 In case of static annunciator schemes, special precaution shall be taken by the Contractor to ensure that spurious alarm conditions do not appear due to false influence of external magnetic fields on the annunciator wiring and switching disturbances from the neighboring circuits.

3.6.8 Each annunciation window shall be provided with two lamps to provide safety against lamp failure. Lamps shall operate in parallel such that failure of one will not affect operation of the other.

3.6.9 Sequence of Operation of the Annunciator shall be as follows:

Alarm Condition	**Fault Contact**	**Audible Alarm**	**sual Alarm**
Normal	Open	Off	Off
Abnormal	Close	On	Flashing
Sound cancel	Close or Open	Off	Flashing
Acknowledge	Close or Open	Off	Steady On
Back to Normal	Open	Off	Steady On
Reset	Open	Off	Off
Lamp Test	Open	Off	Steady On

In case 'RESET' push-button is pressed before abnormality is cleared, the lamps shall continue to glow steady and shall go out only when 'Normal' condition is restored.

3.6.10 Any new annunciation appearing after the operation of "Sound Cancel" for previous annunciation, shall provide a fresh "Audible Alarm" with accompanied "Visual Alarm" even if the process of "Acknowledging" or "Resetting" of previous alarm is going on or yet to be carried out.

3.6.11 Provision of testing facilities for flasher and audible alarm circuits of annunciators shall be provided.

3.7 Switches

Control and instrument switches shall be rotary operated type with escutcheon plates clearly marked to show operating position and circuit designation plates and suitable for flush mounting with only switch front plate and operating handle projecting out.

The selection of operating handles for the different types of switches shall be as follows:

Breaker, Isolator control switches:	Pistol grip, black
Synchronising switches:	Oval, Black, Keyed handle
Selector switches:	Oval or knob, black
Instrument switches:	Round, knurled, black
Protection Transfer switch:	Pistol grip, lockable and black.

The control switch of breaker and isolator shall be of spring return to neutral type. The switch shall have spring return from close and trip positions to "after close" and "after trip" positions respectively. Instrument selection switches shall be of maintained contact (stay put) type. Ammeter selection switches shall have make-before-break type contacts so as to prevent open circuiting of CT secondary when changing the position of the switch. Voltmeter transfer switches for AC shall be suitable for reading all line-to-line and line- to-neutral voltages.

Synchronizing switches shall be of maintained contact (stay put) type having a common key for a group of switches. The key shall be removable only in the OFF position and it shall be co-ordinate to fit in to all the synchronizing switches. These switches shall be arranged to connect the synchronizing equipment when turned to the 'ON' position. One contact of each switch shall be connected in the closing circuit of the respective breaker so that the breaker cannot be closed until the switch is turned to the 'ON' position.

Lockable type of switches which can be locked in particular positions shall be provided when specified. The key locks shall be fitted on the operating handles.

3.8 Indicating Lamps

Indicating lamps shall be of cluster LED type suitable for panel mounting with rear terminal connections.

Lamps shall be provided with series connected resistors preferably built in the lamp assembly. Lamps shall have translucent lamp covers to diffuse lights coloured red, green, amber, clear white or blue as specified. The lamp cover shall be preferably of screwed type, unbreakable and moulded from heat resisting material.

Lamps and lenses shall be interchangeable and easily replaceable from the front of the panel. Tools, if required for replacing the bulbs and lenses shall also be included in the scope of the supply.

The indicating lamps with resistors shall withstand 120% of rated voltage on a continuous basis.

3.9 Position Indicators

Position indicators of "SEMAPHORE" type shall be provided when specified as part of the mimic diagrams on panels for indicating the position of circuit breakers, isolating/earthing switches etc. The indicator shall be suitable for semi-flush mounting with only the front disc projecting out and with terminal connection from the rear. Their strips shall be of the same color as the associated mimic.

Position indicator shall be suitable for 110 DC Voltage. When the supervised object is in the closed position, the pointer of the indicator shall take up a position in line with the mimic bus bars, and at right angles to them when the

object is in the open position. When the supply failure to the indicator occurs, the pointer shall take up an intermediate position to indicate the supply failure.

The rating of the indicator shall not exceed 2.5 W.

The position indicators shall withstand 120% of rated voltage on a continuous basis

3.10 Relays

All relays shall conform to the requirements of IS: 3231/IEC-60255 or other applicable standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear.

All main protective relays shall be numerical type & the communication protocol shall be compatible with IEC 61850. All protective relays shall be in draw out or plug-in type/modular cases with proper testing facilities. Necessary test plugs/test handles shall be supplied loose and shall be included in contractor's scope of supply.

All AC operated relays shall be suitable for operation at 50 Hz. AC Voltage operated relays shall be suitable for 110 Volts VT secondary and current operated relays for 1/5 amp CT secondary. All DC operated relays and timers shall be designed for 110 DC voltage specified, and shall operate satisfactorily between 80% and 110% of rated voltage. Voltage operated relays shall have adequate thermal capacity for continuous operation.

The protective relays shall be suitable for efficient and reliable operation of the protection scheme described in the specification. Necessary auxiliary relays and timers required for interlocking schemes for multiplying of contacts suiting contact duties of protective relays and monitoring of control supplies and circuits, lockout relay monitoring circuits etc. also required for the complete protection schemes described in the specification shall be provided. All protective relays shall be provided with at least two pairs of potential free isolated output contacts. Auxiliary relays and timers shall have pairs of contacts as required to complete the scheme; contacts shall be silver faced with spring action. Relay case shall have adequate number of terminals for making potential free external connections to the relay coils and contacts, including spare contacts.

All protective relays, auxiliary relays and timers except the lock out relays and interlocking relays specified shall be provided with self-reset type contacts. All protective relays and timers shall be provided with externally hand reset positive action operation indicators with inscription. All protective relays which do not have built-in hand-reset operation indicators shall have additional auxiliary relays with operating indicators (Flag relays) for this purpose. Similarly, separate operating indicator (auxiliary relays) shall also be provided in the trip circuits of protections located outside the board such as Buchholz relays, oil and winding temperature protection, sudden pressure devices, fire protection etc.

Timers shall be of the electromagnetic or solid state type. Pneumatic timers are not acceptable. Short time delays in terms of milliseconds may be obtained by using copper slugs on auxiliary relays. In such case it shall be ensured that the continuous rating of the relay is not affected. Time delay in terms of milliseconds obtained by the external capacitor resistor combination is not preferred and shall be avoided to the extent possible.

All protective relays and alarm relays shall be provided with one extra isolated pair of contacts wired to terminals exclusively for future use.

The setting ranges of the relays offered, if different from the ones specified shall also be acceptable if they meet the functional requirements.

Any alternative/additional protections or relays considered necessary for providing complete effective and reliable protection shall also be offered separately. The acceptance of this alternative/ additional equipment shall lie with the Employer.

The bidder shall include in his bid a list of installations where the relays quoted have been in satisfactory operation.

All relays and their drawings shall have phase indications as R-Red, Y-yellow, B-blue

Wherever numerical relays are used, the scope shall include the following:

a) Necessary software and hardware to up/down load the data to/from the relay from/to the Laptop computer.
b) The relay shall have suitable communication facility for future connectivity to MCC/SCADA. Communication protocol shall be IEC 61850.
c) In case of line protection, bus-bar protection and transformer protection, the features like fault recorder and event logging function including as available as optional feature in these relays shall be supplied & activated at no extra cost to the Employer. Also, necessary hardware/software for automatic uploading to station Laptop computer (as applicable) shall be supplied.

3.11 Specific Protection Requirements

The Contractor shall provide state-of-the art numerical type relays (where specification does not call for specific type relay). The contractor shall furnish necessary probe and software, cable suitable for the relays supplied under this contract. The Contractor shall provide at least i5, 7th Gen or equivalent laptop computer, relays programming software and necessary probes & cables for setting the numeric relays. No separate payment for laptop, software, probes, cables etc. will be done and therefore all cost involved for these items shall be included in the cost of relay and control panels.

3.11.1 **Relay Protection**

3.11.1.1 **Over current and Earth fault Protection**

i. Non-Directional Phase Overcurrent Protection shall:

- be single pole & have an inverse characteristic with a definite minimum time of 3sec.at 10times setting.
- have a variable setting range of 5-250% in step of 1% of rated current
- have a time multiplier range of 0.025-1 in step of 0.001 for phase fault

ii. Non-Directional Earth Fault Protection shall :

- be single pole type.
- have an inverse characteristic with a definite minimum time of 3sec. at 10 times setting.
- have a variable setting range of 5-250% in step of 1% of rated current
- have a time multiplier range of 0.025-1 in step of 0.001 for earth fault

3.11.1.3 **Local Breaker Back Up Protection**

Relay shall :

- be triple pole type.
- have an operating time of less than 15 milliseconds.
- have 2 over current and 1 Earth fault elements.
- have a re-setting time of less than 15 milliseconds.
- have a setting range of 30-320% of rated current.
- have a separate time delay relay with a continuously adjustable setting range of 0.1-1 second.

- have necessary auxiliary relays to make a comprehensive scheme.
- have a continuous thermal withstand two times rated current irrespective of setting.
- provide both retrip and back-up trip output contacts.

3.7.2 **Other Requirements**

i. Layout of panel in the control room, individual panel layout incorporating the hardware and control wiring diagrams and schematics shall be prepared by the Contractor and be sent to the Employer for approval.

ii. All auxiliary relays, if and when required for the completeness of the various protection schemes covered in this order, shall be deemed to be included in the scope of supply whether or not such items are specifically mentioned in the enclosed bill of material.

ii. Omission of hardware specifically mentioned in Price schedule material such as auxiliary relays/protective relays, etc. if found necessary during detailed engineering shall be shipped to the Employer with spare parts, without any extra cost to the Employer.

iv. All terminal blocks for CT and PT circuits shall be of disconnecting line type. Suitable plastic covers for all terminal blocks shall be provided in order to prevent dust accumulation.

v. Panels shall be mounted to concrete foundation on galvanized steel channels with an intervening layer of anti-vibration strips made of shock absorbing materials which shall be supplied by the Contractor.

vi. Cable entries for all the panels shall be from bottom. The bottom plates of the panels shall be fitted with removable plates of adequate size for holding cables and sealing from dust and moisture.

vii. A ground bus of bare copper strip of minimum size 25 x 6 mm along the length of each panel shall be provided and shall be connected to the ground mat of the station.

6.8 Multifunction Meters

Multifunction meters shall be numerical type. Each 132 kV and 33 kV feeders shall be equipped with one Multifunction Meter. As a minimum all Multifunction Meters shall display following parameters and also communicate all parameters to SCADA and shall have provision to communicate protection signals with each other directly over optical fibre.

- Three phase currents
- Line and Phase voltages
- Frequency
- Active Power
- Reactive Power
- Apparent Power
- Power factor

3.9 Miscellaneous Accessories

3.9.1 Space Heater

Each panel shall be equipped with automatic thermostat controlled space heaters to prevent moisture condensation within the enclosure and shall be completed with MCB units for power supply. Space heaters and MCB units shall be suitable for continuous operation.

A 230 V, 1 phase, 50Hz AC plug point shall be provided in the interior of each cubicle with on-off switch for connection of hand lamps.

3.9.2 Panel Lighting

Panel lighting with door switch shall be provided in the interior of the cubicle.

3.9.3 DC Control supply:

Independent supply for main protection trip-circuit shall be provided and another separate supply shall be provided for back up protection, control and metering.

3.10 Tests

3.10.1 Routine Tests

Relay and Control Panels shall be subjected the following routine tests at manufacturer's:

a) Works Construction Inspection
b) Mechanical operation test
c) Calibration test for meters
d) Characteristic test for relays
e) High voltage test of insulation (2000 volts for 1 minute)
f) Electrical control, interlock and sequential operation tests
g) Verification of wiring as per approved schematic diagram, etc.

Routine test certificates of all the relays supplied under this contract shall be submitted for the Employer's approval before dispatching the control and relay panel.

3.10.2 Field Tests

After completion of the installation, panels shall be subjected the following field tests:

a) Electrical control, interlock and sequential operation tests
b) Calibration test for meters
c) Measurement of insulation resistance
d) Characteristic test for relays, etc.

3.11 Drawings, Data and Manual

Outline drawings of Control and Relay panels along with make, model and catalogue of all main relays shall furnish along with the bids.

After award of Contract the successful Bidder shall submit the required number of copies of the following drawings and data for approval of the Employer.

a) General equipment layout
b) Outline drawings of panels showing front and rear elevations
c) Loading data and foundation detail
d) Elementary control wiring diagrams
e) Internal wiring diagrams
f) External connection diagrams, showing terminal boards and other external connection points for each panel and the required interconnecting wiring
g) AC and DC diagram for control, metering, relaying, communication alarm etc.
h) Instruction manual for storage, installation, operation and maintenance of relay and accessories

APPENDIX: 6 .1

BILL OF MATERIAL

The bill of materials shall cover only the major equipment or such information as will require particular information from the Bidder. Bidder is to be understood that, all other associated auxiliary equipment and accessories, although not listed in the bill of materials, but necessary for the complete and sound function of the control board as described in this specification, shall be furnished by the Contractor.

A. MAJOR COMPONETS OF 33 KV LINE CONTROL/RELAY PANEL

Item	Legend	Description	Quantity per Panel
1.	ANN	Annunciator assembly, 18 active points, 110V DC, 3 rows high by 6 columns wide, flush mounted, and with:	1
		3-separately mounted push buttons 2-separately mounted indicating lamps, one white lamp, and one red lamp. Following minimum annunciations shall be provided: 1. Over current protection trip	
		2. Earth Fault protection trip	
		3. Trip circuit faulty	
		4. V.T. Fuse fail	
		5. Breaker failure protection trip	
		6. C.B. in trouble	
		7. spare	
		8. spare	
		9. A.C. supply failure Alarm	
		10. D.C. supply failure Alarm	
		11. C.B trip	
		12. spare	
		13. spare	
		15. spare	
		16. spare	

Item	Legend	Description	Quantity per Panel
		17. spare	
		18. spare	
2.	Relay	Only main relays and instruments are listed here. All the trip relays and auxiliary relays required for satisfactory operation of the scheme shall be included by the Contractor.	
	51/51N 50/50N	Over-current and earth fault protection	1
3.	A	Indicating ammeter with selector switch 0-400 A ; 0-200 A (for CT ratios 400-200/1A)	1 set
4.	MFS	Numerical type Multi Function Meter (A, V, F, MW, MVAR, MVA, PF) with communication facilities with SCADA/RTU.	1 set
5.	Energy meter	3 ph, 4w Quadrant type energy meter class 0.2, with impulse contact, 400-200/1 A, 33000/√3/110/√3 V	1
6.	CS	Breaker control switch, with 2-separately mounted indicating lamps for status indication.	1
7.	SI	Electrically operated mimic disconnect device (Semaphore Indication), 110V DC, to indicate the position of disconnecting switch	2
8.	SI	Electrically operated mimic disconnect device (Semaphore Indication), 110V DC, to indicate the position of Line Grounding switch	1

4. Cables

4.1 Control and instrumentation cable

(a) General

All control and instrumentation cable shall be 600V grade as per IEC multicore, color-coded, PVC insulated, cable armored cable. Each multicore cable shall have not less than 20 percent or 4 spare cores whichever is the greater.

(b) Conductor

Copper conductor shall be stranded circular non-compacted copper conductor of minimum cross-section of 2.5 sq. mm.

(c) Insulation

The electrically and thermally stable PVC insulation shall be extruded onto the conductor so as to prevent contamination and voids in the insulation.

(d) Assembly

Multi conductor cables shall be assembled in accordance with applicable IEC standard.

A flame retardative binder tape may be used underneath the overall jacket of multi-conductor cables, if required to achieve the desired flame retardative characteristics. Tapes, if used, shall be non hygroscopic.

(e) Anti-termite covering

Anti-termite protection shall be applied to the cable and shall consist or a non-magnetic barrier.

(f) Jacket

The cable core assembly shall be covered with a flame retardative and resistant jacket, which is free-stripping from the insulation.

The overall jacket shall be clean, dry, and free of grease and shall be suitable for ink or paint application.

Cable jacketing and the interstices within the jacket shall be free of water. Evidence of water shall be grounds for rejection of the cable.

(g) Identification

Each cable shall have a printed legend on the overall jacket, with the manufacturer's name, name of the Employer, voltage class, the number and size of conductors, and a unique number or code indicating the production run or batch. The identification shall remain legible for the life of the cable.

4.2 Communication Cable

All cables and wiring shall have copper conductors and PVC insulation and shall comply with IEC standards.
Each communication cable shall have not less than 20 percent or 4 spare twisted pairs whichever is the greater. Cabling and wiring installations shall be arranged to minimize the risk of fire and damages, which might be caused in the event of fire.

For telephone type cables, 2 conductor wires of not less than 0.6 mm dia shall be used. Where twin or quad make up is required in any cable, the cores shall be uniformly twisted and the lays arranged such that cross talk is reduced to a minimum.

No conductor smaller than 32/0.2 mm (1 mm2), or having less than three strands, shall be used for interconnecting the cables except in the case of telephone extensions. All cables shall have insulation, which will withstand the highest temperature to be experienced in service.

Each conductor of a multi-core cable shall be readily identified by a numbered marker tape or, in the case of telephone type cables, color coded insulation.

4.3 Cable Tags & Marker

Each cable and conduit run shall be tagged with numbers that appear in the cable and conduit schedule.
The tag shall be of aluminium with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG Gl wire.

Conforming to IS: 280. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables.

Location of cables laid directly underground shall be clearly indicated with cable marker made of galvanized iron plate. Location of underground cable joints shall be indicated with cable marker with an additional inscription "Cable joints". The marker shall project 150 mm above ground and shall be spaced at an interval of 30 meters and at every change in direction. They shall be located on both sides of road and drain crossings.
Cable tags shall be provided on all cables at each end Gust before entering the equipment enclosure), on both sides of a wall or floor crossing, ·on each duct/conduit entry and at each end & turning point in cable tray/trench runs.

4.4 Cable Termination and Connections

The termination and connection of cables shall be done strictly in accordance with cable and termination kit manufacturer's instructions, drawing and or as per instruction of the Employer.

Control cable cores entering control panel/switchgear/MCCB/MCC/Miscellaneous panels shall be neatly bunched, clamped and tied with nylon strap or PVC perforated strap to keep them in position.

The Contractor shall tag/ferrule control cable cores at all terminations, as instructed by the Employer. In panels where a large number of cables are to be terminated and cable identification may be difficult, each core ferrule may include the complete cable number as well.

Spare cores shall be similarly tagged with cable numbers and coiled up.

Double compression type nickel plated (coating thickness not less than 10 microns) brass cable glands shall be provided by the Bidder for all power and control cables to provide dust and weather proof terminations.

The cable glands shall conform to BIS: 6121. They shall comprise of heavy duty brass casting, machine finished and nickel plated, to avoid corrosion and oxidation.

Cable lugs shall be tined copper solder less crimping type conforming to IS-8309 & 8394. Bimetallic lugs shall be used depending upon type of cables used.

4.5 Installation of Cables

In general all power and control cables shall be in the cable trenches. In addition to the above, for lighting purpose also, cable trench can be used in outdoor area as far as possible.

Cabling in the Switchgear/control room shall also be done on ladder type cable trays.

For cables laid in conduits in outdoor area, conduits of 50 mm nominal outside diameter of class 4 as per IS 4985 shall be used, which shall be buried in the ground at a depth of 250mm below finish formation level. Separate PVC pipes shall be laid for control and power cables. Cable pull boxes of adequate size shall be provided if required.

Power and control cables in the cable trench shall be laid in separate tiers. The order of laying of various cables shall be as follows, for cables other than directly buried.

- Power cables on top tiers.
- Control instrumentation and other service cables in bottom tiers.

Single core cables in trefoil formation shall be laid with a distance of three times the diameter of cable between trefoil centre lines. Power cables from station transformer to main ACDB shall be laid with a minimum centre to centre distance equal to twice the diameter of the cable.

Power and control cables shall be securely fixed to the trays/supports with self locking type nylon ties with the interlocking facility at every 5 meter interval for horizontal run. Vertical and inclined cable runs shall be secured with 25 mm wide and 2 mm thick aluminium strip clamp at every 2m.

Cables shall not be bent below the minimum permissible limit.

Where cables cross roads, drains, these shall be laid in reinforced spun concrete or steel pipes buried at not less than one meter depth.

4.6 Cable Trays

Cable trays shall be used in control building and other areas within substation and within cable trenches outside substation area. The cable trays shall be of GS sheet and minimum thickness of sheet shall be2 mm. cable trays shall have 2.5 meter straight section and 150, 300 mm and 600 mm wide

4.7 Conduits, Pipes and Duct Installation

Bidder shall supply and install all rigid conduits, mild steel pipes, flexible conduits, Hume pipes etc. including all necessary sundry materials such as tees, elbows, check nuts, bushing, reducers, enlargers, coupling cap, nipples, gland sealing fittings, pull boxes etc. The size of the conduit/pipe shall be selected on the basis of 40% fill criterion.
Embedded conduits shall have a minimum concrete cover of 50 mm.

Size of conduit for lighting shall be selected by the Bidder during detailed engineering.

For directly embedding in soil, the conduits shall be coated with an asphalt-base compound. Concrete pier or anchor shall be provided wherever necessary to support the conduit rigidly and to hold it in place.

Conduit shall be installed in such a way as to ensure against trouble from trapped condensation.

FO cables shall be laid in galvanised steel (GS) conduits within cable trenches keeping proper clearance with HV cables

4.8 Special Requirement

Small cut piece lengths of cables will not be accepted. Cables up to 500 meters in length or as approved by Employer/Employer's Representative shall be of one length shipped in a drum of adequate size. For higher quantities, multiple lengths/drums may be shipped subject to the approval of Employer/Employer's Representative.

4.9 Drawings, Data & Manuals

The following information shall be furnished along with the Tender.

(a) Manufacturer's leaflets giving constructional details, dimensions and characteristics of different cables.

(b) Current rating of cables including de-rating factor due to grouping, ambient temperature and type of various installation.

(c) Write-up with sketches illustrating the manufacturer's recommendation for splicing, jointing and termination of different types of cables.

(d) Type test report of all types of power, control and instrument cables. The Bidder shall clearly describe the type and routine tests to be performed on cables.

(e) Drum length for each type of cable.

