

Government of Nepal
Ministry of Infrastructure Development
Department of Roads
Project Directorate (ADB)
Bishalnagar, Kathmandu, Nepal

Invitation for Bids

IFB No.:	SHEP/2026-01
Date of Publication:	August 27, 2026
Loan No. and Title :	Loan No.: 4316 –NEP / Project No: 52097-003-NEP: SASEC Highway Enhancement Project (SHEP)
Contract ID No. and Title:	SHEP/OCB/KL/06: Upgrading of Kakarbhitta - Laukahi Section of East-West Highway (Section 04) from Km 95+760 to Km 111+500
Deadline for Submission of Bids:	October 8, 2026, 12:00 hours (Nepal Standard Time)

1. The Government of Nepal has received financing from the Asian Development Bank (ADB) towards the cost of SASEC Highway Enhancement Project (SHEP). Part of this financing will be used for payments under the Contract named above. Bidding is open to Bidders from eligible source countries of ADB.
2. The Ministry of Infrastructure Development, Department of Roads, Project Directorate (ADB), Kathmandu, Nepal ("The Employer") invites sealed bids from eligible Bidders for the construction and completion of the following project ("The Works"):

Contract ID No.	Description of Works
SHEP/OCB/KL/06	Upgrading of Kakarbhitta - Laukahi Section of East-West Highway (Section 04) from Km 95+760 to Km 111+500 with two phases viz: Phase 1: Upgrading Works - Upgrading from 2- lanes to 4-lanes and service lanes, structures, Bridges, etc. including Defect Notification Period. Phase 2: Performance Based Maintenance (PBM) Works - PBM maintenance works consisting of all activities to be carried out to achieve and keep the road assets as defined in the Specifications on that upgraded road section.

3. Open competitive bidding – International advertisement will be conducted in accordance with ADB's Single Stage: Two-Envelope (1S2E) bidding procedure and is open to all Bidders from eligible countries as described in the Bidding Document.
4. Only eligible Bidders with the following key qualifications defined in the Bidding Document may participate in this bidding. **Please refer Section 3 of the Bidding document for the key qualification criteria.**
 - a) **Minimum Average Annual Construction Turnover (as per Section 3 of Bidding Document): NRs. 4885.00 Million** calculated as total certified payments received for contracts in progress or completed, **within the last Five (5) years.**
 - b) **Financial Resources (as per Section 3 of Bidding Document):** Must demonstrate availability of Financial Resources (less its financial obligations for current contract commitments), meets or exceeds the total requirement for the subject contract, as detailed below:
 - Single Entity: NRs 815.00 Million
 - Joint Venture:
 - Lead partner must meet or exceed its required share of NRs 490.00 million
 - Each partner must meet or exceed its required share of NRs 122.00 million
 - The combined financial resources of the Joint Venture of NRs 815.00 million
 - c) **Contracts of Similar Size and Nature (as per Section 3 of Bidding Document): NRs 3910.00 Million.**
 - Participation as a contractor, Joint Venture partner, or Subcontractor, **in at least two contracts** that have been satisfactorily and substantially completed **within the last Seven (7) years** and that are similar to the proposed works, where the value of the Bidder's participation under each contract exceeds **3910.00 Million**. The similarity of the Bidder's participation shall be based on

- construction of **at least one road with 12 km length of four (4) lanes or more in each contract.**
- The bidder shall have satisfactorily and substantially completed **at least one contract for Civil Work in Road, Railway, Airport, Bridges or Tunnel of minimum value NRs 3910.00 Million**, either in Nepal or in any other country outside the country of incorporation of the Bidder.

5. To obtain further information and inspect the Bidding Document, Bidders should contact:

Department of Roads, Project Directorate (ADB), Bishalnagar, Kathmandu, Nepal

Tel No.: +977 1 4537492 / 4537493

Fax No.: +977 1 4537488

E-mail: pdadb@dor.gov.np

Attention: The Project Director

6. To purchase the Bidding Document in English, eligible Bidders should

- write to the address above requesting the Bidding Document for SHEP/OCB/KL/06; Upgrading of Kakarbhitta – Laukahi Section of East-West Highway (Section 04) from Km 95+760 to Km 111+500, and pay a non-refundable fee of **Nepalese Rupees (NRs.) 20,000.00** for one set of the bidding document in the following Revenue Account:

Name of Bank	Name of office	Revenue Account No.	Office Code	Revenue Heading	Bank Swift code
Rastriya Banijya Bank, Thamel Branch	Department of Roads, Project Directorate (ADB)	1000100200010000	337013518	14229	RBBANPKA

7. Deliver your bid

- to the address: Department of Roads, Project Directorate (ADB)
Street address: Bishalnagar
City: Kathmandu
Country: Nepal
- on or before the deadline: Date: **October 8, 2026, 12:00 hours** (Nepal Standard time).
- Together with a Bid Security as described in the Bidding Document.**

Bids will be opened promptly after the deadline for bid submission in the presence of Bidders' representatives who choose to attend.