4.10 Tests

4.10.1 **Routine and design tests**

a) The bidder shall submit the Type Test Report as per IEC or any equivalent international standard.

b) The following tests shall be included in the routine test by the manufacturer at the factory as minimum requirements for this specification:

i. Construction inspection
ii. Conductor resistance test
iii. High voltage test
iv. Insulation resistance test
v. Physical and aging test for insulation and jacket

4.11.2 **Field tests**

After installation at site, cables shall be subjected but not limited to the following tests:

(a) Measurement of insulation resistance
(b) DC dielectric test

4.12 Performance Guarantee

The performance figures quoted on schedule of Technical Data shall be guaranteed within the tolerance permitted by relevant standard and shall become a part of the Contract. In case of failure of the cables to meet the guarantee, the Employer/Employer's Representative reserve the right to reject the equipment. The Contractor shall have to rectify the defect t no extra cost to the Employer and without delaying the commissioning schedule.

5. GROUNDING SYSTEM AND LIGHTNING PROTECTION

5.1 General

This specification covers the design, supply, delivery, installation and testing of the complete Grounding System as described herein.

5.2 Codes and Standards

The complete station grounding work shall be in accordance with the recommendation in the "Guide for Safety in Substation Grounding" IEEE No. 80 and the requirements of this section.

5.3 Equipment to be furnished

Complete installation of the ground grid, test link chamber, grounding of all equipment located in the substation as specified herein but not be limited to the supply of grounding conductors, jointing materials and all accessories to complete this grounding installation shall be covered under this specification.

5.4 Grounding Installation Features

5.4.1 The installation shall be complete in all respects for efficient and trouble free service. All work shall be carried out in a first class neat workmanlike manner. Grounding conductors shall be handled carefully to avoid kinking and cutting of the conductors during laying and installation. All exposed ground conductor runs shall be taken in a neat manner, horizontal, vertical and parallel to building walls or columns and shall not be laid haphazardly. All connections to the grounding grid shall be made with the bare copper stranded cable.

5.4.2 For all connections made to equipment or to the structures, the grounding conductor, connectors and equipment enclosures shall have good clean contact surfaces. Grounding conductor connection to all electrical equipment, switchgear, transformers, motors, panels, conduit systems, equipment enclosures, cable trays, distribution boards, equipment frames, bases, steel structure, etc., shall be by pressure type or bolting type connectors.

5.4.3 All lap, cross and tee connections between two grounding conductors both below and above grade shall be made by thermo welding process or compression type connector. The various joints shall have adequate mechanical strength as well as necessary electrical conductivity not less than that of the parent conductors of the joints. All accessories for grounding installation shall be of quality and design approved by the Employer/Employer's Representative.

5.4.4 Grounding conductors, when crossing underground trenches, directly laid underground pipe and equipment foundation, if any, shall be at least 500 mm below the bottom elevation of such trenches/pipes.

5.5 Grounding Conductor

5.5.1 Main ground grid

The main ground system shall consist of a grounding grid buried minimum one meter below grade level. The grounding grid shall consist of one no. 100 sq. mm (min) stranded bare copper conductor cable.

5.5.2 Ground electrodes

The ground electrodes shall be 16 mm diameter and 1.5-meter long (min.) copper clad steel. These shall be driven into ground and connected to the main ground grid.

5.5.3 Risers

The risers shall consist of stranded bare copper conductor or connected at one end to the main ground mat and at the other end to the equipment.

5.6 Design Requirement

5.6.1 The Contractor shall measure the soil resistivity and calculate the total length of buried ground conductor, number of grounding electrode and their depth and spacing to achieve a grounding system resistance of not more than 1.0 ohm.

5.6.2 The Contractor shall calculate the cross-section considering the maximum fault level.

5.7 Tests

On completion of the installation, either wholly or in sections, it shall be tested in compliance with relevant code by the Contractor in the presence of the Employer/Employer's Representative. The cost of any test including labor, material and equipment charges shall be borne by the contractor. The ground grid resistance to remote earth shall be 1.0 ohm or less. If this low resistance cannot be obtained as per his design, then additional grounding conductors shall be buried in the earth, or if necessary, buried in treated soil to obtain the required low ground resistance.

5.8 Lightning Protection

The outdoor equipment of the substation and the substation building shall be protected against lightning. The lightning protection shall be achieved by one or more lightning masts or horizontal lightning conductors above the protected equipment. The design of the lightning protection system shall be subject to the approval of the Employer/Employer's Representative.

5.9 Drawings

After award of the Contract, the Contractor shall furnish the grounding layout drawing with dimensions showing the location of grounding grids, electrodes, test link chambers and risers backed up by necessary calculations for Employer/Employer's Representative approval. The work shall have to be started at site only after getting approval from the Engineer. If alternation is required for any work done before getting Employer/Employer's Representative approval, the same shall have to be done by the Contractor at no extra cost to the Employer.

5.10 **Bus bars**

Bus bars shall be copper, liberally sized for the specified current ratings (both short circuit and continuous currents). Maximum temperature of the bus and bus connection shall be limited to 90 deg. C.

All bus bars, links, etc., shall be covered to prevent accidental contacts.

Buses shall be spaced with adequate clearance between phases and between phase and ground.

Bus supports shall be of molded insulators suitable for polluted atmosphere.

All bus works shall be braced to withstand stresses due to short circuit current, corresponding to the respective fault level of the system to which it is connected. The bus bars shall be able to withstand for 1 second the above short circuit current thermally.

Appropriate color code shall be used to identify the various phases of bus bars and the neutral (wherever applicable).

5.11 Specific Requirement

5.11.1 **Molded Case Circuit Breakers (MCCB)**

The molded case circuit breakers shall be of panel mounting type. It shall have all the live parts enclosed in a molded case and all contacts shall be silver-plated. The breakers shall be trip free and with quick-make and break operating mechanism. The molded case circuit breakers shall be provided with magnetic short circuit protection and thermal overload device. The characteristic curve of these protections shall be furnished along with the offer. The protection device of the incomer MCCB shall be coordinated with feeder MCCB. Each breaker shall have a common trip, causing on overload on one pole to trip all other poles.

The MCCB handle, after breaker tripped due to a fault shall occupy a mean position. The breaker shall be capable of interrupting a RMS current corresponding to the fault level of the system to which the respective distribution board is connected.

It shall be possible to close and trip the breaker without opening the compartment door. The breaker shall be provided with mechanical On-Off indicator at the front properly marked. Each circuit breaker shall be provided with alarm switch and auxiliary switch. The rating of the MCCB's shall be so selected that maximum standardization consistent with the economy is possible. The incoming and bus section breakers shall have shunt trip coils.

5.12 **Cable termination**

Distribution board shall be designed to facilitate cable entry from bottom. Removable plates shall be furnished with compression type cable glands to make entry dust tight and no weight is transferred on the terminal. The glands shall be suitable for terminating cable armor. Compression type cable lugs as required shall be furnished for termination of power and control cables.

Sufficient space shall be provided to avoid sharp bending and for easy connection. A minimum space of 200mm from the gland plate to the nearest terminal block shall be provided.

5.13 **Ground bus**

Grounding terminals on the distribution board shall be provided at either end for connection of copper ground conductor to ground grid.

5.14 **Nameplate**

Nameplates showing "Feeder Designation" shall be provided for each module of distribution board at front door top. Also nameplate shall be furnished at the top for each distribution board.

Material for nameplate shall be a plastic sheet, 3mm thick or approved equivalent. The letters shall be white on black background.

The nameplate shall be held by self-tapping screws. The size of the nameplates shall be proportionate to the size of the modules. Also individual panel number and danger plate shall be furnished at the back of the panel.

5.15 Tests

5.15.1 **Routine and type test**

Type test certificates and results shall be as per relevant IEC. Specification for all the equipment offered under the scope of this specification shall be furnished.

Each distribution board shall be completely assembled, wired adjusted and tested for operation under simulated conditions to ensure correctness of wiring and proper functioning of all equipment.

All component parts such as MCCB'S, meters, etc., shall be tested in accordance with relevant IEC Specification.

All current carrying parts and wiring shall be subjected to a high potential test.

All routine tests shall be conducted on all distribution boards.

5.16 Drawings, Data & Manuals

5.16.1 The following drawings and details shall be furnished along with the Tender.

(a) Bidder's proposed distribution scheme in single line diagram for all distribution boards.

(b) Bidder's proposed typical general arrangement drawing showing constructional features and layout of individual equipment along with the following:

- Space required in the front as well as back of distribution board.
- Power cable entry points
- Bus bar clearance, phase to phase and phase to neutral
- General cross-section drawing of the cubicle

(c) Technical leaflets on : MCCB, Terminal Boards, Insulators.

5.16.2 After award of contract the successful Bidder shall submit the following drawings for approval of the Employer/Employer's Representative.

(a) Confirmed outline dimensional drawing of all distribution boards, showing the general arrangement and indicating the following:

- Space required in the front and back
- Power cable entry points
- Bus bar clearance phase to phase to neutral
- Configuration of bus bars

- Technical details of supporting insulator and their spacing
- Outgoing power termination arrangement
- Transport/shipping dimensions with weights
- Foundation and anchor bolt details including dead load and impact load

Any other relevant drawing and data necessary for approval shall also be submitted by the bidder.

6. MISCELLANEOUS MATERIALS

6.1 General

This specification covers the design, fabrication, properly packed for transportation, deliver, installation, testing and putting into efficient and trouble-free operation of the bus material and insulator complete with all accessories.

6.1.1 Bus Conductor and fittings

(a) General

Bus bars and electrical connections in outdoor substations shall be in accordance with BS, ASTM or equivalent national standards in respect of current rating and material analysis.

Bus conductor to be supplied shall be aluminum tube and aluminum conductor steel reinforced. Minimum size and material of each bus shall be as following

	Bus	Material	Min. Size
-	33kV Main	Al Tube	As per actual
-	33kV Branch	Al Tube	As per actual
-	Overhead ground wire	GSW	55 sq. mm.

In case of existing substation conductors and connectors to be used for extension shall be as nearly as possible identical with the existing equipment.

Materials used for bus bars and connections shall be stressed to not more than two-fifths of their elastic limit. Provision shall be made for expansion and contraction with variation in conductor temperature and bus bars shall be arranged so that they may be readily extended in length with a minimum of disturbance to existing equipment.

Bus bars shall be in continuous lengths between supports. Connectors shall be of approved type, and if necessary type tested. Connection dependent upon site welding techniques will not be permitted.

Unless otherwise approved, bus bars and connections shall be so arranged and supported that under no circumstances, including short circuit conditions, can the clearances between live metal and earth of earthed metal work or between other conductors be less than the specified in the drawings. The extension of bus bar in the existing substation shall match with the existing one.

(b) Strain bus and fittings

The conductor shall be aluminum conductor steel reinforce (ACSR) of sufficient current carrying capacity matching with the existing substations.

The conductor shall be constructed of hard-drawn aluminum and zinc-coated steel-wires which have the mechanical and electrical properties in accordance with the latest revisions of ASTM.

The direction of lay of the outer layer shall be right-hand. The direction of lay shall be reversed in successive layers: contiguous layers shall in all cases have opposite lay.

The external form and surface of the finished conductor shall be uniformly cylindrical upon completion of manufacture and shall remain so when erected in place on the line.

The surface of the conductor shall be free from points, sharp edges, abrasions or other departures from smoothness or uniformity that would tend to increase radio interference and corona loss. When the conductor is subjected to tensions up to 50 percent of its rated ultimate strength, the conductor surface shall not depart from its general cylindrical form, nor shall any of the strands move relative to each other in such a way as to get squeezed out of place and disturb the longitudinal smoothness of the conductor. Strands of a section of "popped" cable shall not protrude more than 1/2 of their diameter of a strand. The conductor shall be capable of withstanding the normal handling necessary for manufacture and erection, such as, reeling, unreeling, and pulling through stringing sheaves under sufficient tension to keep the conductor off the ground, etc., without being deformed from a cylindrical form in such a way as to increase radio interference and corona loss.

The make-up and lay of wires shall be such as to produce a conductor essentially free from a tendency to untwist or spring apart when cut. The steel wires shall be performed or post formed so that, when the conductor is cut and the aluminum wires are stripped away from the core as required for splicing, the steel wires can be readily regrouped and easily held in place with one hand to allow a splicing sleeve to be slipped over the steel core wire at the cut end of the conductor.

This forming of the core is required and shall be done in a manner which will not in any way scratch, scrape, remove or otherwise damage the zinc coating of the steel core wires, individually or collectively.

The conductor shall be free from excessive amounts of die grease, metal particles and dirt. The Bidder shall describe in complete detail the method which he proposes to use in normal production to clean the conductor. The effectiveness the cleaning process shall be subject to verification.

Where dissimilar metals are in contact, approved means shall be provided to prevent electro-chemical action and corrosion. Unless otherwise approved, joints and surfaces of copper or copper alloy fittings shall be tinned.

Suspension and tension conductor clamps shall be approved types and shall be as light as possible. Those for aluminum conductor shall preferably be compression type. Suspension and tension clamps shall be designed to avoid any possibility of deforming the stranded conductor and separating the individual strands.

Tension conductor clamps shall not permit slipping of or damage to, or failure of the complete conductor or any part thereof at a load less than 95 percent of the ultimate strength of the conductor.

Clamps and fittings made of steel or malleable iron shall be galvanized. All bolts and nuts shall be as specified and shall be locked in an approved manner.

(c) Tubular bus and fittings

Tubular bus shall be made of first melting aluminum alloy, cold rolled or hard drawn and assembled using corona free fittings. Continuous lengths of bare conductor shall be installed in bus to dampen Aeolian vibration.

The tubular bus conductor shall have adequate strength to withstand mechanical forces due to short circuit currents and its temperature when carrying full load current shall not exceed 75 deg. C. A safety factor of 2 for normal working loads and 15 with short circuit currents shall be used.

The tubular bus shall include a small drain hole in any low section. Where expansion joints are required they shall be of the thin leaf type. They are required at all potheads and as required on bus bars. Bus supports for main tubular buses shall include on rigid fixed conductor clamp with slide fit on adjacent supports.

All bus support clamps shall be cast of first melting aluminum alloy. Each clamp shall be adjustable for alignment with insulator and furnished with four galvanized steel mounting bolts.

- Bolted type clamps shall be furnished with first melting alloy bolts, nuts and washers finished with anodic coating and lubricated. The clamps for tubing shall have dimensions and section suitable for splicing two pieces of tubing in the clamp.
- Flexible elements of expansion bus support clamps shall be laminated aluminum strap, which has current capacity equivalent to the tube.

Terminal connectors for aluminum shall be of first melting cast aluminum alloy. All terminal pads shall be furnished with stainless steel bolts, nuts and Belliville washers.

The bolted type terminal connectors shall be a multigrip type terminal and furnished with first melting aluminum alloy with bolts, nuts and washers finished with anodic coating and lubricated.

Bolted type connectors listed below shall be furnished with first melting aluminum alloy with bolts, nuts and washers finished with anodic coating and lubricated.

- Angle-Connectors: All angle-connectors shall be of streamlined, bolted type and made of first melting cast aluminum alloy. Tap element sockets shall be deep enough to allow for error in cut-off.
- Couplers: All couplers shall be bolted type and made of first melting cast aluminum alloy.

(d) Overhead ground wire

Overhead shield wore shall be galvanized steel wire, stranded with a cross sectional area of 61.7sqmm and shall comply with BS 183.

Earth wires shall be greased as for conductors and the outer strands shall have a right hand lay.

Each completed shield wire shall be bare and shall be composed of the specified number of wires.

In case of existing substation, the tubular bus and its fittings to be used for extension shall be as nearly as possibly identical with the existing one.

The nominal diameter of individual wires shall have a variation of not more than plus or minus one and an-half (1.5) percent.

Joints or splices may be made in the individual wires prior to drawings to final size or in the finished wire composing the strand. Such joints shall have protection to corrosion equivalent to that of the finished wire itself and shall not decrease the strength of the finished strand below the specified minimum breaking strength. Joints in the individual wires in the finished strand shall be separated by at least 15.2 meters.

All wires in the cable shall lay naturally in their true position in the completed cable, shall tend to remain in position when the cable is cut at any point, and shall permit re-stranding by hand after being forcibly raveled at the end of the cable. The strand shall be free from imperfections and consistent with good commercial practice with a carefully controlled finish completely free from any dirt, loose metal particles, nicks, scratches, abrasions or deformities of any nature.

Each item of material to be furnished by the contractor shall be given the wire manufacturer's routing factory tests.

6.2 Tests

6.2.1 The insulators shall be tested in accordance with IEC or ANSI Standards. Certified copies of the tests shall be submitted for approval to the Employer/Employer's Representative.

(a) Type tests

- Low frequency wet withstand test
- Critical-impulse flashover test
- Impulse withstand test
- Radio-influence voltage test
- Compression strength test
- Thermal shock test

(b) Quality conformance tests

- Visual and dimensional test
- Porosity test
- Galvanizing test
- Cantilever strength test
- Torsional strength test
- Tensile strength test

(c) Routine tests

- Flashover test
- Tension proof test

6.2.2 **Bus materials**

The following shop tests shall be performed for bus materials. All tests shall be made at the manufacturer's plant by and at the expense of the Contractor. Certified results of test shall be submitted whether or not the inspection is waived. The Employer/Employer's Representative may, at its option, waive part or the whole test.

(a) Aluminum tube

- General inspection
- Chemical composition of aluminum alloy
- Conductivity measurement of aluminum tube
- Dimension and weight measurement
- Certified report of aluminum alloy from the original manufacturer

(b) Bus support clamp and connector

- General inspection
- Dimension measurement
- Chemical composition of aluminum alloy
- Certified report of aluminum alloy from the original manufacturer

(c) Connectors for stranded conductor

- General inspection
- Measurement of dimension
- Compression test
- Certified report of aluminum alloy from the original manufacturer

(d) Miscellaneous hardware

- General inspection
- Measurement of dimension
- Tension test
- Galvanizing test

6.3 Packing and Marking

6.3.1 Insulator

(a) Packaging

The insulators shall be packed in strong wooden boxes with a waterproof lining. These boxes shall provide adequate protection against salt spray, chemical attack and damage that might be encountered in transportation and rough handling during loading, transportation to job site, unloading to temporary storage and ocean transportation.

(b) Marking

In addition to marks required for shipping purposes, each crate and pallet shall be marked with Shipper's identity and Employer's name and address and quantity and type of contents. Also, the gross, tare and net weights in kilograms shall be stenciled on each pallet.

6.3.2 Bus materials

(a) Packing

The conductor shall be furnished on non-returnable wooden reels, and shall be properly protected to prevent displacement, chafing, distortion, damage from corrosive atmosphere or other damage to the conductor, which might be encountered in shipping, storage or handling. Each layer of conductor shall be separated from the adjacent layer in such a manner as to prevent abrasion or other damage during handling and shipping.

The non-returnable reels shall be made of a strong material suitably strengthened for ocean transport and treated to withstand rotting or any type damage due to ocean atmosphere. The reels shall be capable of withstanding all stress due to braking and string operations. The Employer will accept the use of returnable reels, but any additional costs of such reels will be the responsibility of the Contractor.

(b) Marking

In addition to marks required for shipping purposes, each reel head shall be stenciled to show serial number, type of conductor, length of conductor in meters, the gross, tare, and net weights in kilograms. Each reel shall also be plainly marked to indicate the direction in which is should be rolled to prevent loosening of the conductor on the reel. Those reels from which test samples were taken shall be marked "Tested" with the length of sample conductor removed.

6.4 Guarantee

Any defects in materials or workmanship or other failure to meet requirements of these specifications, which are disclosed prior to the Taking-Over by the Employer, be corrected entirely (including removal and replacement) at the expenses of the Contractor.

Any latent defects not disclosed before date of the Taking-Over but disclosed within guarantee period, materials and/or supplies shall have been placed in use, shall be corrected promptly by and at the expense of the Contractor.

Circuit.

6.5 EARTHING SWITCHES

The Earthing Switch is operated by means of detachable lever from outside the cable compartment. It shall be mechanically interlocked with the CB so that the earthing switch in close position in section of CB truck into the service position is not possible. The operation of the Earthing Switch shall not be possible as long as the CB is not in isolated position.

6.5.1 The 11kV metalclad switchgear shall include earthing switches to facilitate earthing of each cubicle as specified.

6.5.2 **Main Data**

Rated Voltage kV 12

Rated Current A 1250

Short Circuit Current withstand capability (as specified above)

Bus Bar Rating A 2000

6.5.3 **Technical Requirements:**

a. The Earthing Switches shall meet the requirements of BS 5253 and IEC 129.

ii. Auxiliary Switches shall be provided as specified for the Circuit Breakers.

iii. Provision shall be made for padlocking in the Open and Closed position.

iv. Manual control of the switches and position indicator external to the cubicle shall be provided.

v. The Earthing Switch shall be interlocked manually with transformer circuit breakers.

6.6 INTERLOCKING

The following operation shall be taken place only when the under stated interlocking conditions are fulfilled to ensure Personal and Operational Safety.

6.6.1 Transferring the withdrawable part from the Disconnecting Position to the Service Position:

* Control Circuit Plug Inserted
* High Voltage Compartment Door closed.
* Circuit Breaker in OPEN Position.
* Earthing Switch in OPEN Position

6.6.2 Transferring the Withdrawable part from the Service Position to the Disconnected Position.

* Circuit Breaker in OPEN Position.

6.6.3 Operating the Circuit breaker

Withdrawable part in the Interlocked Final Position (Service or Disconnecting position)

6.6.4 Operating the Earth Switch

i. Withdrawable part in the interlocked disconnected position. windows shall be provided to allow visual inspection.

The Switches shall be tested in accordance with BS5253, IEC129 and IEC265 and shall include the following routine tests:

Operating and Mechanical tests

Measurements of the resistance of the main circuit.

6.6.5 Safety Device

Individual explosion vents should be provided for breaker / busbar / cable chambers on the top of the panel to let out the gases under pressure generated during an unlikely event of fault.

Cubical with the front plate is pressure tested for the internal arc fault as per PHELA recommendations.

Circuit breaker and the sheet metal enclosures are fully earthed.

6.7 Relays

All relays shall conform to the requirements of IS: 3231/IEC-60255 or other applicable standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear.

All main protective relays shall be numerical type & the communication protocol shall be compatible with IEC 61850. All protective relays shall be in draw out or plug-in type/modular cases with proper testing facilities. Necessary test plugs/test handles shall be supplied loose and shall be included in contractor's scope of supply.

All AC operated relays shall be suitable for operation at 50 Hz. AC Voltage operated relays shall be suitable for 110 Volts VT secondary and current operated relays for 1/5 amp CT secondary. All DC operated relays and timers shall be designed for the DC voltage specified, and shall operate satisfactorily between 80% and 110% of rated voltage. Voltage operated relays shall have adequate thermal capacity for continuous operation.

The protective relays shall be suitable for efficient and reliable operation of the protection scheme described in the specification. Necessary auxiliary relays and timers required for interlocking schemes for multiplying of contacts suiting contact duties of protective relays and monitoring of control supplies and circuits, lockout relay monitoring circuits etc. also required for the complete protection schemes described in the specification shall be provided. All protective relays shall be provided with at least two pairs of potential free isolated output contacts. Auxiliary relays and timers shall have pairs of contacts as required to complete the scheme; contacts shall be silver faced with spring action. Relay case shall have adequate number of terminals for making potential free external connections to the relay coils and contacts, including spare contacts.

All protective relays, auxiliary relays and timers except the lock out relays and interlocking relays specified shall be provided with self-reset type contacts. All protective relays and timers shall be provided with externally hand reset positive action operation indicators with inscription. All protective relays which do not have built-in hand-reset operation indicators shall have additional auxiliary relays with operating indicators (Flag relays) for this purpose

Timers shall be of the electromagnetic or solid state type. Pneumatic timers are not acceptable. Short time delays in terms of milliseconds may be obtained by using copper slugs on auxiliary relays. In such case it shall be

ensured that the continuous rating of the relay is not affected. Time delay in terms of milliseconds obtained by the external capacitor resistor combination is not preferred and shall be avoided to the extent possible.

Provision shall be made for easy isolation of trip circuits of each relay for the purpose of testing and maintenance.

All protective relays and alarm relays shall be provided with one extra isolated pair of contacts wired to terminals exclusively for future use.

The setting ranges of the relays offered, if different from the ones specified shall also be acceptable if they meet the functional requirements.

Any alternative/additional protections or relays considered necessary for providing complete effective and reliable protection shall also be offered separately. The acceptance of this alternative/ additional equipment shall lie with the Purchaser.

The bidder shall include in his bid a list of installations where the relays quoted have been in satisfactory operation.

All relays and their drawings shall have phase indications as R-Red, Y-yellow, B-blue

Wherever numerical relays are used, the scope shall include the following:

- Necessary software and hardware to up/down load the data to/from the relay from/to the personal computer installed in the substation.
- The relay shall have suitable communication facility for future connectivity to SCADA. Communication protocol shall be IEC 61850.
- The features like fault recorder and event logging function including as available as optional feature in the relays shall be supplied & activated at no extra cost to the Employer. Also, necessary hardware/software for automatic uploading to station HMI/DR workstation (as applicable) shall be supplied.

6.8 Specific protection requirements

In general, the major protection schemes to be employed are as follows:
For 11 kV incomer from power transformer and outgoing feeders, numerical IDMT over current/earth fault (OC/EF) relays with highest instantaneous feature shall be adopted.

Over-current and Earth-fault Protection

a) Non-directional phase over current protection shall:

- have an inverse characteristic with a definite minimum time of 3 seconds at 10 times setting.
- have a variable setting range of 20-200% of rated current
- have a high set instantaneous unit with a continuously variable setting range of 5-20 times of rated current.

b) Non-directional earth fault protection shall:

- have an inverse characteristic with a definite minimum time of 3 sec. at 10 times setting.
- have an adjustable setting of 10-80% of rated current.
- have a high set instantaneous unit with a continuously variable setting range of 5-20 times of rated current.

6.9 Other Requirements

All auxiliary relays, if and when required for the completeness of the various protection schemes covered in this order, shall be deemed to be included in the scope of supply whether or not such items are specifically mentioned in the enclosed bill of material.

All terminal blocks for CT and PT circuits shall be of disconnecting line type. Suitable plastic covers for all terminal blocks shall be provided in order to prevent dust accumulation.

6.10 Energy Meters

Energy meters shall be numerical type manufactured by internationally reputed manufacturer. Each feeder shall be equipped with one set of 3 ph, 4w kWh and kVARh meters. The meters shall preferably be four quadrant type. In case of numerical type energy meters, the Contractor shall furnish probe, copy write software and other necessary items (serial port, suitable to connect these meters with laptop) for operational programming of the meters.

All kWh and kVARh meters shall be of 0.2 class accuracy. In addition to all the tests required to be performed at the manufacturing plant, each of these meters shall be tested at the Employer's laboratory also at the expense of the Contractor prior to installation and commissioning and as and when required by the Employer during the warranty period. Any meter, which fails the tests, will not be acceptable and the Contractor shall supply their replacements immediately. If the replacements too fail the tests, then the Employer reserves the right to replace the meters with new one at the expense of the Contractor. The test results from the Employer’s laboratory shall be final and binding upon both parties.

6.11 Multifunction Meters

Multifunction meters shall be numerical type. Each 11 kV feeders shall be equipped with one Multifunction Meter. As a minimum, all Multifunction Meters shall display following parameters and also communicate all parameters to SCADA/RCC.

- Three phase currents
- Line and Phase voltage
- Frequency
- Active Power
- Reactive Power
- Apparent Power
- Power factor

6.12 Miscellaneous accessories

6.12.1 Space Heater

Each panel shall be equipped with thermostat controlled space heaters to prevent moisture condensation within the enclosure and shall be completed with MCBs for power supply. Space heaters and switch fuse units shall be suitable for continuous operation.

6.12.2 Plug Point

A 230 V, 1 phase, 50Hz AC plug point shall be provided in the interior of each cubicle with on-off switch for connection of hand lamps.

6.12.3 Panel Lighting

Panel lighting with door switch shall be provided in the interior of the cubicle.

6.12.4 DC Control supply:

Independent supply for protection trip-circuit shall be provided and another separate supply shall be provided for back up protection, control and metering.

6.12.5 Annunciator

Each cubicle shall be provided with a sufficient point annunciator to identify an alarm condition, including audible alarm, test, acknowledge and reset push buttons.

Control switches for circuit breakers shall be of the discrepancy type. Two independent movements shall be required to initiate an operation. The position of manually operated disconnector shall be indicated by means of discrepancy indicators.

The design shall be such that as to avoid nuisance alarms and shall block those devices which assume alarm conditions when the equipment is under shutdown. Annunciator windows shall be engraved with identification of the alarm condition.

Annunciators shall have the following sequence :

Condition	**Lamp**	**Alarm**
Normal	Off	Off
Alarm Flashing	On	On
Acknowledge	On	Off
Reset after return		
Normal	Off	Off
Lamp test	On	Off

Required signals or alarm systems: CB Off/On position by green/red lamp

Flag or lamp indication of faults for : Over current Protection, E/F Protection, DC Supply Failure, CB Failure, MCB tripped, AC supply failure, Interlocking system disturbed, CB driving faults.

The annunciator shall be of solid state type and suitable for operation at 110 V dc and shall be able to withstand IEC 255 class 3 tests without malfunctioning.

6.12.6 Accessories

The Contractor shall furnish following accessories as an integral part of each switchgear panels:

a) Padlocks and duplicate keys.
b) Cable glands (Double compression type), Lugs, Ferrules etc.
c) Space heaters equipped with thermostatic controls.
d) Local/remote control switch.
e) Fuses as required.
f) Operation counters of circuit breaker.
g) Grounding terminals as required.
h) Auxiliary relays.
i) Motor contactor with thermal release for spring charging motor.
j) Rating and diagram plate in accordance with IEC incorporating year of manufacture.
k) Special tools and tackle for operation and maintenance.
l) Other necessary accessories.

6.12.7 Spare Parts

For each type of circuit breaker, the spare parts shall be provided in required quantities as listed in Price Schedule. Further spare parts as recommended by the manufacturer shall also be included in the Price Schedule.

6.13 Tests

6.13.1 Routine Tests

On completion, each circuit breaker shall be subjected to following routine tests. As far as practical, the procedure of IEC shall be followed:

a) Construction Inspection
b) Safety interlock check
c) Functional checking of control circuits interlocks, tripping through protective relays.
d) Operating Speed Check
e) Dielectric test
f) Control and secondary wiring check test
g) Mechanical operation test
h) Operating mechanism system check
i) Voltage withstand test on auxiliary circuits
j) Measurement of resistance of main circuit of each pole
k) Power frequency voltage withstand test on main circuit of each pole and the combination of poles and breaker frame.

In addition to above the complete switchgear shall be subjected to following routine tests. As far as practical, the procedure of IEC shall be followed:

a) Construction Inspection
b) Dielectric test
c) Voltage withstand test on auxiliary circuits

d) Power frequency voltage withstand test on bus bar.

6.13.2 Design Tests

Following design tests shall be performed on the offered model.
The circuit breaker design tests shall include following:

a) Dielectric withstand test
b) Temperature rise test
c) Radio interference voltage test
d) Short-time withstand current and peak withstand current tests
e) Verification of the protection
f) Electromagnetic compatibility tests

The Bidder shall submit type test report as specified in section-2 of this specification for the circuit breaker of the offered model along with the bid.

6.13.3 Field Tests

After installation at Site, the circuit breaker shall be subjected to the following field tests:

a) Insulation resistance of each pole.
b) Check adjustments, if any suggested by manufacturer.
c) Breaker closing and opening time.
d) Trip free and anti pumping operation.
e) Minimum pick-up voltage of coils.
f) Dynamic Contact resistance measurement.
g) Functional checking of control circuits interlocks, tripping through protective relays.
h) Insulation resistance of control circuits, motor etc.
i) Checking of mechanical 'CLOSE' interlock, wherever applicable.
j) Resistance measurement of main circuit.
k) Checking of operating mechanisms
l) Check for annunciations.

The contractor shall ensure that erection, testing and commissioning of 11 kV Switchgear shall be carried out under the supervision of the circuit breaker manufacturer's representative. The commissioning report shall be signed by the manufacturer's representative.

6.13.4 Performance Guarantee

The performance guarantee figures quoted on the schedule of Technical Data shall be guaranteed within the tolerances permitted by relevant standard and will become a part of successful Bidder's Contract.

6.13.5 Drawings, Data and Manual

The outline drawings of the switchgear cubicle with accessories shall be furnished along with the Bid.
After award of Contract the successful Bidder shall submit the required number of copies of the following drawings and data for approval of the Employer.

a) General equipment layout
b) Outline drawings of switchgear with accessories

c) Loading data and foundation detail
d) Single and three Line diagrams of AC & DC circuits including relays, meters etc.
e) Elementary control wiring diagrams
f) Internal wiring diagrams
g) External connection diagrams, showing terminal boards and other external Connection points for each assembly and the required interconnecting wiring
h) Drawings showing typical cross-sections of the switchgear panel
i) Drawings showing assembly of principal component parts and accessories of circuit breaker
j) Drawings showing details of bus bar supporting arrangements.
k) Any other drawings and data required for design and installation of circuit breaker.
l) Instruction manual for storage, installation, operation and maintenance of circuit breaker and switchgear.
m) Instruction manual for Relays, meters, switches and other accessories.

6.13.6 Nameplate

Circuit breaker shall be provided with a nameplate of stainless steel material fitted in a visible position. It shall show the following items as a minimum.

a) Circuit Breaker
- Manufacturer's name
- Manufacturer's serial number and type designation
- Year of manufacture
- Rated voltage, kV
- Rated insulation level, kV
- Rated frequency, Hz
- Rated nominal current, A
- Rated short-circuit breaking current, kA
- Rated short circuit making current, kA
- Rated operating cycle (duty cycles)
- Rated short time current & duration, kA/s
- Rated operating sequence (duty cycles)
- Type of operating mechanism
- First pole to clear factor
- Rated interrupting time, cycles
- Weight of circuit breaker, kg

b) Switchgear cubicle
- Manufacturer's name
- Manufacturer's serial number and type designation
- Year of manufacture
- Rated voltage, kV
- Rated insulation level, kV
- Rated frequency, Hz
- Rated nominal current, A
- Rated short time current & duration, kA/s
- Rated control supply voltage, V

6.13.7 Special Tools

In addition to the tools, which are regularly furnished with such breakers, the Contractor shall also supply all necessary special tools or equipment for assembling and disassembling the breaker and/or other equipment/ accessories. The Contractor shall submit an itemized list of such equipment in the Price Schedule.

6.13.8 MINIMUM REQUIREMENT FOR SWITCHGEAR

Bus Coupler (if applicable)

- Copper busbars, rating shall be 2000A — 1 Set
- Epoxy resin insulated block type current transformer — 2 Nos.
  1st Core : 0.5 class 30 VA (for measurement)
  2nd Core : 5P20 30 VA (for protection)
- Breaker Carriage — 1No.

Cable Tags & Marker

Each cable and conduit run shall be tagged with numbers that appear in the cable and conduit schedule.
The tag shall be of aluminium with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG Gl wire.

Conforming to IS: 280. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables.

Location of cables laid directly underground shall be clearly indicated with cable marker made of galvanized iron plate. Location of underground cable joints shall be indicated with cable marker with an additional inscription "Cable joints". The marker shall project 150 mm above ground and shall be spaced at an interval of 30 meters and at every change in direction. They shall be located on both sides of road and drain crossings.
Cable tags shall be provided on all cables at each end Gust before entering the equipment enclosure), on both sides of a wall or floor crossing, ·on each duct/conduit entry and at each end & turning point in cable tray/trench runs.

Cable Termination and Connections

The termination and connection of cables shall be done strictly in accordance with cable and termination kit manufacturer's instructions, drawing and or as per instruction of the Employer.

Control cable cores entering control panel/switchgear/MCCB/MCC/Miscellaneous panels shall be neatly bunched, clamped and tied with nylon strap or PVC perforated strap to keep them in position.

The Contractor shall tag/ferrule control cable cores at all terminations, as instructed by the Employer. In panels where a large number of cables are to be terminated and cable identification may be difficult, each core ferrule may include the complete cable number as well.

Spare cores shall be similarly tagged with cable numbers and coiled up.

Double compression type nickel plated (coating thickness not less than 10 microns) brass cable glands shall be provided by the Bidder for all power and control cables to provide dust and weather proof terminations.

The cable glands shall conform to BIS: 6121. They shall comprise of heavy duty brass casting, machine finished and nickel plated, to avoid corrosion and oxidation.

Cable lugs shall be tined copper solder less crimping type conforming to IS-8309 & 8394. Bimetallic lugs shall be used depending upon type of cables used.

Installation of Cables

In general all power and control cables shall be in the cable trenches. In addition to the above, for lighting purpose also, cable trench can be used in outdoor area as far as possible.

Cabling in the Switchgear/control room shall also be done on ladder type cable trays.

For cables laid in conduits in out door area, conduits of 50 mm nominal outside diameter of class 4 as per IS 4985 shall be used, which shall be buried in the ground at a depth of 250mm below finish formation level. Separate PVC pipes shall be laid for control and power cables. Cable pull boxes of adequate size shall be provided if required.

Power and control cables in the cable trench shall be laid in separate tiers. The order of laying of various cables shall be as follows, for cables other than directly buried.

- Power cables on top tiers.
- Control instrumentation and other service cables in bottom tiers.

Single core cables in trefoil formation shall be laid with a distance of three times the diameter of cable between trefoil centre lines. Power cables from station transformer to main ACDB shall be laid with a minimum centre to centre distance equal to twice the diameter of the cable.

Power and control cables shall be securely fixed to the trays/supports with self locking type nylon ties with the interlocking facility at every 5 meter interval for horizontal run. Vertical and inclined cable runs shall be secured with 25 mm wide and 2 mm thick aluminium strip clamp at every 2m.

Cables shall not be bent below the minimum permissible limit.

Where cables cross roads, drains, these shall be laid in reinforced spun concrete or steel pipes buried at not less than one meter depth.

Cable Trays

Cable trays shall be used in control building and other areas within substation and within cable trenches outside substation area. The cable trays shall be of GS sheet and minimum thickness of sheet shall be2 mm. cable trays shall have 2.5 meter straight section and 150, 300 mm and 600 mm wide

Conduits, Pipes and Duct Installation

Bidder shall supply and install all rigid conduits, mild steel pipes, flexible conduits, Hume pipes etc. including all necessary sundry materials such as tees, elbows, check nuts, bushing, reducers, enlargers, coupling cap, nipples, gland sealing fittings, pull boxes etc. The size of the conduit/pipe shall be selected on the basis of 40% fill criterion.
Embedded conduits shall have a minimum concrete cover of 50 mm.

Size of conduit for lighting shall be selected by the Bidder during detailed engineering.

For directly embedding in soil, the conduits shall be coated with an asphalt-base compound. Concrete pier or anchor shall be provided wherever necessary to support the conduit rigidly and to hold it in place.

Conduit shall be installed in such a way as to ensure against trouble from trapped condensation.

FO cables shall be laid in galvanised steel (GS) conduits within cable trenches keeping proper clearance with HV cables

Special Requirements

The Contractor shall be responsible for estimating and supplying the quantity of various types and sizes of the cables. In course of actual execution, if it is found that additional cross sections, types or quantities of cables are required for the completion of the specified works the same shall be supplied without any additional charge to the employer.

Small cut piece lengths of cables will not be accepted. Cables up to 500 meters in length or as approved by Employer shall be of one length shipped in a drum of adequate size. For higher quantities, multiple lengths/drums may be shipped subject to the approval of Employer.

Drawings, Data & Manuals

The following information shall be furnished along with the bid.

a) Manufacturer's leaflets giving constructional details, dimensions and characteristics of different cables.
b) Current rating of cables including de-rating factor due to grouping, ambient temperature and type of various installation.

Tests

Routine and Design Tests

Power cable shall be subjected to following routine tests. As far as practical, the procedure of IEC shall be followed:

a) Measurement of the electrical resistance of conductor
b) Partial discharge test
c) Voltage test

Design Test

The power cable design tests shall include following:

a) Partial discharge test
b) Bending test, followed by a partial discharge test
c) Tan delta measurement
d) Heating cycle test, followed by a partial discharge test
e) Impulse test, followed by voltage test
f) Voltage test for 4 hours.

The Bidder shall submit type test report as specified in section-2 of this specification for the offered power cable along with the bid.

Field Tests

After installation at Site, cables shall be subjected but not limited to the following tests:

a) Continuity test
b) Measurement of insulation resistance
c) DC dielectric test

Performance Guarantee

The performance figures quoted on schedule of Technical Data shall be guaranteed within the tolerance permitted by relevant standards and shall become part of the Contract. In case of failure of the cables to meet the guarantees, the Employer reserves the right to reject the item. The Contractor shall have to rectify/replace the defect/defective part at no extra cost to the Employer and without delaying the commissioning schedule.

7. GROUND RODS AND CLAMPS

1. **Scope**

This Specification covers the fabrication and supply of galvanized steel ground rods and clamps for use in overhead power line construction.

2. **Description**

Ground Rod

2.1 The ground rod shall be made of high carbon, open-hearth steel so as to achieve maximum strength. It shall be hot dip galvanized.

2.2 The ground rod shall be 19mm in diameter and 4,000mm in overall length.

2.3 The driven end of the ground rod shall have a truncated cone point. The cone point shall be approximately 13mm long, measured along the axis of the ground rod. The driving head of the ground rod shall have an approximate 3 mm, 45 degrees chamfer.

2.4 The manufacturing process shall assure that ground rod does not bend when driven into hard soils.

Ground Rod Clamp

2.5 The ground rod clamp shall be heavy duty forged steel clamp provided with a hex head cup point set screw of high strength steel with machine-cut threads. It shall be so manufactured that it gives low resistance connection. The ground rod clamp shall be galvanized.

2.6 The clamp shall suitably accommodate and clamp a 19 mm. ground rod and a stranded grounding conductor of 7/12 SWG (7/2.50 mm) size (SPECIFICATION: S.P.18.0).

3. **Galvanizing**

3.1 The galvanization of ground rod and clamp shall be in accordance with IS: 2629-1985 or any revision thereof or other equivalent national or international standard provided that ensure at least equal or better quality to the standard mentioned above will also be acceptable.

4. **Tests**

Grounds rods and clamps shall undergo type and routine tests in accordance with the relevant governing standard.

INSPECTION, TESTING AND COMMISSIONING

1.1 SCOPE OF WORK

The whole of the Works supplied under the Contract shall be subject to inspections and tests by the Employer or their Representatives during manufacture, erection and after completion. The inspections and tests shall include, but not be limited to, the requirements of this section of the Specifications.

The Contractor shall provide all costs, appliances, apparatus, supervision, labor and services necessary to carry out all tests, unless specifically stated otherwise.

The Contractor shall furnish the detailed schedule of his commissioning plan at least one month prior to the scheduled date. The schedule shall include the commissioning procedures, testing sequences and details of special testing equipment, tests and commissioning record formats, information about relevant standards etc.

The scope of the commissioning program includes the site testing and putting into successful operation of all the equipment supplied under the Contract, for 33kV, 11kV, AC & DC plants and all secondary voltages systems. Testing of energy meters and certification of their accuracy shall also be included.

1.2 OBJECTIVES

The objectives of commissioning work, prior to the successful energization of Plant at full voltage and connection to the system, are the following:

- Confirm the integrity (correctness) of installation.
- Confirm the integrity of insulation, connections and phasing.
- Ensure proof of equipment characteristics.
- Review workmanship.
- Confirm the correct implementation of the design.
- Check equipment ratings.
- Check settings and operation of protective relays.
- Check and measure resistivity of earthing grid and earthing system.
- Confirm the proper functioning of SCADA system.

1.3 QUALITY ASSURANCE, INSPECTION AND TESTING

To assure that the supply and services under the scope of this Contract whether manufactured or performed within the Contractor's works or at his subcontractor's premises or at the Site or at any other place of work, are in accordance with the Specifications, the Contractor shall adopt suitable quality assurance program to control such activities at all points necessary. Such program shall be outlined by the Contractor and shall be finally accepted by the Employer after discussions before the award of the Contract. A quality assurance program of the Contractor shall generally cover, but not be limited to the following:

(a) His organization structure for the management and implementation of the proposed quality assurance program.

(b) Documentation control system.

(c) Qualification data for bidder's key personnel.