8. When comparing Bids, Domestic Preference will not be applied as stipulated in the Bidding Document.

9. The Employer/Purchaser will not be responsible for any costs or expenses incurred by Bidders in connection with the preparation or submission/delivery of bids.

Government of Nepal
Ministry of Infrastructure Development
Department of Roads
Project Directorate (ADB)
Bishalnagar, Kathmandu, Nepal

SASEC Highway Enhancement Project (SHEP)
(ADB Loan No.: 4316 -NEP)

Kakarbhatta–Laukahi Section of East-West Highway (H01)
Ch 95+760 to Ch 111+500
Contract No. SHEP/OCB/KL/06

Phase 1: Upgrading Works

(Upgrading of existing road from 2-Lanes to 4 Lanes and Service Lanes, Structures, Bridges, etc. including Defect Notification Period)

Phase 2: Performance Based Maintenance Works

(Maintenance works consisting of all activities to be carried out to achieve and keep the road assets as defined in the PBM Specifications)

Bidding Document

Part I Bidding Procedures

Section1	Instruction to Bidders
Section2	Bid Data Sheet
Section3	Evaluation and Qualification Criteria Section
Section4	Bidding Forms incl. Bills of Quantities
Section5	Eligible Countries

August, 2026

Preface

This Bidding Document for the Procurement of Works (Single Stage – Two Envelope) has been prepared by the Government of Nepal, Ministry of Infrastructure Development, Department of Roads, Project Directorate (ADB) and is based on the Standard Bidding Document for the Procurement of Works (SBD Works) issued by the Asian Development Bank dated December, 2021.

ADB's SBD Works has the structure and the provisions of the Master Procurement Document entitled "Bidding Documents for the Procurement of Works", prepared by multilateral development banks and other public international financial institutions, except where ADB-specific considerations have required a change.

FOR REFERENCE ONLY

Table of Contents - Summary Description

PART I BIDDING PROCEDURES

Section 1 - Instructions to Bidders (ITB) ----- 1-3

This Section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, and evaluation of bids and on the award of contract.

Section 2 - Bid Data Sheet (BDS) ----- 2-1

This Section consists of provisions that are specific to each procurement and supplement the information or requirements included in Section 1 - Instructions to Bidders.

Section 3 - Evaluation and Qualification Criteria (EQC) ----- 3-1

This Section contains the criteria to determine the lowest evaluated bid and the qualifications of the Bidder to perform the contract.

Section 4 - Bidding Forms (BDF) ----- 4-1

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

Section 5 - Eligible Countries (ELC) ----- 5-1

This Section contains the list of eligible countries.

PART II REQUIREMENTS

Section 6 - Employer's Requirements (ERQ) ----- 6-1

This Section contains the Specifications, Drawings, and Supplementary Information that describe the Works to be procured, Personnel Requirements, and Equipment Requirements.

Section 6A – Summary of Description of Works-----

This Section contains the summary list of main works to be executed under the contract. Specification, Special provisions and, the Drawings, that describe the Works to be procured.

Section 6B – Standard Specifications-----

This document has been issued under the authority of the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads (2016 with amendment 2022) it can be purchased from the Quality, Research and Development Center, Chakupat, Lalitpur.

Section 6C – Special Provisions

This section contains amendments, supplements, etc. to the standard specifications to suit the specific requirements of the project, including sections regarding Minor Bridges and PBM works.

Section 6D – Environmental, Health and Safety Management Requirement

This section provides the Environmental, Health and Safety Management Requirement

Section 6E – Drawings

The drawings are presented in a separate volume.

Section 6F

Supplementary Information Regarding Works to Be Procured

This section provides the supplementary information regarding the works

Section 6G– Personnel Requirements

This section provides the information on Personnel Requirements.

Section 6H – Equipment Requirements

This section provides the information on Equipment Requirements.

Section 6I- Check list for OCHS including arrangement for protection against COVID-19

This section provides check list for OCHS

PART III

CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section 7 - General Conditions of Contract (GCC) ----- 7-1

This Section contains the general clauses that govern the Contract. These General Conditions shall be the Conditions of Contract for Construction, Multilateral Development Bank Harmonized Edition, prepared by the **Fédération Internationale des Ingénieurs-Conseil (FIDIC 2010 MDB version)**. These Conditions are subject to the variations and additions set out in Section 8 (Particular Conditions of Contract).

Section 8 - Particular Conditions of Contract (PCC) ----- 8-1

This Section contains provisions that are specific to each contract and that modify or supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC

Section 9 - Contract Forms (CF) ----- 9-1

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 1: Instructions to Bidders

This Section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, evaluation of bids, and award of contract.

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FOR REFERENCE ONLY

A. General

- 1. Scope of Bid**
- 1.1 In connection with the Invitation for Bids (IFB) 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 6 (Employer's Requirements). The name, identification, and number of contracts of the open competitive bidding (OCB) 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 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "ADB") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
- 2.2 Payments by the ADB will be made only at the request of the Borrower and upon approval by ADB in accordance with the terms and conditions of the Financing Agreement between the Borrower and ADB (hereinafter called "Financing Agreement"), and will be subject in all respects to the terms and conditions of that Financing Agreement. No party other than the Borrower shall derive any rights from the Financing Agreement or have any claim to the funds.
- 3. Fraud and Corruption**
- 3.1 ADB requires Borrowers (including beneficiaries of ADB-financed activity) and their personnel, as well as firms and individuals participating in an ADB-financed activity, including but not limited to, Bidders, Suppliers, and Contractors, agents, subcontractors, sub consultants, service providers, sub suppliers, manufacturers (including their respective officers, directors, employees and personnel) under ADB-financed contracts to observe the highest standard of ethics during the procurement and execution of such contracts in accordance with ADB's Anticorruption Policy (1998, as amended from time to time). In pursuance of this policy, ADB
- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (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) "abuse" means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard;
- (vi) "conflict of interest" means any situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations; and
- (vii) "integrity violation" is any act, as defined under ADB's Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB's Anticorruption Policy, including (i) to (vi) above and the following: obstructive practice, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award or any of its officers, directors, employees, personnel, sub consultants, subcontractors, service providers, suppliers or manufacturers 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) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation, including by failing to inform ADB in a timely manner at the time they knew of the integrity violations;
- (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in ADB-financed, -administered, or -supported activities or to benefit from an ADB-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) will have the right to require that a provision be included in bidding documents and in contracts financed, administered, or supported by ADB, requiring Bidders, suppliers and contractors, consultants, manufacturers, service providers and other third parties engaged or involved in ADB-related activities, and their respective officers, directors, employees and personnel, to permit ADB or its representative to inspect the site and their assets, accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

¹ Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

3.2 All Bidders, consultants, contractors, suppliers, manufacturers, service providers, and other third parties engaged or involved in ADB-related activities, and their respective officers, directors, employees and personnel, are obliged to cooperate fully in any investigation when requested by ADB to do so. As determined on a case by case basis by ADB, such cooperation includes, but is not limited to, the following:

- (a) being available to be interviewed and replying fully and truthfully to all questions asked;
- (b) providing ADB with any items requested that are within the party's control including, but not limited to, documents and other physical objects;
- (c) upon written request by ADB, authorizing other related entities to release directly to ADB such information that is specifically and materially related, directly or indirectly, to the said entities or issues which are the subject of the investigation;
- (d) cooperating with all reasonable requests to search or physically inspect their person and/or work areas, including files, electronic databases, and personal property used on ADB activities, or that utilizes ADB's Information and Communication Technology (ICT) resources or systems (including mobile phones, personal electronic devices, and electronic storage devices such as external disk drives);
- (e) cooperating in any testing requested by ADB, including but not limited to, fingerprint identification, handwriting analysis, and physical examination and analysis; and
- (f) Preserving and protecting confidentiality of all information discussed with, and as required by, ADB.

3.3 All Bidders, consultants, contractors and suppliers shall require their officers, directors, employees, personnel, agents to ensure that, in its contracts with its sub-consultants, Subcontractors, and other third parties engaged or involved in ADB-related activities, such sub-consultants, Subcontractors, and other third parties similarly are obliged to cooperate fully in any investigation when requested by ADB to do so.

3.4 The Employer hereby puts the Bidder on notice that the Bidder or any Joint Venture partner of the Bidder (if any) may not be able to receive any payments under the Contract if the Bidder or any of its Joint Venture partners, as appropriate, is, or is owned (in whole or in part) by a person or entity subject to applicable sanctions.

3.5 Furthermore, Bidders shall be aware of the provision stated in Subclause 1.15 and 15.6 of the Conditions of Contract.

4. Eligible Bidders

4.1 A Bidder may be a natural person, private entity, or government-owned enterprise subject to ITB 4.5—or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture. In the case of a Joint Venture,

- (a) all partners shall be jointly and severally liable; and
- (b) the Joint Venture 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 Joint Venture during the bidding process and, in the event the Joint Venture is awarded the Contract, during contract execution.

- 4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered, 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.
- 4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in the bidding process if any of, including but not limited to, the following apply:
- (a) they have controlling shareholders 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 material information about or improperly influence 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, except for alternative offers permitted under ITB 3.3 of the Bidding Document. 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 a Bidder as a Subcontractor in another Bid or of a firm as a Subcontractor in more than one Bid; or
 - (f) a Bidder, Joint Venture partner, associates, parent company, or any 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 or Borrower as Engineer for the contract; or
 - (h) a Bidder would be providing goods, works, or non consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or
 - (i) A Bidder that has a financial or familial relationship with staff of the Employer including project implementing/executing agency, or of a recipient of a part of the loan who: (i) are directly or indirectly involved in the preparation of the bidding documents or specifications of the contract, and/or the bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to ADB throughout the procurement process and execution of the contract.
- 4.4 A firm will not be eligible to participate in any procurement activities under an ADB-financed, -administered, or -supported project while under temporary suspension or debarment by ADB pursuant to its Anticorruption Policy (see ITB

3), whether such debarment was directly imposed by ADB, or enforced by ADB pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporarily suspended or debarred firm will be rejected and such bid may be in breach of debarment conditions, thereby subject to further ADB's investigation.