(d) The procedure for purchases of materials, parts, components, and selection of sub-contractors' services including vendor analysis, source inspection, incoming raw materials inspection, and verification of materials purchases.

(e) System for shop manufacturing including process controls and fabrication and assembly controls.

(f) Control of non-conforming items and system for corrective actions.
(g) Control of calibration and testing of measuring and testing equipment.
(h) Inspection and test procedure for manufacture.
(i) System for indication and appraisal of inspection status.
(j) System for quality audits.
(k) System for authorizing release of manufactured products to the Employer.
(l) System for maintenance of records.
(m) System for handling storage and delivery.
(n) A quality plan detailing out the specific quality control procedure adopting for controlling the quality characteristics relevant to each item of supply.

The quality plan shall be mutually discussed and approved by the Employer after incorporating necessary corrections by the Contractor as may be required.

- Quality Assurance Documents

  The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Employer's inspection of material/equipment.

  The Employer, through his duly authorized representatives, reserves the right to carry out Quality Audit and Quality Surveillance of the systems and the procedures of the Contractor's and the subcontractor's Quality Management and Control Activities.

- Inspection, Testing and Inspection Certificates

The Employer shall have the right to re-inspect at his expenses, any material though it would have been previously inspected and approved by him at the Contractor's works before, and if, after the same are inspected at Site following the latter, material is found defective, then the Contractor shall bear the cost of this inspection and reinstatement according to specification.

1.4 TESTS AT MANUFACTURERS WORKS

1.4.1 General

Where no specific test is specified, then the various items of materials and equipment shall be tested in accordance with the relevant British, IEC, or American Standards. Where no appropriate standard is available, tests shall be carried out in accordance with the maker's standard practice, which shall be subject to the Employer's approval.

At least fourteen days' prior notice, in writing or by tele-fax, shall be given to the Employer of the readiness of the plant for test or inspection and every facility shall be provided by the Contractor and sub-Contractor (s) to enable the Employer or their Representative to carry out the inspections and witness the tests. This includes progress, test rig and packing inspections also.

Inspection of equipment will not be carried out unless the Employer has approved copies of the relevant sub-orders, drawings and test procedures. No equipment shall be packed, prepared for shipment, or dismantled for the purpose of packing for shipment, unless it has been satisfactorily inspected, or inspection has been waived by the Employer.

Functional electrical and mechanical tests shall be carried out on the completed plant after assembly in the Works. The extent and method of recording the results shall be agreed by the Employer in sufficient time to enable the tests to be satisfactorily witnessed or to make any changes to the proposed program of tests. All instruments and apparatus used in the performance of the tests shall be subject to the approval of the Employer and, if required by the Employer, shall be calibrated to an agreed standard at a laboratory of national standing to be nominated by the Contractor and approved by the Employer. The costs of carrying out such calibration shall be borne by the Contractor in all cases.

The costs of making/performing any test shall be borne by the Contractor. This shall apply to tests performed at the site or elsewhere.

After receiving the prior information about the completion of manufacturing at the factory, the Employer will depute his personnel to the Contractor's factory to witness the fabrication, assembly and testing of any or all parts of major equipment. The number of the Employer's personnel and equipment to be witnessed will be as listed below. The duration of such visits shall be as per inspection/testing requirements. The Employer shall bear the cost of associated with to and fro travel, daily allowances, accommodation etc. of the inspection personnel. The Employer may hire the services of the third party for the inspection.

1) 33kV Vacuum Circuit Breaker – 2 persons, 1 visit
2) Control & Relay Panel (Transformer and Line Protection) - 2 persons, 1 visit
3) Disconnecting Switch and Lightning Arrestor – 2 persons, 1 visit
4) Battery and Charger – 2 persons, 1 visit

The Inspection and Testing works of the power transformer and all other materials shall be carried out at the manufacture's Factory premises. The minutes of meeting of the inspection and testing works shall be prepared. The inspection reports as well as minutes of meeting shall be mentioned with, whether the results of inspection and testing comply with the Technical Specifications of the contract agreement or not. After successful inspection and testing, the power transformers and other materials shall be sealed and packed in presence of the Employer's inspectors/representative(s) and the same materials shall be dispatched. The photographs of

the sealing/packing/of materials along with the inspectors/representative(s) of the Employer / contractor / manufacturer shall be submitted with the inspection and testing report.

Upon arrival the power transformers and other electrical equipment shall be subjected to the test at NEA owned or nominated lab as per technical specifications.

1.4.2 Test Certificates

Within 30 days of the completion of any test, triplicate sets of all principal test records, test certificates and performance curves shall be supplied to the Employer.

These test records, certificates and performance curves shall be supplied for all tests, whether or not they have been witnessed by the Employer or his representative. The information given on such test certificates and curves shall be sufficient to identify the material or equipment to which the certificate refers and should also bear the Contract reference title. Specified requirements shall be shown on each certificate for comparison with actual test results.

When all equipment has been tested, test certificates of all factory and site tests shall be compiled by the Contractor into volumes and bound in an approved form complete with index. Two copies of each volume shall be supplied to the Consultant and five copies to the Employer.

1.4.3 Type Tests

Type tests are required to prove the general design of the equipment and the Contractor may submit certificates of such design tests, which have been carried out on identical equipment. Notwithstanding any provision in BS, IEC or ANSI Standards, the Employer shall have the right to accept such certificates in lieu of the specified type tests or to reject them.

The type tests prescribed shall be carried out at the Contractor's cost in all cases, where either such certificates are not available or are rejected by the Employer.

1.5 RESPONSIBILITIES

To ensure that the test jurisdiction and transfer of responsibilities is regulated by strict safety and handover procedures, the Contractor agrees the interface with the Employer to establish and implement handover procedures consistent with the terms of these Specifications.

The Employer shall retain full jurisdiction over all commissioning activities, which may affect the operation of the existing system. In these circumstances and when so requested, shall provide technical advices and assistances.

The Contractor shall be responsible for technical guidance and assistance in establishing the scope and method of tests, witnessing of the testing, assessment of results, and re-negotiation of the changes in test schedules which may be necessary as a result of other circumstances, such as delays in the delivery, possible equipment failures.

1.6 SAFETY PROCEDURES

The Contractor shall share the responsibility for safety procedures with the Employer. The Contractor shall establish and implement a work permit and tagging system and associated safety procedures (subject to the review of Employer) for all equipment, systems and areas not covered by the Employer's safety procedures.

The Employer will assume responsibility for the establishment and implementation of tagging, safety and work permit procedures for the protection of personnel and equipment, as soon as equipment and systems are connected to or are energizeable from the existing system.

1.7 TRAINING OF THE EMPLOYER'S STAFF

The Contractor shall plan for the Employer's staffs' participation, either continuously or on a regularly recurring basis, in the commissioning work and:

Allow the Employer's staffs to become familiar with the operating and maintenance aspects of the new equipment supplied by him,

Maintain a continuing assessment with the Employer of the precautions required in or possible consequences of, initial energization of equipment, Allow for the above two necessary objectives in the preparation of schedules.

The Contractor shall station at site, at least, one technical expert for a minimum of six months continuously after commissioning to rectify any problems, as well as train the Employer's attending staffs. If required, the length of his stay shall be extended as per requirement, which shall be at the Employer's discretion.

1.8 COMMISSIONING STAFF

The Contractor shall provide commissioning personnel including skilled and unskilled labor as required. Submit a list with names, experience and proposed duration of the stay of key personnel on site, consistent with the construction schedule, along with the commissioning program.

Ensure that only staffs assigned to commissioning fulfills that duty for the duration of the assignment.

Ensure that commissioning staffs have authorization, and the competence, to undertake minor repairs or to make temporary redesigns and to reconnect systems to meet the specified system performance to preclude delays in energization and putting into commercial service of any part of the works.

1.9 TEST EQUIPMENT

The Contractor shall ensure that all instruments, tools and other equipment required for testing and commissioning are available on site, ensure that the test equipment is of satisfactory quality and condition and, where necessary, is calibrated by an approved authority or standard.

Make arrangements for the provision of power supplies for testing with necessary vector configuration, voltage and current rating.

1.10 COMMISSIONING PROGRAM

Prepare a commissioning program for approval by the Employer and for incorporation into the Project master construction program. Allocate adequate time in this program to permit full commissioning of all components.

Carry out all testing during normal working hours as far as practicable. Tests, which involve existing apparatus and system outages, may be carried out outside normal working hours. Give the Employer sufficient notice to allow for the necessary outage arrangements to be made in conformity with the testing program.

Note that no tests listed in the agreed program will be waived except upon the instructions or consent of the Employer in writing.

1.10.1 Test Procedures

The following basic tests, in addition to others, shall be carried out:

- Measurement of insulation resistance.
- AC withstand voltage test

1.10.2 Requirements for Field Tests

The field tests shall be carried out in presence of Employer under the following conditions:

AC withstand test voltages for conductors and outdoor equipment shall be normal operation voltage of the transmission line and, withstand voltage test shall be carried out for ten (10) minutes by the normal voltage mentioned above. The field tests shall be carried out by the Contractor after adjustment of all the equipment have been completed.

Expandable and lead wires and other materials required for the field tests shall be arranged by the Contractor. The Contractor shall be responsible for providing all measuring instruments, test equipment and tools required for the tests.

Preparation of the test record sheets and test reports shall be the responsibility of the Contractor and the results of the field tests shall be submitted by the Contractor for Employer's approval.

Measurement of insulation resistance of the equipment shall be performed by at least 1000 V meggar.

After completion of the measurement of insulation resistance mentioned above, ac withstand voltage test shall be performed by the normal operation voltage of the existing power system in accordance with the following procedure:

- 11 and 33 kV Main Circuit: The 11 kV and 33 kV circuit breakers and disconnecting switches, except for circuit breakers receiving power for the test from the existing power system through a transmission line, shall be closed, succeeding, normal operation voltage shall be charged on the equipment and bus conductors for ten (10) minutes for ac withstand voltage test. The indication value of meters mounted on

the board during the ac withstand voltage test shall be recorded on the test record sheets prepared by the Contractor.

Submit test procedures, consisting of detailed test methods and samples of the related test record forms, for all equipment to be tested, to the Employer for approval along with the commissioning program. Strictly adhere to these procedures for the commissioning tests.

1.10.3 Records

Maintain an up-to-date record of all commissioning activities on site.

Record the results of the tests clearly on forms and formats approved by the Employer and with clear references to the equipment and items tested, so that the record can be used as the basis for maintenance tests, in future. Submit the required number of site test records to the Employer as soon as possible after completion of the tests.

Record the details of the test equipment and instruments used in the test sheets, in those cases where the instrument or equipment characteristics can have a bearing on the test results.

1.10.4 "As-Built" Drawings

Keep an ongoing record of all changes on a master set of drawings. Produce and supply a minimum of five complete sets of marked-up "As Constructed/As-Built" drawings before leaving the Site. Correct and re-issue the original drawings as soon as possible as per this specification.

1.10.5 Test Methods

Carry out all necessary tests for commissioning the substations. The following clauses detail the tests which are considered to represent the minimum required in addition to those specified under the appropriate IEC Publications, other approved standards and the manufacturer's instructions for each item of equipment.

Strictly adhere to the methods of testing approved by the Employer.

A) Site and Commissioning Tests for Main and Auxiliary Equipment

General Checks:

Make a general check of all main and auxiliary equipment. Include a check of the completeness, correctness and condition of ground connections, labeling, arcing ring, paint surfaces, cables, wiring, pipe-work, valves, blanking plates and all other auxiliary and ancillary items.

Check for oil and gas leaks and that insulators are clean and free from external damage. Check that loose items, which are to be handed over to the Employer, e.g., blanking plates, tools, spares, etc. are in order and are correctly stored or handed over.

Circuit Breaker Tests

Check and set pressure switches settings when required. Also test mechanical operating systems.

Carry out contact resistance tests. In the case of multi-interrupter circuit breakers, perform resistance tests at each interrupter or pair of interrupters as well as through the series of interrupters on each pole.

Test local and remote trip/close operation and perform circuit breaker and auxiliary contact timing tests on all circuit breakers.

Control/ Relay Panels, energy meters and Switchboards

Carry out general testing and inspection, as referred to above. The Contractor shall also carry following tests: a) Carrier signal testing b) protective relay testing c) Instrument transformers testing c) Phase correcting testing. Functionally test and perform the timing tests on circuit breakers and AC and DC circuits, associated with stand-by auxiliary supplies and stand-by generating sets, particularly where automatic operation is defined.

Carry out insulation measurement tests of secondary circuits with a 1000 V DC megger before and after high voltage testing.

Check shutters, interlocking, earth procedures and the inter-changeability of components.

Carry out a high voltage 50 Hz dielectric test on each bus at 75% of the specified value for the equivalent factory test.

Disconnecting Switch and Earth Switches

Test all disconnecting switch and earth switches operationally to confirm contact pressures, contact resistance, simultaneous-operation of all phases and the ease of operation.

Check the local and remote indications and the operation of auxiliary contacts. Check the earthing mat at the operating positions and check the availability of connecting points for maintenance earthing arrangements.

Test the earth switches and maintenance earthing devices to confirm the opening and closing sequences and check the ground mat connections, indications and manual locking devices.

Lightning Arresters

Inspect and verify the condition and satisfactory mounting of the arresters and their earth connections, electrodes and operation counters. Note the counter readings.

Busbars and Connections

Test flexible bus bars and connections to ensure that the correct tensions, sags and clearances will be maintained over the range of environmental conditions and loads without stress to other equipment. If dynamometers are used to check the sags and tensions, check them before and after use.

Check rigid bus bars and connections to ensure that the bus bars will not cause overloading of the supporting insulators under load conditions and under the range of climatic variations applicable to the Site. Ensure that expansion and contraction of the equipment is fully accommodated by flexible connections.

Test conductivity on selected connections and joints.

Perform high voltage DC tests on all HV cables and isolated phase bus bars at 75% of the specified value for the equivalent factory test. Carry out with at least 1000 V DC meggar the insulation measurement test, before and after high voltage tests.

Batteries and Battery Charging Equipment

Test the insulation to earth of the complete DC system. Test the batteries and chargers to confirm the charger ratings, adjustment, alarm systems and battery capacity for the specified length of time at maximum expected loading. Record the specific gravity and cell voltages of the batteries during the initial charge and when fully charged and maintain proper regular records until the battery is taken over by the Employer.

Interlocking: Check all interlocking arrangements, both electrical and mechanical.

B)Earthing System

Carry out the tests and measurements in accordance with IEEE Standard 80. Test the effectiveness of the bonding and earthing and make conductivity tests on selected joints on the main earthing system and at the connections to equipment and structures. Check the precautions taken to avoid corrosion attack on the earthing system.

Measure the resistance of the earthing system to the remote earth indicating method and equipment used. Separate test probes of minimum 300 to 600 meters length to effectively test the earthing system. Perform earthing resistance measurements with the transmission line earth wires disconnected from the grounding grid.

C) Area Lighting

Check all lighting circuits including the operation of relevant photoelectric cells and remote/local commands. Measure the lighting levels throughout the substation on horizontal surface 800 mm above ground level and on all vertical surfaces of transformers, marshaling kiosks, etc. Measure the lighting levels in the area surrounding the substation up to 20 m from the fence.

D) Particular Constraints and Special Tests

The Contractor shall be prepared to cooperate with any special tests requested by the Employer.

8. Transportation of Electrical Item

The Contractor is required to Transport The Item stated in table 8.1 from Premise of Madi Substation, Chitwan to Premise of Bhiman Substation , Sindhuli . The necessary Insurance Provision should be provided by Contractor himself .

Table 8.1

1	36 kV, 1250 A, 25 kA Outdoor Type, Vacuum Circuit Breaker with Accessories all Complete	2	set
2	36 kV, 800 A, 25 kA, Disconnecting Switch with earth switch including accessories all complete	1	set
3	36 kV, 800 A, 25 kA, Disconnecting Switch without earth switch including accessories all complete	2	set
4	600-400-200/5A Current Transformer for 33 kV with accessories all complete as specified (3 numbers in one set)	2	set
5	30 kV, 10 kA, lighting arrestor with accessories all complete (3 numbers in one set)	2	set
6	33 kV Protection Line Control and Relay Panel complete with all accessories as per specification for Line Bays	1	set

TECHNICAL DATA SHEET
(Electrical Equipment)

(To be filled in by the Bidder/ Manufacturer)

DISCONNECTING SWITCH

S. No	Description	Unit	NEA requirement	Bidders Offer
1	Manufacturer and Country of Origin			
	Model No.			
2	Year of manufacturing experience			
3	Applicable Standard		IEC	
4	Type		3 pole, single throw, outdoor, center rotating or center break	
5	Frequency	Hz	50	
6	Rated voltage			
	Nominal	kV	33	
	Maximum	kV	36	
7	Rated Current			
7.1	Continuous at 45 deg C ambient	A	800	
7.2	Short time for 3 sec at max kV	kA	25	
7.3.	Peak short time current	kA	32	
8	Temperature rise above 45 deg C ambient at Normal rated current			
8.1	Contacts	deg C		
8.2	Current carrying parts	deg C		
9	Maximum current the switch can safely interrupt			
9.1	Bus/Line charging current	A		
9.1	Potential transformer magnetizing current	A		
10	Clearance			
10.1	Between live parts and ground	mm		
10.2	Between fixed contact and blade in open position	mm		
11	Insulation level			
11.1	Impulse withstand voltage(peak)	kV	170	
11.2	Power frequency withstand voltage (1min,rms)	kV	75	
12	Main contacts			
	Material of fixed contact		Silver coated copper alloy	
	Coating of fixed contact		Silver coated copper alloy	
	Material of moving contacts		Silver coated copper alloy	
	Coating of moving contacts		Silver coated copper alloy	
	Material of the contacts of the earthing switch		Silver coated copper alloy	
	Coating of the contacts of the earthing switch		Silver coated copper alloy	
13	Material of Terminals			
13.1	Coating of terminals			
14	Operating mechanism		Motor operated and manual	
15	Auxiliary Contacts			
15.1	Type	Convertible or fixed	Convertible	

15.2	Continuous current at 110 V DC	A		
15.3	Material		Copper	
15.4	Contacts silver plated	Yes/No	Yes	
16	No of operation switch can withstand without deterioration of contact	No		
17	Type of interlock furnished		Electrical and mechanical	
18	Are the disconnector and the earthing switch mechanically interlocked to each other	Yes/No	Yes	
19	Insulator			
19.1	Manufacturer			
19.2	Type			
19.3	Ref Standard			
19.4	No of units per stack			
19.5	Power frequency withstand voltage			
	Dry	kV		
	Wet	kV		
19.6	Impulse withstand voltage (1min)			
19.7	Creepage distance in Air	mm		
19.8	Tensile strength			
19.9	Cantilever strength			
19.10	Compression strength			
19.11	Torsional strength			
20	Enclosure Protection		IP-55W	
21	Operating mechanism		Motor operated and manual	
22	Type of interlock furnished		Manual	
23	Weight of Isolator	kg		
24	ISO 9001 holder	Yes/No	Yes	
25	ISO 9001 certificate submitted	Yes/No	Yes	
26	Type test certificate submitted	Yes/No	Yes	

Signed……..

As Representative for…….

Address…… Date……

33kV CONTROL AND RELAY PANEL

S. No	Description	Unit	NEA requirement	Bidders Offer
1	Control and relay panel type			
1.1	Manufacturer and Country of origin			
1.2	Year of manufacturing experience	Years		
2	Control switches			
2.1	Manufacturer and Country of origin			
2.2	Type			
2.3	Current Rating	A		
2.4	Catalog Furnished	Yes/No	Yes	
3	Push Botton			
3.1	Manufacturer and Country of origin			
3.2	Type			
3.3	Contact rating continuous	Amp		
	Making current	Amp		
	Breaking current	Amp		
3.4	Catalog Furnished	Yes/No	Yes	
4	Indicating Lamps			
4.1	Manufacturer			
4.2	Voltage ratings	V		
4.3	Wattage	W		
5	Indicating instruments			
5.1	Ammeter			
	Manufacturer and Country of origin			
	Type		Digital	
	Current Range (400-200-100/5 Amp CT operated)	A		
	Accuracy Class		0.5	
	Scale			
	Type of scale			
	Range of indication (400-200-100/5 Amp CT operated)	A	0-100 0-200 0-400	
	Lineal/ Non linear			
	Overloaded range	%	1.5	
	VA burden			
	Catalog furnished	Yes/No	Yes	
	Transducer operated	Yes/No		
6	Voltmeter			
	Manufacturer and Country of origin			
	Type		Static	
	Accuracy class		0.5	
	Scale			
	Range of indication	kV	0-36	
	Linear/Non linear			
	Over scale range	%	1.1	
	VA burden	VA		

	Catalog furnished	Yes/No	Yes	
	Transducer operated	Yes/No	Yes	
7	Apparent power meter (kVA)			
	Manufacturer and Country of origin			
	Type		digital	
	Rated voltage	kV	33/√3:0.11/√3	
	Rated current	A	400-200-100/5	
	Current range (Transducer operated)	mA		
	Accuracy class		0.5	
	Scale	MVA		
	Type of scale			
	Range of indication		0-10	
	Linear/Non linear			
	VA burden			
	Current coil	VA		
	Voltage coil	VA		
	Catalog furnished	Yes/No	Yes	
	Transducer operated	Yes/No	Yes	
8	kWH Meter			
	Manufacturer and Country of origin			
	Type		TOD (static)	
	Applicable standard		IEC	
	Accuracy class		0.2	
	Import Export meter provided	Yes/No	Yes	
	Rated voltage	kV	33/√3:0.11/√3	
	Rated current	A	400-200-100/5	
	VA burden			
	Current coil	VA		
	Voltage coil	VA		
	Impulse contact provided 1pulse 100kW	Yes/No	Yes	
	Reverse rotation locking mechanism provided	Yes/No	Yes	

9	Power factor meter			
	Manufacturer and Country of origin			
	Type		Digital	
	Accuracy class		0.5	
10	Annunciators			
	Manufacturer and Country of origin			
	Type			
	Manufacturer's type designation			
	Catalog furnished	Yes/No	Yes	
	Number of inputs (annunciator/event)			
	Number of active points	Nos	24	
	Number of rows		4	
	Number of column		6	
	Type of mounting		Flush	
	Replacement of individual inscription plates and lamps from front panel possible	Yes/No	Yes	
	Sequence of operation as per specification	Yes/No	Yes	

11	Protective Relays			
11.1	Phase Over Current Relay			
	Manufacturer and Country of origin			
	Type		Numerical	
	Manufacturer's type designation			
	Applicable standards		IEC	
	Triple pole or single pole		Single*3	
	Current setting range	% of rated current	5-250%	
	Operating time at 10 times current settings (for TDS=1)	sec	3	
	Reset time	ms		
	Characteristics		IDMT (Standard inverse)	
	Instantaneous unit provided	Yes/No	Yes	
	Current setting range	% of rated current	500-2000%	
	Operating range			
	No Contacts			
	Insulation test as per IEC	Yes/ No	Yes	
	Indication			
	Hand reset flags provided	Yes/No	Yes	
	Light emitting diode provided	Yes/No	Yes	
	Auxiliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test Certificate submitted	Yes/No	Yes	
11.2	Earth fault relay			
	Manufacturer and Country of origin			
	Type		Numerical	
	Manufacturer's type designation			
	Applicable standard		IEC	
	Triple pole or single pole		Single	
	Continuous overload capacity	x In		
	Current setting range	% of rated current	5-250%	
	operating time at 10 times current setting (for TDS=1)	sec	3	
	Characteristics		IDMT (Standard inverse)	
	Instantaneous unit provided	Yes/No	Yes	
	Current setting range	% of rated current	500-2000%	
	Operating range			
	No Contacts			
	Insulation test as per IEC	Yes/ No	Yes	
	Indication			
	Hand reset flags provided	Yes/No	Yes	
	Light emitting diode provided	Yes/No	Yes	
	Auxiliary DC supply	V	110	

	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.3	Differential Relay			
	Manufacturer and Country of origin			
	Standard reference			
	Type			
	Voltage rating	V	110	
	Type of Mounting		Flush	
	Operating time setting	ms	<30	
	Sensitivity setting		10-50%xIn	
	Bias setting			
	CT ratio Compensating range			
	Burden for Current Circuit	VA		
	DC Burden	VA		
	Tripping	A		
	Making Current	A		
	Closing load (At 110V DC)	A		
	Ambient Temperature Range	Deg C		
	Auxiliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.4	Auxiliary Tripping and Lockout Relay			
	Manufacturer and Country of origin			
	Type			
	Manufacturer's type designation			
	Applicable standard		IEC	
	Operating Time	ms	<15	
	Does the lockout relay reset by the manually operated or electrically operated reset device			
	Is the cut off contact provided to interrupt the operating coil	Yes/No	Yes	
	Contact rating at 125V DC	A		
	Auxiliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.5	Break Fail Lockout Relay, 86K			
	DC Voltage Rating	V	110	
	Nos. of electrically separate No and NC Contacts			
11.6	Break Failure Lockout Relay BF			
	DC Voltage Rating	V	110	
	Nos. of electrically separate No and NC Contacts			
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
12	Construction of Control and Relay Panel			
	Type		Simplex	
	Manufacturer's type designation			

	Applicable Standard			
	Control panel furnished as per specification	Yes/No	Yes	
	Enclosure protection class	IP	IP54	
	Thickness of sheet metal used			
	Front and rear portion	mm	>3	
	Side top and bottom cover	mm	>2	
	All instruments, meters, relays and control switches flush or semi flush type		Flush	
	Ground Bus			
	Material		Copper	
	Size	mm x mm		
	Internal Wiring			
	Type of Insulation			
	Voltage Grade of Wires	V	600	
	Cross Section of Wires	sq.mm	2.5 min	
	Current Circuit			
	Voltage and auxiliary circuit			
	Over all dimension of control board	cu mm		
	Shipping data			
	Size of large package	mm x mm x mm		
	Weight of heaviest package ISO 9001 holder ISO 9001 certificate submitted	kg Yes/No Yes/No	 Yes Yes	

Signed……..

As Representative for……..

Address…… Date……

CONTROL CABLE

S. No	Description	Unit	NEA requirement	Bidders Offer
1	Manufacturer and country of origin			
2	Manufacturer's type designation			
3	Type			
4	Applicable Standards		IEC	
5	Voltage ratings			
	Suitable for max. system voltage	V	1000	
	Voltage grade of the cables	V	600	
	Rated voltage between each conductor and screen	V		
	Rated voltage between two conductors	V		
6	Conductor material		Copper	
7	Conductor			
	Cross section of wires	sq.mm		
	Nos & dia of each core in cable			
	Overall jacket of thickness			
8	Insulating material		Polyethylene	
9	Overall jacket material		PVC	
10	Net weight of the cable	kg/m		
11	Standard drum length	m		
12	Continuous current at 45 deg C			
	in ground			
	in duct			
13	Electrical parameters			
	Resistance	Ohm		
	Reactance	Ohm		
14	Technical literature submitted	Yes/No	Yes	
15	Type test certificate submitted	Yes/No	Yes	
16	Delivery of equipment in months following award of contract ISO 9001 holder ISO 9001 certificate submitted	Months Yes/No Yes/No	 Yes Yes	

Signed……..

As Representative for…….

Address…… Date……

GROUNDING SYSTEM

S. No	Description	Unit	NEA requirement	Bidders Offer
1	Main ground grid conductor material		Copper	
2	Main ground grid conductor size	sq.mm		
3	Depth of buried main ground conductor			
4	Material of riser		Copper	
	Cross section of riser conductor	sq.mm	100	
5	Type of joint above and below ground level			
6	Ground electrode			
	Material		Copper clad steel	
	Diameter	mm	16	
	Length	m	as per IEEE 80	
7	Fench grounding included			
8	Cross section of conductor rise for fench ground	sq.mm		
9	Fench separately grounded by electrode	Yes/No	Yes	
10	Calculation for grounding grid length and conductor size furnished	Yes/No	Yes	
11	Earthing systen designed for	ohm	<1	

Signed……..

As Representative for……..

Address…… Date……

MISCELLANEOUS MATERIALS

S. No	Description	Unit	NEA requirement	Bidders Offer
A	Strain bus and fittings			
1	Manufacturer and country of origin			
2	Nominal sectional area			
3	Nos and Size of wires			
	Aluminum			
	Steel			
4	Overall diameter	mm x mm x mm		
	Steel core			
	Complete conductor			
5	Continuous current at 45 deg C	A		
6	Ultimate tensile strength			
7	Short circuit current 1 sec			
8	Resistance	ohm		
9	Weight	kg		
B	Fittings			
1	Manufacturer and country of origin			
2	Material			
C	Suspension and tension insulators			
1	Manufacturer and country of origin			
2	Manufacturer's type designation			
3	Applicable standard			
4	Size			
	Diameter	mm	254	
	Height	mm	146	
5	No of units per string	No	11	
6	Combined electrical and mechanical failing load	kg	12000	
7	Creepage distance per unit	mm	292	
8	Impulse withstand voltage	kV	120	
9	Dry power frequency withstand voltage	kV	78	
10	Wet power frequency withstand test	kv	45	
11	puncture voltage	kV	120	
12	Technical literature submitted	Yes/No	Yes	
13	Type test certificate submitted	Yes/No	Yes	
D	Post insulator			
1	Manufacturer and country of origin			
2	Manufacturer's type designation			
3	Applicable standard			
4	Rated system voltage	kV	33	
5	Maximum rated voltage	kV	36	
6	Unit size (Diameter)	mm		
7	Unit size (length)	mm		
8	Creepage distance	mm	>900	

9	Insulation level			
	Impulse withstand voltage	kV	170	
	Power frequency withstand voltage (1 min rms)	kV	95	
10	Failing load (bending)	kg		
11	Failing load (torsion)	kg-m		
12	Technical literature submitted	Yes/No	Yes	
13	Type test certificate submitted	Yes/No	Yes	
E	ACSR Conductor			
1	Manufacturer and country of origin			
2	manufacturer's type designation			
3	Applicable standard			
4	Unit size(dia x No of strands)			
5	Overall cross sectional area			
6	Technical literature submitted	Yes/No	Yes	
7	Type test certificate submitted	Yes/No	Yes	
F	Earth Wires			
1	Manufacturer and country of origin			
2	manufacturer's type designation			
3	Applicable standard			
4	Unit size(dia x No of strands)			
5	Overall cross sectional area			
6	Technical literature submitted	Yes/No	Yes	
7	Type test certificate submitted	Yes/No	Yes	

Signed……..

As Representative for……..

Address……

Date……

CIVIL WORKS

1 GENERAL

This specification covers the general requirements for Design, Manufacture, Test, Supply and Construction of Civil works necessary for the erection of Equipment at the various substations.

The Contractor shall perform the works to meet the requirements of this Specification, the attached drawings and the relevant Articles in these Contract Documents.

2 STANDARD AND REFERENCES.

All equipment, materials, fabrication and tests under these Specifications shall conform to the latest applicable standards, manuals and Specifications contained in the following list or to equivalent applicable standards, manuals and Specifications established and approved in the country of manufacturer, and approved as equal by Employer.

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standard Institute
ASCE	American Society of Civil Engineers ASTM
	American Society for Testing Materials AWS
	American Welding Society
JIS	Japanese Industrial Standards
DIN	Dueches Industries Norms

Any details not specifically covered by these standards and Specifications shall be subject to approval of Employer. In the event of contradictory requirements between the standards and these Specification requirements, the terms of the Specifications shall apply.

Unless specifically mentioned reference to standards and specifications or to equipment and materials of the particular manufacture shall be considered as followed by "or equivalent". The Contractor may propose equivalent specifications, materials or equipment, which shall be equal in every respect to that specified. If the Contractor for any reason proposes equivalents to or, deviates from, the above standard, the Contractor shall state the exact nature of the change and shall submit complete specifications of the materials, as well as copies of pertinent standards, for the approval of Employer and decision of Employer in the matter of quality will be the final.

3 SCOPE OF WORKS

3.1 Site Installation. All offices, housing facilities, plants and equipment, temporary structures and works, temporary construction and access road and everything else which will be used or needed for the performance of the Works shall be considered part of the Contract.

The Contractor shall perform detailed design for each structure and on the basis of the design criteria and codes or regulations of international standards.

Prior to proceeding with the design work, design conditions or design values that shall include other allowable stress safety factor, load conditions, and applicable standards shall be approved by Employer.

The Contractor shall submit to Employer for approval the Contractor's drawing, structural and other calculation sheets, bill of materials, construction method and schedule for the construction of civil works.

In case modification of detailed design of civil work is required, the Contractor shall promptly inform Employer and shall submit modified drawings to Employer for approval.

No separate or direct payment will be made to the Contractor for design works. All costs incurred in connections therewith shall be included in the unit/lump sum bid prices for the construction of various structures, foundations, etc.

4 FOUNDATIONS AND CONCRETE WORK.

4.1 Foundation Works

4.1.1 General Requirement.

The design of the foundation for all the substation steel structures, electro-mechanical equipment"s, control building to be constructed shall be the responsibility of the Contractor. All designs and details shall be subject to approval of Employer. Approval of designs by Employer in no way relieves the Contractor of responsibility for an inadequate foundation design.

Where new transformers are to replace existing transformers, the Contractor shall investigate the technical feasibility of using the existing foundations for the new transformers. In case, the existing foundations are not suitable, the Contractor shall remove them from site.

Design loads

Foundations shall be actual working loads applied to the foundations by the equipment and structures. The foundations shall be designed to resist all vertical and lateral forces, uplift forces and overturning moments with a minimum factor of safety of 1.5.

Bearing loads

The Contractor shall use an allowable soil bearing pressure of 1.0kg/sq.cm for the design of the foundation for the purpose of bidding, but this is only reference value. After award of Contract, the Contractor shall carry out detail soil test and detail design of foundation based on the soil test result. There may be variation in the volume of work in final design compared to the bidding design, for which the Contractor will not get any extra payment.

Uplift and overturning loads

The uplift and overturning resistance of concrete spread footings shall be assumed as the weight of a volume of earth in the form of an inverted frustum of a cone or pyramid. The cone or pyramid height shall be 30 cm less than the depth from finish grade to the top of

the concrete mat, the base area shall be the top area of the mat and the top area shall be determined by the intersection of planes starting at the mat edges and sloping outward at a 20 degree cone angle from the vertical and the horizontal plane 30 cm below finish grade.

Unit weights for overturning resistance

The following unit weights shall be used for design:

(a) Soil 1,200kg/m^3

(b) Concrete 1,600kg/m^3

4.1.2 Details

Detail Calculation

Detail calculations for each type of foundation shall be submitted for approval of Employer. Such details shall show the following requirements:

(a) Calculation of loads acting on foundation under different conditions.

(b) Calculated safety factor for each type of stability and condition.

(c) Maximum stresses in concrete and in steel reinforcement at any critical section.

Line and Grade

The Contractor shall provide all lines and grades or elevation of the ground at each footing and set the necessary stakes that are required for the work and will be held responsible for their accuracy. Employer may check lines and levels set by the Contractor from time to time, but the responsibility for their accuracy shall rest entirely with the Contractor.

Detail Drawings

Details of each type of foundation submitted for Employer's approval shall be as shown on the approved design drawings and shall conform to the requirements described hereafter. No change shall be made without the written approval of Employer. The detail drawings shall at least include:

(a) Detail dimensions of foundation.

(b) Detail of setting dimensions of foundation.

(c) Details of placing of all reinforcing steel which shall conform to the Building Code Requirements for Reinforced Concrete (ACI 318) and the Manual of Standard Practice of Detailing Reinforced Concrete Structure (ACI 315) unless otherwise as specified herein.

(d) Details of type, size and length of each reinforcing steel including details of bar bending.

5 EARTH WORK

Earth work

Excavation

Excavation shall conform to the dimensions and elevations as shown on the approved drawings. The general cut slope shall not be steeper than 1: 1.5; however, where the Contractor shall not excavate the slope to satisfy the condition above, temporary supports to the sides of excavations shall be required by means of timbering, sheet piling or shoreing.

When foundations rest on an excavated surface other than rock, special care shall be taken not to disturb the bottom of the excavation. When subsoil for foundations become mucky on top due to construction operation

or any other reason, such subsoil shall be removed and replaced by one or more layers of compacted sand or compacted crushed rock, as directed by Employer.

Excavated materials suitable for use as backfill shall be deposited by the Contractor in storage piles at the area approved by Employer. However, surplus excavated materials shall also be hauled and transported to the disposal area designated by Employer.

Backfill

The Contractor shall place and compact the backfill materials to the lines, grades and dimensions to be shown on the approved drawings. The materials to be used for backfill, the amount thereof and the manner of depositing the materials shall be approved by Employer.

Payment

No separate or direct payment will be made to the Contractor for earth work in foundations. All costs incurred in connections therewith shall be included in the unit/lump sum bid prices for the construction of various foundations, etc.

6 CONCRETE WORKS

Concrete work shall mean and include all and every concrete work for the civil work. The Contractor shall perform the concrete work in strict conformity to the Specification and as directed by Employer and shall inform Employer at least 24 hours in advance, of the times and places at which he intends to place concrete.

6.1 Composition of Concrete

General Mix Composition

The concrete shall be composed of cement, fine aggregate, coarse aggregate, water and admixtures as specified. All materials shall be well mixed and brought to the proper consistency.

The mix proportions shall be as follows:

Minimum compressive strength (28 days)	210 kg/cm^2 Minimum
cement content	300 kg/cm^3
Maximum water cement ratio	0.6
Maximum slump	10 cm.

The detailed mix proportion shall be submitted to Employer for approval on the basis of producing concrete having suitable workability, consistency, density, impermeability, durability, and required strength, with concrete compressive strength test records. If 210 kg/sq.cm. Strength of 28 days concrete cannot be achieved with the above cement content, more cement shall be used for which the Contractor will not receive any extra payment.

Consistency

The detailed mix proportions shall be submitted to Employer for approval to secure concrete of the proper consistency and to adjust for any variation in the moisture content or grading of the aggregate as they enter the mixer. Addition of water to compensate for stiffening of the concrete before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

Lean Concrete

Lean concrete of minimum 5 cm. thickness shall be used under all foundations with the ratio of cement: fine aggregate: coarse aggregate equal to 1:3:5 (by volume)

6.2 Cement

Quality

The Contractor shall furnish normal Portland cement in fifty (50) kg net weight sacks.

The cement for the civil work shall conform to the requirements of "Portland cement, Type I" designated in ASTM C150.Where conditions require the use of high sulphate resistance cement, cement conforming to the requirements of ASTM CISO Type V shall be used without any cost to Employer.

6.3 Coarse Aggregate

Quantity

Coarse aggregate shall conform to the requirements of ASTM C 33 and shall be either natural gravel or manufactured coarse aggregate. Coarse aggregate shall consist of well-shaped clean, hard, dense, durable rock fragments and shall not contain wood chips and any other impurities.

Grading

Coarse aggregate shall be graded for each maximum size within the standard limits specified as follows:

Sieve Size (with Square Openings)	Designation of Size in Inches	Percentage Passing by Weight
40 mm (1-1/2 to 3/4 Inch)	1-1/2	100
	1	90 to 55
	3/4	20 to 15
20 mm (3/8 Inch to No. 4)	3/8	20 to 55
	No. 4	0 to 10

6.4 Fine Aggregate

Quality

Fine aggregate shall conform to the requirements of ASTM C33 and shall be natural sand or manufactured sand. It shall consist of clean, hard, dense and durable rock particles, free from injurious amounts of dust, silt, stone powder, pieces of thin stone, alkali, organic matter and other impurities.

Grading

The fine aggregate as batched shall be well graded, and when tested shall conform to the following limits:

Sieve size	Percentage passing by weight
9.51mm (3/8 inch)	100
4.76 mm (No.4)	95 to 100
2.38 mm (No.8)	80 to 100
1.19 mm (No.16)	50 to 85
595 micron (No.30)	25 to 60
297 micron (No.50)	10 to 30
149 micron (No.100)	2 to 10

6.5 Admixture

The Contractor shall use admixture, if required, listed below in order to improve the quality of concrete or mortar such as workability and finishability and water tightness.

Air-entraining agent - ASTM C260

Water-reducing and set retarding agent - ASTM C494

Plasticizer

The cost of the material and all costs incidental to their use shall be included in the unit price bid in the Price Schedule for concrete in which the materials are used.

6.6 Batching and Mixing

The Contractor shall provide equipment and shall maintain and operate the equipment to produce the required quality of concrete.

When any mixer produces unsatisfactory results, Employer may direct the Contractor to increase the mixing time or repair the mixing blades, and the Contractor shall promptly carry out the directions of Employer.

The order of feeding the materials into the mixer shall be subject to approval of Employer. If concrete is to be mixed by hand, it shall be subject to approval of Employer.

6.7 Placing of Concrete.

General Conditions

Prior to placing concrete, the Contractor shall submit to Employer for approval the mixed proportion, the characteristics of each materials of concrete, the concrete placing schedule, placing equipment, and method of execution of work. No concrete shall be placed until all formwork, treatment of surface, placing of reinforcement and other parts to be embedded have been inspected and approved by Employer.

Placing of concrete shall not be permitted under the following conditions, unless specifically approved by Employer.

(a) When it rains.

(b) When illumination is imperfect for night work.

(c) When Employer orders to stop.

Preparation for Placing

Treatment of foundation surfaces

All surfaces of foundation upon or against which the concrete is to be placed shall be cleaned and moistened thoroughly before the placing. When concrete is placed upon or against earth foundations, the Contractor shall, in accordance with the direction of Employer, remove all objectionable substances such as standing water, flowing water, fragments of wood.

Treatment of surfaces of construction joints

Prior to placing the concrete upon or against the hardened concrete, the surface of the construction joints shall be cleaned, moistened and removed of all laitance, defectable or loose concrete, and unsound foreign materials.

Transporting and Conveying

The concrete which has elapsed more than 60 minutes after being discharged from the mixer and/or in which slump loss exceeds 3.0 cm as it is delivered to the site for placing shall be disposed of at the place designated by Employer. All such wasted concrete shall be borne to the Contractor's account. Concrete shall be placed with a vertical drop not greater than 1.0 m except where suitable equipment is provided to prevent segregation or where specifically authorized.

Concrete which has segregated during transportation shall be remixed. Retempering of concrete shall not be permitted.

Placing

After the surface of unformed construction joint has been cleaned and the placing of concrete has been approved by Employer in accordance with the provisions of the preceding sub-Articles, surface of unformed construction joint shall be covered with a layer of mortar approximately 1.5 cm thick. The Contractor shall place concrete upon the fresh mortar before it begins to set. The mortar shall be of richer cement content than concrete without coarse aggregate. The cost of the mortar shall be included in the bid unit price for the foundation lot.

Concrete shall be deposited in all cases, as nearly as practicable, directly in its final position and shall not be caused to flow such that will permit lateral movement or cause segregation of the coarse aggregate, mortar or water from the concrete mass.

Consolidation

Immediately after placing, every layer of concrete shall be consolidated to the maximum practicable density so that it closes snugly against all surfaces of reinforcement bars and embedded fixtures and against all corners of the forms. Consolidation of concrete shall be by electric or pneumatic power-driven, immersion-type vibrators or other approved means.

6.8 Concrete Construction Tolerance

Variation in alignment, grade and dimension of the structures from the established alignment, grade and dimensions shall be remedied or removed and replaced by the Contractor at his own expense.

6.9 Repair of Concrete

The Contractor shall repair at his own expense the imperfections of concrete surfaces and the irregularities which do not meet the specified dimensions. Repairing work shall be performed and completed within 24 hours after the removal of forms, in accordance with the direction of Employer.

6.10 Curing

Prior to placing concrete, the Contractor shall obtain Employer's approval in respect of the method to protect and cure concrete and the facilities he proposes to use. After concrete has been placed, it shall be protected and cured strictly in accordance with the method approved by Employer.

All costs for the curing of concrete shall be included in the unit price bid for foundation lot.

6.11 Forms

General Conditions

Forms shall be used, wherever necessary, to confine and shape the concrete to the required lines, and as directed by Employer. Forms shall have sufficient strength to withstand the pressure resulting from placing and vibrating of the concrete, and shall be maintained rigidly in positions. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Each form shall be so prepared that each section may be removed individually without injuring the concrete.

The costs of all labor and materials for forms and for any necessary treatment of coating of forms shall be included in the unit price bid for foundation lot, for which the forms are to be used. No separate payment will be made for form.