4.5 Government-owned enterprises in the Employer's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not a dependent agency of the Employer.

4.6 A Bidder shall not be under suspension from bidding by the Employer as the result of the execution of a Bid-Securing Declaration.

4.7 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

4.8 Bidders shall be excluded if, 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 payments to, a particular country, person or entity in respect of goods or services originating in that country. Where the Borrower's country prohibits payments to a particular person or entity or for particular goods or services by such an act of compliance, that firm shall be excluded.

4.9 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.

5. Eligible Materials, Equipment and Services

5.1 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as defined in ITB 4.2, 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 Document

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 1 - Instructions to Bidders (ITB)
Section 2 - Bid Data Sheet (BDS)
Section 3 - Evaluation and Qualification Criteria (EQC)
Section 4 - Bidding Forms (BDF)
Section 5 - Eligible Countries (ELC)

PART II Requirements

Section 6 - Employer's Requirements (ERQ)

PART III Conditions of Contract and Contract Forms

Section 7 - General Conditions of Contract (GCC)

Section 8 - Particular Conditions of Contract (PCC)

Section 9 - Contract Forms (COF)

6.2 The IFB 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 IFB.

6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. 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 on the Bidding Document shall contact the Employer in writing at the Employer's address indicated in the BDS or raise his inquiries 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 no later than 21 days prior to the deadline for submission of bids. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a 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 22.2.

7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own 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 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 to submit any questions in writing, to reach the Employer not later than 1 week before the meeting.

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 addenda.
- 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 22.2

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 two envelopes submitted simultaneously, one called the Technical Bid containing the documents listed in ITB 11.2 and the other the Price Bid containing the documents listed in ITB 11.3, both envelopes enclosed together in an outer single envelope.

- 11.2 The Technical Bid shall comprise the following:

- (a) Letter of Technical Bid;
- (b) Bid Security or Bid-Securing Declaration, in accordance with ITB 19;
- (c) alternative Bids, if permissible, in accordance with ITB 13;
- (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
- (e) documentary evidence in accordance with ITB 17, establishing the Bidder's qualifications to perform the contract;
- (f) Technical Proposal in accordance with ITB 16; and
- (g) any other document required in the BDS.

- 11.3 The Price Bid shall comprise the following:

- (a) Letter of Price Bid;
- (b) completed Price Schedules, in accordance with ITB 12 and ITB 14;

- (c) alternative price Bids, at Bidder's option and if permissible, in accordance with ITB 13; and
- (d) any other document required in the BDS.
- 11.4 In addition to the requirements under ITB 11.2, 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.
- 12. Letters of Bid and Schedules**
- 12.1 The Letters of Technical Bid and Price Bid, and the Schedules, including the Bill of Quantities, shall be prepared using the relevant forms furnished in Section 4 (Bidding Forms). 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 and as required in the BDS.
- 13. Alternative Bids**
- 13.1 Unless otherwise indicated in the BDS, alternative Bids shall not be considered.
- 13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS, as will the method of evaluating different times for completion.
- 13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the Bidding Document must first price the Employer's design as described in the Bidding Document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.
- 13.4 When specified in the BDS, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the BDS and described in Section 6 (Employer's Requirements). The method for their evaluation will be stipulated in Section 3 (Evaluation and Qualification Criteria).
- 14. Bid Prices and Discounts**
- 14.1 The prices and discounts quoted by the Bidder in the Letter of Price Bid and in the Bill of Quantities shall conform to the requirements specified below.
- 14.2 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. Unit rates and prices for all items of the Works described in the Bill of Quantities shall be expressed in positive values. If unit rates and prices are expressed in negative values, the bid will be rejected.
- 14.3 The price to be quoted in the Letter of Price Bid, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the Bid.
- 14.4 The Bidder shall quote any discounts and the methodology for their application in the Letter of Price Bid, in accordance with ITB 12.1.

14.5 The prices shall be either fixed or adjustable as specified in the BDS.

(a) In the case of Fixed Price, prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price will be treated as nonresponsive and rejected.

(b) In the case of Adjustable Price, prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, transport, and contractor's equipment in accordance with the provisions of the Conditions of Contract. A Bid submitted with a fixed price will be treated as nonresponsive and be rejected. The Bidder shall furnish the indexes and weightings for the price adjustment formulas in the Tables of Adjustment Data included in Section 4 (Bidding Forms) and the Employer may require the Bidder to justify its proposed indexes and weightings. Any bid that omits indexes and weightings shall be subject to clarification with the Bidder.

14.6 If so indicated in ITB 1.1, bids are being 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 packages. Price reductions or discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all contracts are submitted and opened at the same time.

14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 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.

15. Currencies of Bid and Payment

15.1 The unit rates and the prices shall be quoted by the Bidder entirely in the currency specified in the BDS.

15.2 Bidders shall indicate the portion of the bid price that corresponds to expenditures incurred in the currency of the Employer's country in the Schedule of Payment Currencies included in Section 4 (Bidding Forms).

15.3 Bidders expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country and wishing to be paid accordingly may indicate the other currencies in the Schedule of Payment Currencies included in Section 4 (Bidding Forms).

15.4 The rates of exchange to be used by the Bidder for currency conversion during bid preparation shall be the selling rates for similar transactions prevailing on the date 28 days prior to the deadline for submission of bids published by the source specified in the BDS. If exchange rates are not so published for certain currencies, the Bidder shall state the rates used and the source. Bidders should note that for the purpose of payments, the exchange rates confirmed by the source specified in the BDS as the selling rates prevailing 28 days prior to the deadline for submission of Bids shall apply for the duration of the Contract so that no currency exchange risk is borne by the Bidder.

- 15.5 Foreign currency requirements indicated by the Bidders in the Schedule of Payment Currencies shall include but not limited to the specific requirements for
- (a) expatriate staff and labor employed directly on the Works;
 - (b) social, insurance, medical and other charges relating to such expatriate staff and labor, and foreign travel expenses;
 - (c) imported materials, both temporary and permanent, including fuels, oil and lubricants required for the Works;
 - (d) depreciation and usage of imported Plant and Contractor's Equipment, including spare parts, required for the Works;
 - (e) foreign insurance and freight charges for imported materials, Plant and Contractor's Equipment, including spare parts; and
 - (f) overhead expenses, fees, profit, and financial charges arising outside the Employer's country in connection with the Works.
- 15.6 Bidders may be required by the Employer to clarify their foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Payment Currencies are reasonable and responsive to ITB 15.3 above, in which case a detailed breakdown of its foreign currency requirements shall be provided by the Bidder.
- 15.7 Bidders should note that during the progress of the Works, the foreign currency requirements on the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor in order to reflect any changes in foreign currency requirements for the Contract, in accordance with Sub clause 14.15 of the Conditions of Contract. Any such adjustment shall be effected by comparing the percentages quoted in the bid with the amounts already used in the Works and the Contractor's future needs for imported items.
- 16. Documents Comprising the Technical Proposal**
- 16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule, environmental, health and safety (EHS) management plan commensurate with the proposed scope of works, EHS Code of Conduct, and any other information as stipulated in Section 4 (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
- 17. Documents Establishing the Qualifications of the Bidder**
- 17.1 To establish its qualifications to perform the Contract in accordance with Section 3 (Evaluation and Qualification Criteria), the Bidder shall provide the information requested in the corresponding information sheets included in Section 4 (Bidding Forms).
- 17.2 Domestic Bidders, individually or in Joint Ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility as described in ITB 36.
- 18. Period of Validity of Bids**
- 18.1 Bids shall remain valid for the bid validity period specified in the BDS. The bid validity period starts from the date fixed for the bid submission deadline date prescribed by the Employer in accordance with ITB 22.1. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 18.2 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 19, it shall also be extended 28 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.

19. Bid Security/Bid-Securing Declaration

19.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, in original form, either a Bid-Securing Declaration or a bid security as specified in the BDS. In the case of a bid security, the amount and currency shall be as specified in the BDS.

19.2 If a Bid-Securing Declaration is required pursuant to ITB 19.1, it shall use the form included in Section 4 (Bidding Forms). The Employer will declare a Bidder ineligible to be awarded a Contract for a specified period of time, as indicated in the BDS, if the Bid-Securing Declaration is executed.

19.3 If a bid security is specified pursuant to ITB 19.1, the bid security shall be, at the Bidder's option, in any of the following forms:

- (a) an unconditional bank guarantee (hard copy of the bank guarantee or in the form of SWIFT message MT760), or
- (b) an irrevocable letter of credit, or
- (c) a cashier's or certified check.

all from a reputable source from an eligible country as described in Section 5 (Eligible Countries). In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section 4 (Bidding Forms) or another form acceptable to the Employer. The form must include the complete name of the Bidder. The bid security shall be valid for 28 days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.

19.4 Unless otherwise specified in the BDS, any Bid not accompanied by a substantially compliant bid security or Bid-Securing Declaration, if one is required in accordance with ITB 19.1, shall be rejected by the Employer as nonresponsive.

19.5 If a bid security is specified pursuant to ITB 19.1, the bid security of substantially nonresponsive Technical Bids shall be returned before opening the Price Bids. The bid security of unsuccessful Bidders at Price Bid evaluation shall be returned promptly upon the successful Bidder's furnishing of the performance security pursuant to ITB 45.

19.6 If a bid security is specified pursuant to ITB 19.1, the bid security of the successful Bidder shall be returned promptly once the successful Bidder has signed the Contract and furnished the required performance security.

19.7 The bid security may be forfeited or the Bid Securing Declaration executed, if

- (a) notwithstanding ITB 24.3, a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, except as provided in ITB 18.2; or
- (b) the successful Bidder fails to
 - (i) sign the Contract in accordance with ITB 44;
 - (ii) furnish a performance security in accordance with ITB 45;

- (iii) accept the arithmetical correction of its Bid in accordance with ITB 34; or
- (iv) furnish a domestic preference security, if so required.