Removal of Forms

Forms shall not be removed without the approval of Employer. As a rule, the forms shall be removed at the following minimum times after concrete has been placed.

Side form of column and wall	2 days
Supporting form of floors and beam	28 days

6.12 Grouting

Grouting for seating structural steel members and equipment on foundations shall be non- shrink (not-setting) Portland cement mortar grout, or a suitable commercially available grout, at the Contractor's option. Grouting shall be done under pressure by means of an expanding agent or by means of a static head. Proportioning and mixing of grout shall conform to the following:

(a) Mortar grout containing aluminum powder as an expansive agent mixture of 1 part cement and 2 parts sand, by weight, with a water-cement ratio not exceeding 0.55. The quantity of aluminum powder used shall be approximately 0.005 percent of the weight of cement, the actual quantity to be determined from tests with materials to be used, and at the temperature and under the conditions of placement. Aluminum powder shall be blended with cement in proportions of one part powder to 50 parts cement, by weight, and the blend shall be sprinkled over the dry batch. After all ingredients are added, the batch shall be mixed for 3 minutes. Grout which has not been placed within 45 minutes shall be wasted.

(b) In lieu of use of an expansive agent, settlement shall be reduced by extending the mixing period or by delaying final mixture to minimize the interval between time of placement and initial set and placement the understatic header pressure. The mortar grout shall be a mixture of one part cement and 2.5 parts sand, with a minimum necessary to enable placement.

Payment

No separate or direct payment will be made to the Contractor for Grouting. All cost incurred in connection therewith shall be included in the unit sum bid price for the construction of the various foundation types.

6.13 Tests

The Contractor shall make all necessary tests for determining the mixed proportions of each type of concrete, including tests of aggregates, so as to produce the concrete specified in Item 14.7.1.

In order to control the quality of concrete to be placed, the Contractor shall perform the following field tests:

Slump Test

A slump test will be made from each of the first three batches mixed each day. An additional slump test will be made for each additional 40 cubic meters of concrete placed in any one day. Slump will be determined in accordance with ASTM C 143.

Compression Test

Three sets of three concrete compression test cylinders will be made each day when concrete is placed or as directed by Employer. One set of each group will be tested at an age of 7 days and the other set will be tested at an age of 28 days. The third set will be an extra set to be tested only if needed. If the compressive strength indicates a compressive strength of less than 210 kg/sq.cm., the Employer will determine what remedial measures are necessary and the Contractor shall perform the remedial measures at his own expense.

Concrete test cubes/cylinders will be made, cured, and stored in accordance with ASTM C31. Concrete cubes/cylinders will be tested in accordance with ASTM C39.

No separate or direct payment will be made to the Contractor for tests. All costs for the tests shall be included in the unit bid price for the construction of various foundation types.

6.14 Measurement for payment

Measurement for payment for the Contract item, "Concrete Foundation" shall be on the basis of the actual unit/lump sum of each type of foundation constructed by the Contractor.

(a) Performing detail foundation designs and preparation of construction drawing including bar-bending schedule.

(b) Supplying and transporting all foundation materials to job site.

(c) Excavating, dewatering, form works, providing 10cm thick soiling layer providing 5cm thick (1M3M6) lean concrete layer, form works and backfilling for the foundations and all other related operations.

7 STEEL REINFORCEMENT

The Contractor shall place all the reinforcement bars in the concrete structures as shown on the approved drawings and as directed by Employer. The reinforcement bars shall be furnished by the Contractor.

Quality

The reinforcement bars used for the concrete structure shall be torsteel reinforcing bars and dimensions, shapes, tensile strength, yield point, elongation and other properties, shall conform to BS 1144 or equivalent.

Placing

Reinforcement bars shall be accurately placed and special care shall be exercised to prevent the reinforcement bars from being displaced during the placement of concrete. Intersecting points and splices of the reinforcement bars shall be fixed by using suitable clips or annealed wires, the diameter of which shall be no less than No.16 gauge. The reinforcement bars in structures shall be placed and supported by use of concrete blocks, metal spacers, metal hangers or other satisfactory devices to ensure required coverage between the reinforcement bars and the surface of concrete. Drawings of bar lists shall be submitted for approval. The cost of binding wires, cutting and placing of steel bars shall be included in the unit price bid for foundation lot.

Payment

No separate or direct payment will be made to the Contractor for Concrete Reinforcing Steel in foundations. All costs incurred in connection therewith shall be included in the unit bid price for the construction of the various foundation types.

9. SUBSTATION STEEL STRUCTURES

9.1 General Requirements

The Contractor shall assume full responsibility for design and details of the steel structures and for their satisfactory performance. All designs and details shall be subject to approval of Employer. Employer shall have the right to instruct the Contractor to make any changes to conform to the Contract Document. Elevations of all structures shall be compatible with the existing structures.

No omissions or ambiguities on the drawings or in these Specification will relieve the Contractor from furnishing first class materials and workmanship. Should any inaccuracies

be found the Contractor shall notify Employer and any further work done before these discrepancies are corrected will be at the Contractor's risk.

9.2 Materials

The materials shall conform to the following requirements:

Item	Description	Unit	Minimum Value
1.	Tensile and Yield strength		
	The quality of steel used for support members and bolts.		
1.1	Mild steel		
	(a) Tensile strength	kg/mm^2	24
	(b) Yield strength	kg/mm^2	14
1.2	High strength steel		
	(a) Tensile strength	kg/mm^2	36
	(b) Yield strength	kg/mm^2	20

9.3 Design of Steel Structures

Design Methods

The stress analysis shall be conducted by the force diagram method for all type of steel structures. Any computer programs to be employed, shall be prepared or approved by a recognized institute and be submitted to Employer.

Loading Conditions

In additions to dynamic loads imposed by equipment, steelwork shall be design to withstand simultaneously wind and other loads as follows:

Design Load

Wind Load

On flat steel surface	121 kg/m^2
For lattice structures	121 kg/m^2 of 1.71 times the projected area of the members of one face of the structure
On line trap, disconnecting switch	50 kg/m^2
On overhead ground wire,	
Conductor	75 kg/m^2
On porcelain insulator	
Strings and all other section	50 kg/m^2

Human Load

240 kg at the center of the beam.

Load due to conductor and weight of equipment and accessories.

Loads due to the ACSR conductor shall be wind load, dead weight and short circuit forces. Weight of equipment including insulator string shall be according to actual installation.

Normal Working Condition

The normal working condition for various loads shall be deemed to work simultaneously. The take-off structure shall be subjected to a vertical uplift of 500 kg. at each supporting point of overhead ground wire and conductor. The tension for conductor and ground wire will be 750 and 350 kg respectively and angle of deviation will be 15^0.

Combination of loads

The Contractor shall calculate the maximum and minimum stresses at any combinations of loading conditions.

Safety Factors

The safety factors shall be not less than two (2) times for normal working conditions and

1.5 in combination with short circuit forces.

Design and Ultimate Stress Allowed in Design

For tensile members of steel structure the design stress shall not exceed the yield point of materials even under test loading condition. For compressive members the design stress shall not exceed the value of the ultimate buckling stress.

Ultimate stress allowed in design shall be as follows :

Members:

Buckling	As per ASCE Manuals and Reports on Engineering Practice-No. 52.
Tension	Less than 1.00 Fy
Bearing	Less than 1.80 Fy

Bolts:

Shear	less than 0.60 Fu
Bearing	Less than 1.00 Fu
Where :	Fy : Yield point of steel member materials Fu : Ultimate tensile stress of bolt materials

Limit of Effective Slenderness Ratio.

The effective slenderness ratio (L/r) of members shall meet the following limits:

Leg member, main compression member and ground wire peaks	= 120
Other members having computed compressive stresses	= 200
Secondary members without computed compressive stresses	= 250
Tension member	= 350

Where : L : Length of the unsupported panel of member r : Radius of gyration of members.

In determining the slenderness ratio for various members, suitable provisions shall be taken into consideration for various types of end connections, eccentricity of load transfer in the members etc. The unsupported length "L" shall be considered from centre to centre of intersections or working lines at both ends of members. A single bolt connection shall not be considered as offering restraint against rotation. A multiple bolt connection with minimum two (2) bolts; properly detailed to minimize eccentricities shall be considered to offer partial restraint, if such connection is to a member having adequate strength to resist rotation of joint. Points of intermediate supports shall not be considered as offering full restraint to rotation, if the same is provided only on one flange of the member. For members of double-diagonal web system which are bolted at their point of intersection, max L/r shall be determined from the following criteria:

'L' is the greatest distance from the point of the intersection to either of the end connections and 'r' is the minimum radius of gyration of the member.

'L' is equal to 0.75 times the distance between the end connections and 'r' is the radius of gyration of the member for its axis parallel to the plane of connected leg.

Minimum Thickness and Size of Steel Members

Minimum thickness and size of steel members of structures shall be as follows: Calculated

members	40x5 mm
All other stressed members and secondary members	not less than L40x4 mm
Gusset plates	not less than 5 mm
Bolts and nuts	M-12 mm

In computing the net section of tension members, the diameter of the bolt holes shall be taken as 3.0 mm greater than the nominal diameter of the bolts. Net section on both straight and zigzag sections across the members shall be as specified in ASCE or BS.

Connections

Bolts

All connections shall be bolted and all stressed members shall be connected by at least one(1) bolt. For structural connections, a maximum of two bolt sizes may be used for each tower type provided the quantity of each size is not less than 20 per cent of the total requirement for the tower and the bolts in any one connection are uniform in size.

Splices

The number of splices shall be practically minimum. Splices shall develop the maximum stress in member or seventy (70%) percent of compressive strength of gross section or tensile stress of net section. No credit shall be allowed for bearing on abutting areas.

Design Drawings and Calculation

The design drawings shall show the following data and information

Scaled line diagram of the steel structures showing all redundant bracing members and their sizes completely dimensioned and proving compliance with all clearance requirements.

All loadings and their manners of application including the determination of wind load (wind load on structure shall be applied at each panel point along the height of the steel structure.)

Calculations showing:

(a) Total stresses in each member for each loading case and the critical case.

(b) The effective slenderness ratio, calculated stress ratio of maximum total stress to calculated stress for each member and strength of connection.

(c) The estimated weight of the complete galvanized steel structures.

(d) Size and type of steel for each member and number of bolts required for its connection.

(e) The compression and uplift reactions and corresponding horizontal shears at each leg of all steel structures (column and equipment supports) for all loading cases.

9.4 Detailing

Detailing shall be as follows:

General

Steel structure dimensions, framing, member sizes and length, number, size and length of bolts, thickness of each filler, and other necessary details to fabricate each piece shall be shown on the approved detail drawings. No change shall be made without the written approval of Employer.

All web members shall be in one piece where practicable. All double diagonal web system members shall be connected at their point of intersection by at least one bolt.

Step Bolts

Step bolts shall be of 16 mm diameter and shall have round or hexagonal head. Each step bolt shall be provided with two hexagonal nuts. The minimum bolt length and length of unthreaded portion shall be 180 and 125 mm respectively. Step bolts shall not be used as connection bolts.

The step bolts shall be spaced alternately on the inner gauge line on each face of the angle about 40 cm centers. They shall be furnished for one leg of each steel tower from the base elevation of the steel tower.

Step bolts for lattice single pole or H-frames are not required.

U-Bolts

U-bolts shall be suitably furnished on steel structures to suspend or terminate insulator strings or ground wire assemblies. Size of U-bolt shall withstand all loads acting on it.

Detail Drawings

Detail drawings shall be complete with sizes and detail dimensions of all steel structure members. At each joint, there shall be the number, size and length of bolts, number and size of fillers and detail dimensions of gusset plate, if any.

Bill of Material

Bill of materials shall give the size length and galvanized weight of each member and the total weights of steel structures. It shall also include the number of bolts, nuts and washer per structure.

9.5 Fabrications

Workmanship

Workmanship shall be first class throughout. All pieces must be straight, true to detail drawings and free from lamination flaws and other defects. All clipping, backcuts, grindings, bends, holes and etc. must be true to detail drawings and free of burrs.

All identical pieces bearing the same erection number must be exactly interchangeable with each other and interchangeable in their relative position in all towers or structures of which they form a part.

Threads of bolts and nuts shall be cleanly rolled or cut and the face and head of nut shall be truly at right angle to the axis of the bolt.

9.6 Cleaning and Galvanizing.

(a) Cleaning

After fabrication has been completed and accepted, all materials shall be clear of rust, loose scale, dirt, oil, grease and other foreign substances.

(b) Galvanizing

All materials shall be hot-dip galvanized after fabrication and cleaning. Retapping of nuts after galvanizing is not required.

Galvanizing for structural mild steel products shall meet the requirements of ASTM A123. All holes in materials shall be free of excess splinter after galvanizing.

Galvanizing for bolts, nuts, washers, lock nuts, step bolts and similar hardware shall meet requirements of ASTM A153. Excess spelter on bolts, nuts, washers, lockouts , step bolts and similar hardware shall be removed by appropriate means acceptable to Employer.

Finished materials shall be dipped into the solution of dichromate after galvanizing for white rust protection during sea transportation.

(c) Uniformity of Coating

The uniformity of coating test shall be made in accordance with ASTM A239. The minimum repetition times for one minute dip in uniformity test shall be as follows :

Steel shapes and plates	6
Bolts, nuts and similar hardware	4

Galvanizing Coating Weight

Description	Thickness	Coating Weight (g/sq.m)		Uniformity Test Time
		Average Value	Minimum Value	(1 min/1 time)
Shaped steel	over 6mm	more than 700	more than 610	more than 6
Steel plates	under 6mm	more than 610	more than 550	more than 6

Bolts, Nuts & Washers etc	more than 470	more than 400	more than 4

(d) Straightening after Galvanizing

All plates and shapes which have been warped by the galvanizing process shall be straightened by being rerolled or pressed. The materials shall not be hammered or otherwise straightened in a manner that will injure the protective coating. If, in the opinion of Employer, the material has been hardfully bent or warped in the process of galvanizing or fabrication, such defects shall be cause for rejection.

(e) Repair of Galvanizing

Materials on which galvanizing has been damaged shall be acid stripped and regalvanized, unless, in the opinion of Employer, the damage is local and can be repaired by zinc spraying or by applying a coating of galvanizing repair compound. Where regalvanizing is required, any member which becomes damaged after having been dipped twice shall be rejected.

(f) Shop Assembly

One of each type of steel structure shall be assembled in the shop to such an extent as to insure proper field erection. Reaming of untrue holes will not be permitted. A reasonable amount of drifting will be allowed in assembling. Shop assembled parts shall be dismantled for shipment.

9.7 Shop Test.

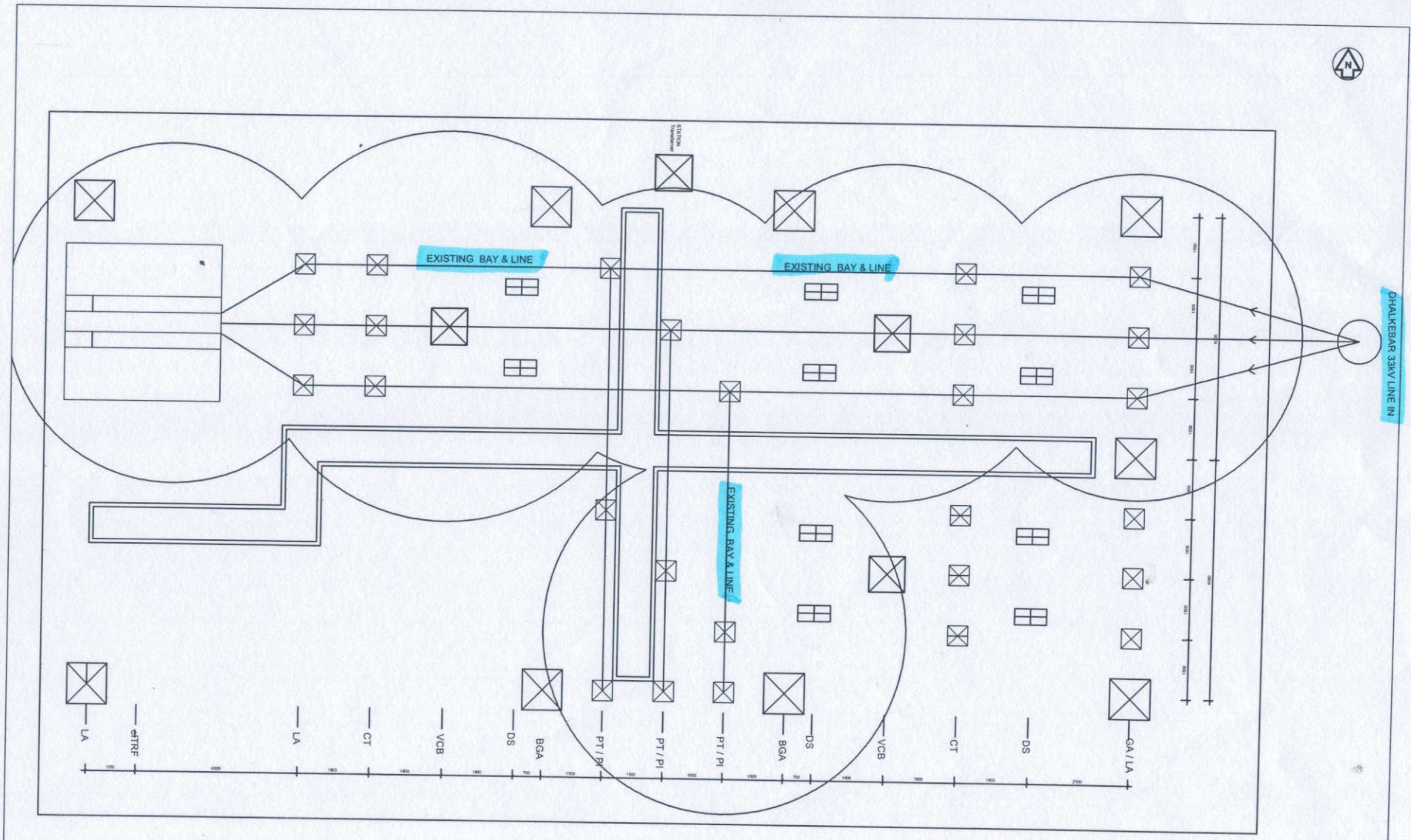
The following shop test shall be performed with relevant provisions of the ASTM.

(a) General inspection
(b) Material tests
(c) Assembly test
(d) Galvanizing test

The Contractor shall furnish four certified copies of report of all tests to Employer. The cost of all tests and reports shall be borne by the Contractor.

9.8 Payment

Payment for the Contract item, "Steel Structures" will be made at the unit / lump sum price per steel structures type bid therefore in the Price Schedule, which unit/lump sum price shall include full compensation for all costs incurred in furnishing all materials, equipment and labor and all other operations related to steel structure design, fabrication, installation etc.



BAGMATI PROVINCE
PROVINCE DIVISION OFFICE
HETAUDA

SHEET TITLE:
BAY EXTENSION
BHIMAN 33kV S/S
SINDHULI

DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE:NOT IN SCALE (in A#)

e				DRAWING NO.
d				
c				
b				
a				SHEET:
BUFFIX	DATE	INITIALS	REVISION DETAILS	

SECTION-VI

Bill of Quantities

Notes for Unit Rate Contracts :
Objectives
The objectives of the Bill of Quantities are
(a) to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and
(b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.
Content
The Bill of Quantities should be divided generally into the following sections:
(a) Preamble;
(b) Work Items (grouped into parts);
(c) Day works Schedule;
d) Provisional Sums; and
(d) Summary.

Preamble
The Preamble should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bill of Quantities and which are to be used for the measurement of any part of the works.

Work Items
The items in the Bill of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the works may be grouped as a separate section in the Bill of Quantities.
Day work Schedule
A Day work Schedule should be included only if the probability of unforeseen work, outside the items included in the Bill of Quantities, is high. To facilitate checking by the Employer of the realism of rates quoted by the Bidders, the Day work Schedule should normally comprise the following:
(a) A list of the various classes of labor, materials, and Constructional Plant for which basic day work rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a day work basis.
(b) Nominal quantities for each item of Day work, to be priced by each Bidder at Day work rates as bid.
The rate to be entered by the Bidder against each basic Day work item should include the Contractor's profit, overheads, supervision, and other charges.
Provisional Sums
A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the Contract Data should state the manner in which they will be used, and under whose authority (usually the Project Manager' s).

Summary
The Summary should contain a tabulation of the separate parts of the Bill of Quantities carried forward, with provisional sums for Day work, for physical (quantity) contingencies, and for price contingencies (upward price adjustment) where applicable.

These Notes for Preparing Specifications are intended only as information for the Employer or the person drafting the Bidding documents. They should not be included in the final documents.

Preamble of Bill of Quantities

A. General

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Project Manager and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Project Manager may fix within the terms of the Contract.

3. For any item for which measurement is based on records made before or during construction the records shall be prepared and agreed between the Engineer and the Contractor. Should the Contractor carry out such work without the prior agreement of the Engineer, the Engineer may request the Contractor to carry out investigations to confirm the extent of the work and the quantity of work certified for payment shall be solely at the Engineer's discretion. The cost of any such investigation shall be borne by the Contractor.

4. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

5. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

6. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

7. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities. The Specification Clause references where given in the item description of the Bills of Quantities are for the convenience of bidders and generally refer to the principal relevant- specification clause but do not necessarily represent the whole of the specification requirements for the work required within the item. The presence of a Specification clause reference shall not in any way reduce the Bidders obligation to complete work in accordance with all the requirements of the Specification.

8. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager in accordance with the Conditions of Contract.