19.8 If the bid security is required as per ITB 19.1, the bid security of a Joint Venture shall be in the name of the Joint Venture that submits the Bid. If the Joint Venture has not been legally constituted at the time of bidding, the bid security shall be in the name of any or all of the Joint Venture partners. If the Bid-Securing Declaration is required as per ITB 19.1, the Bid-Securing Declaration of a Joint Venture shall be in the name of the Joint Venture that submits the Bid. If the Joint Venture has not been legally constituted at the time of bidding, the Bid-Securing Declaration shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.

20. Format and Signing of Bid

20.1 The Bidder shall prepare one original set of the Technical Bid and one original set of the Price Bid comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - PRICE BID." Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE." In addition, the Bidder shall submit copies of the Technical and Price Bids, 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.

20.2 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. If a Bidder submits a deficient authorization, the Bid shall not be rejected in the first instance. The Employer shall request the Bidder to submit an acceptable authorization within the number of days as specified in the BDS. Failure to provide an acceptable authorization within the period as stated in the Employer's request shall cause the rejection of the Bid. If either the Letter of Technical Bid or Letter of Price Bid or Bid-Securing Declaration (if applicable) is not signed, the Bid shall be rejected.

20.3 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

21. Sealing and Marking of Bids

21.1 Bidders shall submit their Bids as specified in the BDS. Procedures for submission, sealing, and marking are as follows:

- (a) Bidders submitting Bids by mail or by hand shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and each copy of the Price Bid, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL - TECHNICAL BID," "ORIGINAL - PRICE BID," and "COPY NO... - TECHNICAL BID" and "COPY NO.... - PRICE BID." These envelopes, the first containing the originals and the others containing copies, shall then be enclosed in one single envelope per set. If permitted in accordance with ITB 13, alternative Bids shall be similarly sealed, marked and included in the sets. The rest of the procedure shall be in accordance with ITB 21.2 and ITB 21.5.
- (b) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in the BDS.

- 21.2 The inner and outer envelopes shall
- (a) bear the name and address of the Bidder;
 - (b) be addressed to the Employer in accordance with BDS 22.1; and
 - (c) bear the specific identification of this bidding process indicated in the BDS 1.1.
- 21.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bid, in accordance with ITB 25.1.
- 21.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer in accordance with ITB 25.7.
- 21.5 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.
- 22. Deadline for Submission of Bids**
- 22.1 Bids must be received by the Employer at the address and no later than the date and time indicated in the BDS.
- 22.2 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.
- 23. Late Bids**
- 23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.
- 24. Withdrawal, Substitution, and Modification of Bids**
- 24.1 A Bidder may withdraw, substitute, or modify its Bid – Technical or Price – after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.2 (except for withdrawal notices, which do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:
- (a) prepared and submitted in accordance with ITB 20 and ITB 21 (except for withdrawal notices, which do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION”; and
 - (b) received by the Employer no later than the deadline prescribed for submission of Bids, in accordance with ITB 22.
- 24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.
- 24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid or any extension thereof.
- 25. Bid Opening**
- 25.1 The Employer shall open the Technical Bids in public at the address, on the date and time specified in the BDS in the presence of Bidders’ designated representatives and anyone who chooses to attend. Any specific electronic bid

opening procedures required if electronic bidding is permitted in accordance with ITB 21.1, shall be as specified in the BDS. The Price Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening. If the Technical Bid and the Price Bid are submitted together in one envelope, the Employer may reject the entire Bid. Alternatively, the Price Bid may be immediately resealed for later evaluation.

25.2 First, 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.

25.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Price Bid will remain unopened in accordance with ITB 25.1. No envelope shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.

25.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Price Bids, both Original as well as Modification, will remain unopened in accordance with ITB 25.1.

25.5 All other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:

- (a) the name of the Bidder;
- (b) whether there is a modification or substitution;
- (c) the presence of a bid security or Bid-Securing Declaration, if required; and
- (d) any other details as the Employer may consider appropriate.

Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Technical Bid are to be initialed by at least three representatives of the Employer attending bid opening. No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with ITB 23.1.

25.6 The Employer shall prepare a record of the opening of Technical Bids that shall include, as a minimum, the name of the Bidder and whether there is a withdrawal, substitution, or modification; alternative proposals; and the presence or absence of a bid security or Bid-Securing Declaration, if one was required. 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. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

25.7 At the end of the evaluation of the Technical Bids, the Employer will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice of the opening of Price Bids.

25.8 The Employer will notify in writing Bidders who have been rejected for submitting nonresponsive Technical Bids and return their Price Bids unopened together with their bid securities, before opening the Price Bids of the substantially responsive Bidders.

25.9 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.

25.10 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:

- (a) the name of the Bidder;
- (b) whether there is a modification or substitution;
- (c) the Bid Prices, including any discounts and alternative offers; and
- (d) any other details as the Employer may consider appropriate.

Only Price Bids, discounts, and alternative offers read out and recorded during the opening of Price Bids shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Price Bid and Bill of Quantities are to be initialed by at least three representatives of the Employer attending bid opening. No Bid shall be rejected at the opening of Price Bids.

25.11 The Employer shall prepare a record of the opening of Price Bids that shall include, as a minimum, the name of the Bidder, the Bid Price (per lot if applicable), any discounts, and alternative offers. 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. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

E. Evaluation and Comparison of Bids

26. Confidentiality

26.1 Information relating to the examination, evaluation, comparison, and postqualification of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on the Contract award is communicated to all Bidders.

26.2 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.

- 26.3 Notwithstanding ITB 26.2, 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.
- 27. Clarification of Bids**
- 27.1 To assist in the examination, evaluation, and comparison of the Technical and Price 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 substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Price Bids, in accordance with ITB 34.
- 27.2 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.
- 28. Deviations, Reservations, and Omissions**
- 28.1 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.
- 29. Examination of Technical Bids**
- 29.1 The Employer shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.
- 29.2 The Employer shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer shall be rejected.
- (a) Letter of Technical Bid;
 - (b) written confirmation of authorization to commit the Bidder;
 - (c) Bid Security or Bid-Securing Declaration, if applicable; and
 - (d) Technical Proposal in accordance with ITB 16.
- 30. Responsiveness of Technical Bid**
- 30.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11.
- 30.2 A substantially responsive Technical 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.
- 30.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, Technical Proposal, in particular, to confirm that all requirements of Section 6 (Employer's Requirements) have been met without any material deviation, reservation, or omission.
- 30.4 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.
- 31. Nonmaterial Nonconformities**
- 31.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid that do not constitute a material deviation, reservation, or omission.
- 31.2 Provided that a Technical 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 Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 31.3 Provided that a Technical 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 method indicated in Section 3 (Evaluation and Qualification Criteria).
- 32. Qualification of the Bidder**
- 32.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meet the qualifying criteria specified in Section 3 (Evaluation and Qualification Criteria).
- 32.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1. Unless permitted in the BDS, the determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities or affiliates.
- 32.3 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. The Employer reserves the right to reject the bid of any bidder found to be in circumstances described in GCC 15.2(e). A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder.
- 33. Subcontractors**
- 33.1 Unless otherwise stated in the BDS, the Employer does not intend for the contractor to execute any specific elements of the Works through nominated subcontractors.
- 33.2 If subcontractors are proposed for any of the key activities listed in Section 3 (Evaluation and Qualification) Criteria 2.4.2, they shall be considered as "Specialist Subcontractors" and shall meet qualification requirements for the relevant key activities.

**34. Correction of
Arithmetical Errors**

34.1 During the evaluation of Price Bids, the Employer shall correct arithmetical errors on the following basis:

- (a) 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.
- (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 Price Bid, the bid price in the Summary of Bill of Quantities will prevail and the bid amount in item (c) of the Letter of Price 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.

34.2 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 may be forfeited or its Bid-Securing Declaration executed.

**35. Conversion to Single
Currency**

35.1 For evaluation and comparison purposes, the currency (ies) of the Bid shall be converted into a single currency as specified in the BDS.

36. Domestic Preference

36.1 Unless otherwise specified in the BDS, domestic preference shall not apply.

**37. Evaluation and
Comparison of Price
Bids**

37.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

37.2 To evaluate the Price Bid, the Employer shall consider the following:

- (a) the bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including Day work items, where priced competitively;
- (b) price adjustment for correction of arithmetic errors in accordance with ITB 34.1;
- (c) price adjustment due to discounts offered in accordance with ITB 14.4;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 35;
- (e) adjustment for nonmaterial nonconformities in accordance with ITB 31.3;
- (f) assessment whether the bid is abnormally low in accordance with ITB 38; and
- (g) application of all the evaluation factors indicated in Section 3 (Evaluation and Qualification Criteria).

37.3 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.

- 37.4 If this Bidding Document allows Bidders to quote separate prices for different contracts, and the award to a single Bidder of multiple contracts, the methodology to determine the lowest evaluated price of the contract combinations, including any discounts offered in the Letter of Price Bid, is specified in Section 3 (Evaluation and Qualification Criteria).
- 37.5 The Employer shall compare all substantially responsive Bids to determine the lowest evaluated Bid price, in accordance with ITB 37.2.
- 38. Abnormally Low bids**
- 38.1 An abnormally low bid is one where the bid price, in combination with other elements of the bid, appears to be so low that it raises concerns as to the capability of the Bidder to perform the contract for the offered bid price.
- 38.2 When the offered bid price appears to be abnormally low, the Employer shall undertake a three-step review process as follows:
- (a) identify abnormally low costs and unit rates by comparing them with the engineer's estimates, other substantially responsive bids, or recently awarded similar contracts;
 - (b) clarify and analyze the bidder's resource inputs and pricing, including overheads, contingencies and profit margins; and
 - (c) decide whether to accept or reject the bid.
- 38.3 With regard to ITB 38.2 (b) above, the Employer will seek a written explanation from the bidder of the reasons for the offered bid price, including a detailed analysis of costs and unit prices, by reference to the scope, proposed methodology, schedule, and allocation of risks and responsibilities. This may also include information regarding the economy of the manufacturing process; the services to be provided, or the construction method to be used; the technical solutions to be adopted; and any exceptionally favorable conditions available to the bidder for the works, equipment or services proposed.
- 38.4 After examining the explanation given and the detailed price analyses presented by the bidder, the Employer may:
- (a) accept the bid, if the evidence provided satisfactorily accounts for the low bid price and costs, in which case the bid is not considered abnormally low;
 - (b) accept the bid, but require that the amount of the performance security be increased at the expense of the bidder to a level sufficient to protect the Employer against financial loss. The amount of the performance security shall generally be not more than 20% of the contract price; or
 - (c) reject the bid if the evidence provided does not satisfactorily account for the low bid price, and make a similar determination for the next ranked bid, if required.
- 39. Unbalanced or Front-Loaded Bids**
- 39.1 If the Bid, which results in the lowest evaluated Bid Price, is seriously unbalanced or front-loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed, as well as the pricing and sources of materials, equipment and labor.
- 39.2 After the evaluation of the information and detailed price analyses presented by the Bidder, the Employer may as appropriate:
- (a) accept the Bid; or