9. The method of measurement of completed work for payment shall be in accordance with the Specifications.

10. The abbreviations and symbols used in this Bill of Quantities are:

[Insert as applicable]

B. Day work Schedule

a) **General**

1. Work shall not be executed on a day work basis except by written order of the Project Manager. Bidders shall enter basic rates for day work items in the Schedules. These rates shall apply to any quantity of day work ordered by the Project Manager. Nominal quantities have been indicated against each item of day work, and the extended total for day work shall, be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for day work shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

b) Day work Labor

1. In calculating payments due to the Contractor for the execution of day works, the hours for labor will be reckoned from the time of arrival of the labor at the job site to execute the particular item of day work to the time of departure from the job site, but excluding meal breaks and rest periods. Only the time of classes of labor directly doing work ordered by the Project Manager and are competent to perform such work will be measured. The time of gangers (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.
2. The Contractor shall be entitled to payment in respect of the total time that labor is employed on day work, calculated at the basis rates entered by it in the " SCHEDULE OF DAY WORK RATES: 1. LABOR". The rates for labor shall be deemed to cover all costs to the Contractor including (but not limited to) i) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances, ii) any sums paid to or on behalf of such labor for social benefits in accordance with Nepal law, iii) Contractor's profit, overheads, superintendence, liabilities and insurance and iv) charges incidental to the foregoing.

c) Day work Equipment

1. The Contractor shall be entitled to payments in respect of Constructional Plant already on site and employed on day work at the basis rental rates entered by him in the “SCHEDULE OF DAY WORK RATES:2 EQUIPMENT ”. The said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricant, and other consumables and all overhead, profit and administrative costs related to the use of such equipment. The cost of drivers, operators and assistants also shall be included in the rate of the equipment and no separately payment shall be made for it.
2. In calculating the payment due to the Contractor for Constructional Plant employed on day work, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Project Manager, the travelling time from the part of the Site where the Construction Plant was located when ordered by the Project Manager to be employed on day work and the time for return journey there to shall be included for payment.

d) Day work Materials

1. The Contractor shall be entitled to payment in respect of materials used for day work (except for materials for which the cost is included in the percentage addition to labor costs as detailed heretofore), at the rates entered by him in the "SCHEDULE OF DAY WORK RATES: 3 MATERIALS" and shall be deemed to include overhead charges and profit as follows;

   (i) the rates for materials shall be calculated on the basis of the invoiced price, freight, insurance, handling expenses, damage, losses, etc. and shall provide for delivery to store for stockpiling at the Site.

   (ii) the cost of hauling materials for use on work ordered to be carried out as day work, from the store or stockpile on the Site to the place where it is to be used also shall be include in the same rate.

Provisional Sums

A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the SCC should state the manner in which they will be used, and under whose authority (usually the Project Manager's).

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Employer to select such specialized contractors. To provide an element of competition among the Bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

Bill of Quantities

1 Provisional Sum

Procument Item Details

SL. No	Item Description	Unit	Quantity	Unit Rate(NPR)	Amount(NPR)
1	Null	0	0.0	0.0	0.00

2 Construction work

2.1 Works for complete or part construction and civil engineering work

2.1.1 Engineering works and construction works

Procument Item Details

SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1	Site Clearance Work	Sqm	100.0			
2	Earth work in excavation	Cum	290.7			
3	Backfilling work	Cum	206.22			
4	150 mm stone Soling	Cum	12.92			
5	PCC work in foundation in 1:3:6	Cum	7.55			
6	PCC work in 1:1.5:3	Cum	81.85			
7	Reinforcement bar (all sizes)	Kg	6712.16			
8	Form work	Sqm	306.1			
9	Crushed Stone work with Compaction	Cum	90.0			
10	Structural steel work	Kg	5231.59			
11	Dismantling of RCC Structure	Cum	40.93			

3 Architectural engineering construction legal accounting and other professiol services

3.1 Architectural engineering construction and related technical consultancy services

3.1.1 Engineering services

Procument Item Details

SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)

Procument Item Details						
SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1	Preconstruction Survey, Hydrological Study to identify flood levels and cut/fill volume of substation, Design and Drawings of 33/11 kV substation as per the scope of the project.	LS	1.0			
2	As Built Drawings, Testing and Commissioning of 33/11 kV Substation as per the scope of the project	LS	1.0			

4 Land transport services and transport via pipeline services

4.1 Land transport services

4.1.1 Land freight transport services

Procument Item Details						
SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1	Load/Unload/Vehicular Transportation of Electrical Equipment from Madi (Chitwan) to Sindhuli (Bhiman) refer to technical specification.	LS	1.0			

5 Electrical machinery apparatus equipment and consumables

5.1 Electrical equipment and apparatus

5.1.1 Electrical parts of machinery or apparatus

Procument Item Details						
SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1	Supply of 36 kV, 800 A, 25 kA, Disconnecting Switch with earth switch including accessories all complete.	Set	1.0			
2	Supply of 33 kV Outdoor Busbar (suitable ACSR conductor or Equivalent IPS Tube) with required insulators and accessories complete (1 set consists of busbar at Source Bay & Destination Bay).	Lot	1.0			
3	Supply of 33 kV Protection Line Control and Relay Panel complete with all accessories as per specification for Line Bays.	Set	1.0			
4	Supply of Control cables including accessories complete.	Lot	1.0			
5	Supply of Switchyard Lightning Protection System, Equipment Earthing arrangement with Buried Copper strips/Conductors with Risers, Electrode grounding materials and accessories to complete the specified scope of works, all complete.	Lot	1.0			

Procument Item Details						
SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
6	Installation of 36 kV, 1250 A, 25 kA Outdoor Type, Vacuum Circuit Breaker with Accessories all Complete	Set	2.0			
7	Installation of 36 kV, 800 A, 25 kA, Disconnecting Switch with earth switch including accessories all complete	Set	2.0			
8	Installation of 36 kV, 800 A, 25 kA, Disconnecting Switch without earth switch including accessories all complete	Set	2.0			
9	Installation of 600-400-200/5A Current Transformer for 33 kV with accessories all complete as specified (3 numbers in one set)	Set	2.0			
10	Installation of 30 kV, 10 kA, lighting arrestor with accessories all complete (3 numbers in one set)	Set	2.0			
11	Installation of 33 kV Outdoor Busbar (suitable ACSR conductor or Equivalent IPS Tube) with required insulators and accessories complete (1 set consists of busbar at Source Bay & Destination Bay)	Lot	1.0			
12	Installation of 33 kV Protection Line Control and Relay Panel complete with all accessories as per specification for Line Bays	Set	2.0			
13	Installation of Control cables including accessories complete	Lot	1.0			
14	Installation of Switchyard Lightning Protection System, Equipment Earthing arrangement with Buried Copper strips/Conductors with Risers, Electrode grounding materials and accessories to complete the specified scope of works, all complete	Lot	1.0			
15	Installation of Gantry Column, Girder structures for 33/11 kV substation, all complete as per specifications for each sub-station	Ton	5.23			
16	Dismantling & Removal of Existing 36 kV Disconnecting Switch complete.	Set	1.0			

Total of Procument Items	
Total Item Price	
VAT	
Grand Total	

CONDITIONS OF CONTRACT AND CONTRACT FORMS

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SECTION-VII

General Conditions of Contract

General Conditions of Contract

	General
1. Definitions	1.1 Boldface type is used to identify defined terms. (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects. (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events. (c) The Adjudicator is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.2 hereunder. (d) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid. (e) **Compensation Events** are those defined in GCC 50 hereunder. (f) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 68.1. (g) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below. (h) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer. (i) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer. (j) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract. (k) **Days** are calendar days; months are calendar-months. (l) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant. (m) A **Defect** is any part of the Works not completed in accordance with the Contract. (n) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor. (o) The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects. (p) **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract. (q) The **Employer** is the party who employs the Contractor to carry out the Works, as **specified in the SCC**. (r) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works. (s) **Force Majeure** means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party. (t) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance. (u) **In writing** or **written** means hand written, type written, printed or electronically made, and resulting in permanent record.

	(v) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is **specified in the SCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order. (w) **Letter of Acceptance** means the formal acceptance by the Employer of the Bid and denotes the formation of the contract at the date of acceptance. (x) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works. (y) **Party** means the Employer or the Contractor, as the context requires. (z) **SCC** means Special Conditions of Contract (aa) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function. (bb) The **Project Manager** is the person **named in the SCC** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract. (cc) **Retention Money** means the aggregate of all monies retained by the Employer pursuant to GCC 54.1. (dd) **Schedules** means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Bids, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices. (ee) The **Site** is the area defined as such in the SCC (ff) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site. (gg) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager. (hh) The **Start Date** is given i**n the SCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates. (ii) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site. (jj) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works. (kk) A **Variation** is an instruction given by the Project Manager which varies the Works (ll) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as **defined in the SCC**.
2. Interpretation	2.1 In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC. 2.2 If sectional completion is specified in the SCC, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works). 2.3 The documents forming the Contract shall be interpreted in the following order of

	priority: (a) Contract Agreement, (b) Letter of Acceptance, (c) Letters of Bid, (d) Special Conditions of Contract, (e) General Conditions of Contract, (f) Specifications, (g) Drawings, (h) Bill of Quantities (or Schedules of Prices for lump sum contracts), and (i) Any other document **listed in the SCC** as forming part of the Contract.
3. Language and Law	3.1 The language of the Contract and the law governing the Contract are **stated in the SCC**.
	a. Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when (a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from, or any payments to, a particular country, person, or entity. Where the borrower's country prohibits payments to a particular firm or for particular goods by such an act of compliance, that firm may be excluded.
4. Contract Agreement	4.1 The Parties shall enter into a Contract Agreement within 15 days after the Contractor receives the Letter of Acceptance, unless the Special Conditions establish otherwise. The Contract Agreement shall be based upon the attached Contract forms in Section IX.
5. Assignment	5.1 Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party (a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party; and (b) may, as security in favor of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.
6. Care and Supply of Documents	6.1 The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, one copy of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.
	6.2 Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.
	6.3 The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations

	and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times. 6.4 If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.
7. Confidential Details	7.1 The Contractor's and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify the Contractor's compliance with the Contract and allow its proper implementation.
	7.2 Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.
	7.3 Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this Clause.
8. Compliance with Laws	8.1 The Contractor shall, in performing the Contract, comply with applicable Laws.
9. Joint and Several Liability	9.1 If the Contractor is a joint venture of two or more entities , all such entities shall be jointly and severally liable to the Employer for the fulfillment of the provisions of the Contract, and shall designate one of such persons to act as a leader with authority to bind the joint venture. **The contractor shall not handover the responsibility of the contract to any one member or some members of Joint Venture or any other parties, not involved in the contract.** The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.
10. Project Manager's Decisions	10.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
11. Delegation	11.1 The Project Manager may delegate any of his duties and responsibilities to other people after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
12. Communications	12.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.
13. Subcontracting	13.1 A list of approved Subcontractors including its value/works is included as Article 2 (k) of contract Agreement. Approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties, or responsibilities under the contract.

14. Other Contractors	14.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, **as referred to in the SCC**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification
15 Personnel and Equipment	15.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid to carry out the Works, or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid. 15.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract. 15.3 If the Employer, Project Manager, or Contractor determines, that any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or other prohibited practices during the execution of the Works, then that employee shall be removed in accordance with Clause 15.2 above.
16. Employer's and Contractor's Risk	16.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
17. Employer's Risks	17.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks: (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor. (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed. 17.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to (a) a Defect which existed on the Completion Date, (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or (c) the activities of the Contractor on the Site after the Completion Date.

18. Contractor's Risks	18.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.
19. Insurance	19.1 The Contractor shall provide insurance in the joint names of the Employer and the Contractor from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles **stated in the SCC** for the following events which are due to the Contractor's risks: (a) loss of or damage to the Works, Plant, and Materials; (b) loss of or damage to Equipment; (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and (d) Personal injury or death.
	19.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the proportions of Nepalese Rupees required to rectify the loss or damage incurred. 19.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due. 19.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager. 19.5 Both parties shall comply with any conditions of the insurance policies.
20. Site Investigation Reports	20.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to **in the SCC**, supplemented by any information available to the Contractor.
21. Contractor to Construct the Works	21.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
22. The Works to Be Completed within intended Completion Date	22.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them within the intended Completion Date.
23. Design by contractor and Approval by the Project Manager	23.1 The contractor shall be responsible for the design of permanent works as **specified in SCC**. 23.2 Contractor shall be responsible for design of the Temporary Works. The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval. 23.3 All Drawings prepared by the Contractor for the execution of the temporary or

	permanent Works, shall be subject to prior approval by the Project Manager before their use. 23.4 The Project Manager's approval shall not alter the Contractor's responsibility for design of temporary works.
24. Safety, Security and Protection of the Environment	24.1 The Contractor shall, throughout the execution, and completion of the works and remedying of any defects therein: a. Have full regard for the safety of all persons entitled to be upon the site and keep the site (so as the same is under his control) and the works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons. b. Provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when necessary or required by the Project Manager or by any duly constituted authority, for the protection of the Works of for the safety and convenience of the public or others. c. Take all reasonable steps to protect the environment on and off the site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. d. Ensure that any cut or fill slopes are planted in grass or other plant cover as soon as possible to protect them from erosion. e. Any spoil or material removed from drains shall be disposed of to designated stable tipping areas as directed by the Project Manager. f. Shall not use fuel wood as a means of heating during the processing or preparation of any materials forming part of the works. g. The Project Manager shall have the power to disallow any working practice or activity of the Contractor or direct that such practices or activities be modified should the Project Manager consider, on the advice of the relevant Government Departments, that the practices or activities will be harmful to wildlife. h. Provide on the Site such lifesaving apparatus as may be appropriate and an adequate and easily accessible first aid outfit or such outfits as may be required by any government ordinance, factory act, etc., subsequently published and amended from time to time.
25. Discoveries	25.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
26. Possession of the Site	26.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the SCC, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
27. Access to the Site	27.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

28.Instructions, Inspections and Audits	28.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located. 28.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and sub consultants to keep accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs. 28.3 The Contractor shall permit the GoN/DP and/or persons appointed by the GoN/DP to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the GoN/DP if required by the GoN/DP. The Contractor's attention is drawn to Sub-Clause 73.2 which provides, inter alia, that acts intended to materially impede the exercise of the GoN's/DP's inspection and audit rights provided for under this Sub-Clause constitute a obstructive practice subject to contract termination.
29. Dispute Settlement	29.1 The Employer and the Contractor shall attempt to settle amicably by direct negotiation any disagreement or dispute arising between them under or in connection with the Contract. 29.2 Any dispute between the Parties as to matters arising pursuant to this Contract which cannot be settled amicably within thirty (30) days after receipt by one Party of the other Party's request for such amicable settlement may be referred to Arbitration within 30 days after the expiration of amicable settlement period.
30. Procedures for Disputes	30.1 In case of arbitration, the arbitration shall be conducted in accordance with procedures in accordance with law of Nepal at the place given in the SCC.
	B. Staff and Labor
31. Forced Labor	31.1 The Contractor shall not employ forced labor, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor–contracting arrangements.
32. Child Labor	32.1 The Contractor shall not employ children in a manner that is economically exploitative, or is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. Where national laws have provisions for employment of minors, the Contractor shall follow those laws applicable to the Contractor. Children below the age of 18 years shall not be employed in dangerous work.
33.Non-discrimination and Equal Opportunity	34.1 The Contractor shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. In countries where national law provides for non-discrimination in employment, the Contractor shall comply with national law. When national laws are silent on nondiscrimination in employment, the Contractor shall meet this Sub clause's requirements. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed

	discrimination.
	Time Control
34. Program	34.1 Within the time **stated in the SCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule. 34.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities. 34.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period **stated in the SCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall Provide an updated Activity Schedule within 15 days of being instructed to by the Project Manager. 34.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.
35. Extension of the Intended Completion Date	35.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost. 35.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information at least 21 days prior to the intended completion date. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. Along with full supporting information the contractor shall also submit Performance Security, Advanced Payment Guarantee and insurance Policy with extended validity as well as revised work schedule.
36. Acceleration	36.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor. 36.2 If the Contractor's priced proposals for acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.

37. Delays Ordered by the Project Manager	37.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
38. Management Meetings	38.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure. 38.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
39. Early Warning	39.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible. 39.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.
C. Quality Control	
40. Identifying Defects	40.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
41. Tests	41.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
42. Correction of Defects	42.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is **defined in the SCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected. 42.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
43. Uncorrected Defects	43.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.
D. Cost Control	
44. Contract Price	44.1 In the case of a Unit Rate contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is

	used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item. 44.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.
45. Changes in the Contract Price	45.1 In the case of an Unit Rate contract: (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 2 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. (b) The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 10 percent, except with the prior approval of the Employer. (c) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities. 45.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.
46. Variations	46.1 All Variations shall be included in updated Programs, and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.
	46.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered. 46.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs. 46.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event. 46.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning. 46.6 In the case of an Unit Rate contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in GCC 45.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.

47. Cash Flow Forecasts	47.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.
48. Payment Certificates	48.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously. 48.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within 30 days of submission by contractor. 48.3 The value of work executed shall be determined by the Project Manager. 48.4 The value of work executed shall comprise: (a) In the case of an Unit Rate contract, the value of the quantities of work in the Bill of Quantities that have been completed; or (b) In the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule. 48.5 The value of work executed shall include the valuation of Variations and Compensation Events. 48.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
49. Payments	49.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest as indicated in the SCC on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made. 49.2 If an amount certified is increased in a later certificate or as a result of an award by an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute. 49.3 Items of the Works for which no rate or price has been entered in BOQ shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
50. Compensation Events	50.1 The following shall be Compensation Events: (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 26.1. (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract. (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time. (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.

	(e) The Project Manager unreasonably does not approve a subcontract to be let. (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site. (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons. (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor. (i) The advance payment is delayed. (j) The effects on the Contractor of any of the Employer's Risks. (k) The Project Manager unreasonably delays issuing a Certificate of Completion. 50.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended. 50.3 As soon as information demonstrating effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event. 50.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
51. Tax	51.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 30 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 53.
52. Currency	52.1 The currency of Contracts shall be Nepalese Rupees.
53. Price Adjustment	53.1 Prices shall be adjusted for fluctuations in the cost of inputs only if **provided for in the SCC**. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due. 53.2 Adjustment Formulae[1]: The formulae will be of the following general type:

[1] For complex Works involving several types of construction work with different inputs, a family of Formulae will be necessary. The various items of Day work may also require different formulae, depending on the nature and source of the inputs

	$$pn = A + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{En}{Eo} + etc.$$ Where: *pn* is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Clause 49; *A* is a constant, specified in the Bidding Forms- Table of Price Adjustment data, representing the nonadjustable portion in contractual payments;[2]b, c, d, etc., coefficients representing the estimated proportion of each cost element (labor, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, as specified in the SCC; *Ln, Mn, En,* etc., are the current cost indices or reference prices of the cost elements for month "n," determined pursuant to Sub-Clause 53.4, applicable to each cost element; and *Lo, Mo, Eo,* etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 53.4
	53.3 Sources of Indices and Weightings: The sources of indices shall be those listed in the Bidding Forms- Table of Price Adjustment data, as approved by the Project Manager and stated in SCC. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightings and Source of Indices in the Bidding Forms, which shall be subject to approval by the Project Manager. 53.4 Base, Current and Provisional Indices: The base cost indices or prices shall be those prevailing on the day 30 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 30 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Project Manager will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available. 53.5 Weightings: The weightings for each of the factors of cost given in the Bidding Forms shall be adjusted if, in the opinion of the Project Manager, they have been rendered unreasonable, unbalanced or inapplicable as a result of varied or additional work already executed or instructed under Clause 46 or for any other reason.
	53.6 Where, price adjustment provision is not applicable pursuant to Sub-clause 53.1 then the Contract is subject to price adjustment only for construction material in accordance with this clause. If the prices of the construction materials stated in the contract is increased or decreased in an unexpected manner in excess of ten (10%) percent in comparison to the base price construction material stated in Section –IV, Bidding Forms-Table of Price Adjustment Data, then the price adjustment for the increase or decrease of price of the construction material

[2] Insert a figure for factor A only where there is a part of the Contractors' expenditures which will not be subject to fluctuation in cost or to compensate for the unreliability of some indices. A should normally be 0.15. The sum of A, b, c, d, etc., should be one.

	beyond 10% shall be made by applying the following formulas: For unexpected increase in price $P = [R_1 - (R_0 \times 1.10)] \times Q$ For unexpected decrease in price P $= [R_1 - (R_0 \times 0.90)] \times Q$ Where: "P" is price adjustment amount "R_1" is the present price of the construction material (Source of indices shall be those listed in the Bidding forms) "R_0" is the base price of the construction material "Q" is quantity of the construction material consumed in construction during the period of price adjustment consideration If the Base price and source is to be proposed by the Bidder as per the provision made in Section –IV, Bidding Forms-Table of Price Adjustment Data then the Base price and source filled by Bidder for the construction material stated in the Bidding Form shall be subject to the approval of the Project manager and shall be as **stated in SCC**.. 53.7 The Price Adjustment amount shall be limited to a maximum of the initial Contract Amount **as specified in the SCC**. 53.8 The Price Adjustment provision shall not be applicable for delayed period if the contract is not completed in time due to the delay caused by the contractor or the contract is a Lump sum Contract
54. Retention	54.1 The Employer shall retain from each payment due to theContractor the proportion stated in the SCC until Completion of the whole of the Works. 54.2 Upon the issue of a Defects Liability Certificate by the Project Manager, **in accordance with GCC** 70.1, half the total amount retained shall be repaid to the Contractor and half when the Contractor has submitted the evidence of submission of tax return to the concerned Internal Revenue Office. The Contractor may substitute retention money with an "on demand" bank guarantee having validity at least one month more than the end of defect liability period if: (a) at least eighty (80) percent of the whole works have been completed, (b) progress of the works is satisfactory in accordance with the Contract as per approved work schedule, (c) it can be assured that the works can be completed at the intended completion date.
55. Liquidated Damages	55.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the SCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount **defined in the SCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities. 55.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of

	repayment, at the rates specified in GCC.49
56. Bonus	56.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the SCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.
57. Advance Payment	57.1 The Employer shall make advance payment to the Contractor of the amounts stated in the SCC in two equal installments by the date **stated in the SCC**, against provision by the Contractor of an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in a form acceptable to the Employer in amounts equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.
	57.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager. 57.3 The advance payment shall be repaid by deducting proportionate amounts, **as stated in SCC**, from payments otherwise due Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
58. Securities	58.1 The Performance Security, including any additional security required as per ITB 32.5 and ITB 37.1, shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the SCC,** by a Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law acceptable to the Employer, and denominated in Nepalese Rupees. The Performance Security shall be valid until a date 30 days from the date of issue of the Defect Liability Certificate in the case of a bank guarantee. Any additional performance security required as per ITB 32.5 shall be valid until a date 30 days from the date of issue of the certificate of Completion in the case of a bank guarantee. Any additional performance security required as per ITB 37.1 shall be valid until a date 30 days from the date of issue of the certificate of DLP in the case of a bank guarantee. 58.2 The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by an Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in Nepal.
59. Day works	59.1 If applicable, the Day works rates in the Contractor's Bid shall be used for small additional amounts of work only when the Project Manager has given written

	instructions in advance for additional work to be paid for in that way. 59.2 All work to be paid for as Day works shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done. 59.3 The Contractor shall be paid for Day works subject to obtaining signed Day works forms.
60. Cost of Repairs	60.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.
F. Force Majeure	
61. Definition of Force Majeure	61.1 In this Clause, "Force Majeure" means an exceptional event or circumstance, (a) which is beyond a Party's control; (b) which such Party could not reasonably have provided against before entering into the Contract; (c) which, having arisen, such Party could not reasonably have avoided or overcome; and (d) which is not substantially attributable to the other Party.
	61.2 Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied: (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies; (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war; (c) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel; (d) munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; and (e) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.
62. Notice of Force Majeure	62.1 If a Party is or will be prevented from performing its substantial obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.
	62.2 The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.