(b) accept the Bid, but require that the total amount of the Performance Security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract subject to ITB 45.2; or

(c) reject the Bid and make a similar determination for the next ranked bid.

40. Employer's Right to Accept Any Bid, and to Reject Any or All Bids

40.1 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.

41. Notice of Intention for Award of Contract

41.1 If Standstill provisions apply as specified in the BDS, the standstill period shall be defined in the BDS to specify the duration subsequent to notification of intention for award of contract (before making the actual contract award) within which any unsuccessful bidder can challenge the proposed award.

F. Award of Contract

42. Award Criteria

42.1 The Employer shall award the Contract to the Bidder whose offer has been determined in line with ITB 37 to ITB 39 above 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.

43. Notification of Award

43.1 Prior to the expiration of the period of bid validity and upon expiry of the standstill period specified in ITB 41.1, or upon satisfactory resolution of a complaint filed within standstill period, if applicable, the Employer shall transmit the Notification of Award through issuance of Letter of Acceptance using the form included in Section 9 (Contract Forms) to the successful Bidder, in writing, that its Bid has been accepted.

43.2 Unless standstill period applies, upon notification of award through issuance of Letter of Acceptance, 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 and/or in a debriefing meeting to any unsuccessful Bidder who, after publication of contract award, requests a debriefing.

43.3 Until a formal contract is prepared and executed, the notification of award through issuance of Letter of Acceptance shall constitute a binding Contract.

43.4 Within 2 weeks of the award of contract or expiry of the standstill period, where such period applies, or, if a complaint has been filed within the standstill period, upon receipt of ADB's confirmation of satisfactory resolution of the complaint, the borrower shall publish in an English language newspaper or widely known and freely accessible website the results identifying the bid and lot or package numbers, as applicable and the following information:

(a) name of each Bidder who submitted a Bid;

(b) bid prices as read out at bid opening;

(c) name and evaluated prices of each Bid that was evaluated;

(d) name of Bidders whose bids were rejected and the reasons for their rejection; and

(e) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.

44. Signing of Contract

44.1 Promptly after notification, the Employer shall send the successful Bidder the Contract Agreement.

44.2 Within 28 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.

45. Performance Security

45.1 Within 28 days of the receipt of notification of award through issuance of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, subject to ITB 38 and ITB 39, using for that purpose the Performance Security Form included in Section 9 (Contract Forms), or another form acceptable to the Employer. If the bank issuing performance security is located outside the Employer's country, it shall be counter-guaranteed or encashable by a bank in the Employer's country.

45.2 Failure of the successful Bidder to submit the abovementioned performance security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security or execution of the Bid-Securing Declaration. 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.

45.3 The above provision shall also apply to the furnishing of a domestic preference security if so required.

46. Bidding-Related Complaints

46.1 The procedures for dealing with Bidding-Related Complaints arising out of this bidding process are specified in the BDS.

FOR REFERENCE ONLY

Section 2 - Bid Data Sheet

A. General

ITB 1.1	The number of the Invitation for Bids (IFB) is: SHEP/2026-02
ITB 1.1	The Employer is: Project Director, Project Directorate (ADB) of Department of Roads under Ministry of Infrastructure Development, Kathmandu, Nepal. The Authorized Representative is: Project Director, The Project Directorate (ADB)
ITB 1.1	The name of the open competitive bidding (OCB) is: Upgrading of Kakarbhitta-Laukahi Section of East-West Highway The identification number of the OCB is: SHEP/OCB/KL The contract identification number of this package is: SHEP/OCB/KL/06 This Bidding document is for the Contract package ID No. SHEP/OCB/KL/06: Upgrading of Kakarbhitta-Laukahi Section of East-West Highway (Section 04) from Km 95+760 to Km 111+500 with two phases viz: Phase 1: Upgrading Works - Upgrading from 2-lanes to 4-lanes and service lanes, structures, Bridges, etc. including Defect Notification Period and Phase 2: Performance Based Maintenance (PBM) Works - PBM maintenance works consisting of all activities to