	62.3 Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.
63. Duty to Minimize Delay	63.1 Each Party shall at all times use all reasonable endeavors to minimize any delay in the performance of the Contract as a result of Force Majeure.
	63.2 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.
64. Consequences of Force Majeure	64.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under GCC 62, and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to GCC 30 to (a) an extension of time for any such delay, if completion is or will be delayed, under GCC35 ; and (b) if the event or circumstance is of the kind described in sub-paragraphs (a) to (d) of GCC 61.2 and, in the case of subparagraphs (b) to (d), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destructed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in GCC 19.
	64.2 After receiving this notice, the Project Manager shall proceed in accordance with GCC 10 to agree or determine these matters.
65. Force Majeure Affecting Subcontractor	65.1 If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's nonperformance or entitle him to relief under this Clause.
66.Optional Termination, Payment and Release	66.1 If the execution of substantially all the Works in progress is prevented for a continuous period of 90 days by reason of Force Majeure of which notice has been given under GCC 62, or for multiple periods which total more than 150 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with GCC 72.5.
	66.2 Upon such termination, the Project Manager shall determine the value of the work done and issue a Payment Certificate, which shall include (a) the amounts payable for any work carried out for which a price is stated in the Contract; (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept

	delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal; (c) other Costs or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works; (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and (e) the Cost of repatriation of the Contractor's staff and labor employed wholly in connection with the Works at the date of termination.
67. Release from Performance	67.1 Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises, which makes it impossible or unlawful for either or both Parties to fulfill its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance, (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract; and (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under GCC 66 if the Contract had been terminated under GCC 66.
G. Finishing the Contract	
68. Completion	68.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed. 68.2 In addition to the other provisions, before acceptance of the completed works, Employer shall verify and assure that such works are within the set objective, quality and appropriate to operate and use.
69. Taking Over	69.1 In the contractor's Opinion, if the works are complete and ready for taking over, the contractor may apply by notice to the Project Manager for a Taking-Over Certificate. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section. 69.2 The Project Manager shall, within 30 days after receiving the Contractor's application: (a) issue the Taking-Over Certificate to the Contractor if physical progress of works is at least ninety (90) percent in accordance with the Contract except for any minor outstanding work and defects (as listed in the Taking-Over Certificate) which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or (b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The

	Contractor shall then complete this work before issuing a further notice under this Sub-Clause. 69.3 If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 30 days, and if the Works or Section (as the case may be) are substantially completed in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.
70. Final Account	70.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 60 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 60 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.
71. Operating and Maintenance Manuals	71.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the **dates stated in the SCC**. 71.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the SCC** pursuant to **GCC 71.1,** or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the SCC** from payments due to the Contractor.
72. Termination	72.1 The Employer may terminate the Contract at any time if the contractor; a. does not commence the work as per the Contract, b. abandons the work without completing, c. fails to achieve progress as per the Contract. 72.2 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. 72.3 Fundamental breaches of Contract shall include, but shall not be limited to, the following : (a) The Contractor uses the advance payment for matters other than the contractual obligations, (b) the Contractor stops work for 30 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager; (c) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days; (d) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation. (e) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 90 days of the date of the Project Manager's certificate; (f) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager; (g) the Project Manager gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with GCC Sub clause 22.1 and the

	Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Project Manager; (h) the Contractor does not maintain a Security, which is required; (i) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, **as defined in the SCC**; and (j) If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC 73.1. 72.4 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC 72.3 above, the Project Manager shall decide whether the breach is fundamental or not. 72.5 Notwithstanding the above, the Employer may terminate the Contract for convenience. 72.6 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.
73.Fraud and Corruption	73.1 If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 15 days' notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site. 73.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with GCC Clause 15. For the purposes of this GCC 73; (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party. (ii) "fraudulent practice"[5] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "collusive practice"[6] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party; (iv) "coercive practice"[7] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (v) "obstructive practice" is (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (bb) acts intended to materially impede the exercise of the GON's/DP's

	inspection and audit rights provided for under GCC28.3.
74. Black Listing	74.1 Without prejudice to any other rights of the Employer under this Contract, GoN, Public Procurement Monitoring Office (PPMO), on the recommendation of procuring entity, may blacklist a Bidder for its conduct for a period of one (1) to three (3) years on the following grounds and seriousness of the act committed by the bidder: (a) if it is established that the Contractor has committed substantial defect in implementation of the contract or has not substantially fulfilled its obligations under the contract or the completed work is not of the specified quality as per the contract. (b) If convicted from a court of law in a criminal offense liable to be disqualified for taking part in procurement contract, (c) If it is established that the Contractor has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.
75. Payment upon Termination	75.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer. 75.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.
	75.3 If the Contract is terminated because of fundamental breach of Contract or for any other fault by the Contractor, the performance security shall be forfeited by the Employer. In such case, amount to complete the remaining works as per the Contract shall be recovered from the Contractor as Government dues.
76. Property	76.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
77.Release from Performance	77.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.
78. Suspension of DP Loan/Credit/Grant	78.1 In the event that the DP suspends the loan/ credit/grant to the Employer from which part of the payments to the Contractor are being made: a. the Employer is obligated to notify the Contractor of such suspension within 7 days of having received the DP's suspension notice; and b. if the Contractor has not received sums due him within the 30 days for payment provided for in GCC 49.1, the Contractor may immediately issue a 15-day

	termination notice.
79. Eligibility	79.1 The Contractor shall have the nationality of an eligible country as specified in Section V of the bidding document. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.
	79.2 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as specified in Section V of the bidding document and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment, and services.
	79.3 For purposes of GCC 79.2, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.
80.ProjectManager's Duties and Authorities	80.1 The Project Manager's duties and authorities are restricted to the extent as **stated in the SCC**.
81.Quarries and Spoil Dumps	81.1 Any quarry operated as part of this Contract shall be maintained and left in a stable condition without steep slopes and be either refilled or drained and be landscaped by appropriate planting. Rock or gravel taken from a river shall be removed over some distance so as to limit the depth of material removed at any one location, not disrupt the river flow or damage or undermine the river banks. The Contractor shall not deposit excavated material on land in Government or private ownership except as directed by the Project Manager in writing or by permission in writing of the authority responsible for such land in Government ownership, or of the owner or responsible representative of the owner of such land in private ownership, and only then in those places and under such conditions as the authority, owner or responsible representative may prescribe.
82. Local Taxation	82.1 The prices bid by the Contractor shall include all taxes that may be levied in accordance to the laws and regulations in being in Nepal on the date 30 days prior to the closing date for submissions of Bids on the Contractor's equipment, plant and materials acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from his responsibility to pay any tax that may be levied in Nepal on profits made by him in respect of the Contract.
83. Value Added Tax	83.1 The Contract is not exempted from value added tax. An amount specified in the schedule of taxes shall be paid by the Contractor in the concerned VAT office within time frame specified in VAT regulation.

84. Income Taxes on Staff	84.1 The Contractor's staff, personnel and labor will be liable to pay personal income taxes in Nepal in respect of their salaries and wages, as are chargeable under the laws and regulations for the time being in force, and the Contractor shall perform such duties in regard to such deductions as may be imposed on him by such laws and regulations. 84.2 The issue of the Final Account Certificate pursuant to clause GCC 70 shall be made only upon submittal by the Contractor of a certificate of income tax clearance from the Government of Nepal.
85. Duties, Taxes and Royalties	85.1 Any element of royalty, duty or tax in the price of any goods including fuel oil, and lubricating oil, cement, timber, iron and iron goods locally procured by the Contractor for the works shall be included in the Contract rates and prices and no reimbursement or payment in that respect shall be made to the Contractor. 85.2 The Contractor shall familiarize himself with GON the rules and regulations with regard to customs, duties, taxes, clearing of goods and equipment, immigration and the like, and it will be necessary for him to follow the required procedures regardless of the assistance as may be provided by the Employer wherever possible. 85.3 The Contractor shall pay and shall not be entitled to the reimbursement of cost of extracting construction materials such as sand, stone/boulder, gravel, etc. from the river beds or quarries. Such prices will be levied by the local District Development Committee (DDC) as may be in force at the time. The Contractor, sub-contractor(s) employed directly by him and for whom he is responsible, will not be exempted from payment of royalties, taxes or other kinds of surcharges on these construction materials so extracted and paid for to the DDC.
86. Member of Government, etc, not Personally Liable	86.1 No member or officer of GoN or the Employer or the Project Manager or any of their respective employees shall be in any way personally bound or liable for the act or obligations of the Employer under the Contract or answerable for any default or omission in the observance or performance of any of act, matter or thing which are herein contained.
87. Approval of Use of Explosives	87.1 No explosives of any kind shall be used by the Contractor without the prior consent of the Employer in writing and the Contractor shall provide, store and handle these and all other items of every kind whatsoever required for blasting operations, all at his own expense in a manner approved in writing by the Employer.
88 Compliance with Regulations for Explosives	88.1 The Contractor shall comply with all relevant ordinances, instructions and regulations which the Government, or other person or persons having due authority, may issue from time to time regarding the handling, transportation, storage and use of explosives.
89. Permission for Blasting	89.1 The Contractor shall at all times maintain full liaison with and inform well in advance, and obtain such permission as is required from all Government authorities, public bodies and private parties whatsoever concerned or affected, or likely to be concerned or affected by blasting operation.
90.Records of Explosives	90.1 Before the beginning of the Defects Liability Period, the Contractor shall account to the satisfaction of the Project Manager for all explosives brought on to the Site during the execution of the Contract and the Contractor shall remove all unused explosives from the Site on completion of works when ordered by the Project

	Manager.
91. Traffic Diversion	91.1 The Contractor shall include the necessary safety procedures regarding and pedestrian traffic diversion that is needed in execution of the works. The Contractor shall include in his costing of works, any temporary works or diversion that are needed during the construction period. All traffic diversion should be designed for the safety of both the motoring public and the men at work. It shall ensure the uninterrupted flow of traffic and minimum inconvenience to the public during the period concerned. As such, adequate warning signs, flagmen and other relevant safety precautionary measures shall be provided to warn motorists and pedestrians well ahead of the intended diversion as directed by the Project Manager. All traffic devices used shall be designed in accordance with the instruction of Project Manager.

Section VIII. Special Conditions of Contract (SCC)

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

A. General	
GCC 1.1 (q)	The Employer is NEA, Bagmati Province, Province Division Office, Hetauda
GCC 1.1 (v)	The Intended Completion Date for the whole of the Works shall be 6 Month
GCC 1.1 (bb) & 10.1	The Project Manager is Jitendra Kumar Jha The Project Manager and Engineer are synonyms
GCC 1.1 (ee)	The Site is located at Sindhuli, Bhiman 33 kV Substation and is defined in drawings No. as per NEA.
GCC 1.1 (hh)	The Start Date shall be 09-09-2025
GCC 1.1 (ll)	The Works consist of Design, Supply, Installation, Testing and Commissioning of 33kV Bay Extension works in 33/11kV Bhiman SubStation.
GCC 2.2	Sectional Completions are: As per NEA Requirements.
GCC 2.3(i)	The following documents also form part of the Contract: listed in the SCC
GCC 3.1	The language of the contract is ENGLISH/NEPALI The law that applies to the Contract is the law of NEPAL
GCC 11.1	The Project Manager may delegate any of his duties and responsibilities.
GCC 14.1	Schedule of other contractors: NA

GCC 19.1	The minimum insurance amounts and deductibles shall be: 1. The minimum cover for loss of or damage to the Works, Plant and Materials is: [insert percent] of the Contract Amount. 2. The maximum deductible for insurance of the Works and of Plant and Materials is: [insert amount] 3. The minimum cover for loss or damage to Equipment is : [insert amount] 4. The maximum deductible for insurance of Equipment is: [insert amount 5. The minimum for insurance of other property is: [insert amount] with unlimited number of occurrences 6. The maximum deductible for insurance of other property is: [insert amount] 7. The minimum cover for personal injury or death insurance i. for the Contractor's employees is that specified in the Labor act of Nepal and ii. for other people is :[insert amount] with an unlimited number of occurrences
GCC 20.1	Site Investigation Reports are: Required
GCC 23.1	The following shall be designed by the Contractor: As per NEA Requirements.
GCC 26.1	The Site Possession Date(s) shall be: One week after the contract agreement.
GCC 28.4	The Contractor shall at its own expense and at no cost to the Employer carry out all such tests and/or inspections of the Goods and Related Services as are specified in Sections V, Work Requirements. The inspections and tests may be conducted on the premises of the Contractor or its Subcontractor, at point of delivery, and/or at the final destination of the Goods, or in another place in Nepal. If conducted on the premises of the Contractor or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Employer. Employer or its designated representative shall be entitled to attend the tests and/or inspections referred provided that the Employer bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses. Whenever the Contractor is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Employer. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer or its designated representative to attend the test and/or inspection. The Employer may require the Contractor to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications, codes and standards under the Contract, provided that the Contractor's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected. The Contractor shall provide the Employer with a report of the results of any such test and/or inspection. The Employer may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Contractor shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Employer, and shall repeat the test and/or inspection, at no cost to the Employer, upon giving a notice pursuant to The Contractor agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Employer or its representative, nor the issue of any report pursuant to shall release the Contractor from any warranties or other obligations under the Contract.
GCC 30.1	The place of arbitration shall be: according to Law of Nepal.

B. Time Control

GCC 34.1	The Contractor shall submit for approval a Program for the Works within 365days from the date of the Letter of Acceptance.

GCC 34.3	The period between Program updates is 15 days The amount to be withheld for late submission of an updated Program is as per NEA NPR.

C. Quality Control

GCC 42.1	The Defects Liability Period is 365 days.

D. Cost Control

GCC 49.1	Prevailing Interest Rate NA %
GCC 53.1	The Contract is not subject to price adjustment.
GCC 53.6	Base Price of Construction Materials applicable for price adjustment shall be as per the Table of Adjustment Data submitted by Bidder together with the Letter of Price Bid which is approved by the Project manager.
	Bidder should propose Base Price and Source
	Base Price of Construction Materials applicable for price adjustment shall be as per the Table of Adjustment Data submitted by Bidder together with the Letter of Bid which is approved by the Project manager

Sl No.	Construction Material	Unit	Base Price (NRs/Unit) (Ex-factory)	Source (Factory)
1	NA	NA	0.00	0

GCC 53.7	The Price Adjustment amount shall be limited to a maximum 0 % of the initial Contract Amount
GCC 54.1	The proportion of payments retained is: 5 %
GCC 55.1	The liquidated damages for the whole of the Works are 0.05 % of the final Contract Price per day. The maximum amount of liquidated damages for the whole of the Works is 10 % of the final Contract Price.
GCC 56.1	The Bonus for the whole of the Works is 0 % per day. The maximum amount of Bonus for the whole of the Works is 0 % of the Contract Price.

GCC 57.1	The Advance Payments shall be 5.00 % and shall be paid in two equal installments and to the Contractor.

Installment	Percentage	Requirement
2	5.0	10

GCC 57.3	Deductions from Payment Certificates will commence in the first certificate in which the value of works executed exceeds 30% of the Contract Price. Deduction will be at the rate of 0% of the respective Monthly Interim Payment Certificate until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the end of 80% of the approved contract price.
GCC 58.1	The Performance Security amount is 5 %

E. Finishing the Contract

GCC 71.1	The date by which operating and maintenance manuals are required is NEA
GCC 71.2	The date by which “as built” drawings are required is NEA The amount to be withheld for failing to produce "as built" drawings and/or Operating and maintenance manuals is As Per
GCC 72.3 (i)	The maximum number of days is 30 days
GCC 80	The Project Manager has to obtain the specific approval of the Employer for taking any of the following actions : a. Approving subcontracting of any part of the works under General Conditions of Contract Clause 13; b. Certifying additional costs determined under General Conditions of Contract Clause 50; c. Determining start date under General Conditions of Contract Clause 1; d. Determining the extension of the intended Completion Date under General Conditions of Contract Clause 35; e. Issuing a Variation under General Conditions of Contract Clause 1 and 46, except in an emergency situation, as reasonably determined by the Project Manager; emergency situation may be defined as the situation when protective measures must be taken for the safety of life or of the works or of adjoining property. f. Adjustment of rates under General Conditions of Contract Clause 45;

Section IX: Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

Section IX: Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

Letter of Intent
[on letterhead paper of the Employer]

Date: ... ……

To: .....***Name and address of the Contractor***.....

Subject: …… Issuance of letter of intent to award the contract.....

This is to notify you that, it is our intention to award the contract ..…… ***[insert date]*** .....for execution of the ....…….***[insert name of the contract and identification number, as given in the Contract Data/SCC]*** to you as your bid price ..... ***[insert amount in figures and words in Nepalese Rupees]*** as corrected and modified in accordance with the Instructions to Bidders is hereby selected as substantially responsive lowest evaluated bid.

Authorized Signature: ……

Name: ... ……..

Title: ……..

CC:
[Insert name and address of all other Bidders, who submitted the bid]

[Notes on Letter of Intent
The issuance of Letter of Intent is the information of the selection of the bid of the successful bidder by the Employer and for providing information to other unsuccessful bidders who participated in the bid as regards to the outcome of the procurement process. This standard form of Letter of Intent to Award should be filled in and sent to the successful Bidder only after evaluation and selection of substantially responsible lowest evaluated bid.]

Letter of Acceptance
[on letterhead paper of the Employer]

Date: ……..

To: ……***Name and address of the Contractor***……..

Subject: ……*Notification of Award*

This is to notify that your Bid dated ……***date*** ……..for execution of the……***name of the contract and identification number, as given in the Contract Data/SCC*** …….. for the Contract price of Nepalese Rupees ***[insert amount in figures and words in Nepalese Rupees],*** as corrected in accordance with the Instructions to Bidders is hereby accepted in accordance with the Instruction to Bidders.

You are hereby instructed to contact this office to sign the formal contract agreement within 15 days with Performance Security of **NRs**. ……. in accordance with the Conditions of Contract, using for that purpose the Performance security Form included in Section X (Contract Forms) of this Bidding Document.

Authorized Signature: ……..

Name and Title of Signatory: ……

Contract Agreement

THIS AGREEMENT made the .....day of.....between…….. name of the Employer ***……(hereinafter "the Employer"),*** of the one part, and ……name of the Contractor ……(hereinafter "the Contractor"), of the other part:

WHEREAS the Employer desires that the Works known as …….. name of the Contract .....should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects in the sum of NRs ***.....[insert amount of contract price in words and figures including taxes]***(hereinafter "the Contract Price").

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
   (a) the Letter of Acceptance;
   (b) the Letters of Bid;
   (c) the Addenda Nos ..... **Insert addenda numbers if any** ……
   (d) the Special Conditions of Contract;
   (e) the List of Eligible Countries that was specified in Section V of the bidding document,
   (f) the General Conditions of Contract;
   (g) the Specification;
   (h) the Drawings;
   (i) Bill of Quantities (or Schedules of Prices for lump sum contracts), and
   (j) Table of Price Adjustment Data
   (k)List of Approved Subcontractors
   (l)…… ..**[Specify if there are any other document]**

3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, 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 hereto have caused this Agreement to be executed in accordance with the laws of Nepal on the day, month and year indicated above.

Signed by ……..
for and on behalf the Contractor in the presence of

Witness, Name Signature, Address, DateList of Approved Subcontractors

In accordance with GCC Sub-Clause 13.1,The following Subcontractors are approved for carrying out the work as specified below.

Name of Subcontractors	Description of Works	Value/Percentage of subcontract

Performance Security

(On letterhead paper of the Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law)

..... ***Bank's Name, and Address of Issuing Branch or Office*** .....
Beneficiary: ..... Name and Address of Employer …….....
Date: .....

Performance Guarantee No.:……..

We have been informed that ... ... ***[insert name of the Contractor]*** (hereinafter called "the Contractor") has been notified by you to sign the Contract No. …….. ***[insert reference number of the Contract]*** for the execution of ……. ***[insert name of contract and brief description of Works]*** (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we..…… ***[insert name of the Bank]*** hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of .....***[insert name of the currency and amount in figures*] (…….. insert amount in words)*** such sum being payable in Nepalese Rupees, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the……..Day of …… **, and any demand for payment under it must be received by us at this office on or before that date.

……

Seal of Bank and Signature(s)

Note:
All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

* The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract in Nepalese Rupees.

** Insert the date thirty days after the date specified for the Defect Liability Period. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee".

Advance Payment Security

(On letterhead paper of the Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law)

…… Bank's Name, and Address of Issuing Branch or Office……

Beneficiary: ……***Name and address of employer***

Date : ……

Advance Payment Guarantee No……..

We have been informed that ……has entered into Contract No. ..... ***Name and Address of Employer***……***name of the Contractor***……(hereinafter called "the Contractor")..reference number of the Contract……dated …… with you, for the execution of ...contract and brief description of Works …….. (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum…….. name of the currency and amount in figures****...(.... amount in words .....)*** is to be made against an advance payment guarantee.

At the request of the Contractor, we……. ***name of the Bank*** …….. hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of……..name of the currency and amount in figures****..... .(…… amount in words ..... .)*** upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the ..... day of .....**, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

……

Seal of Bank and Signature(s)

Note:

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

*The Guarantor shall insert an amount representing the amount of the advance payment in Nepalese Rupees of the advance payment as specified in the Contract.

** Insert the date Thirty days after the expected completion date. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee".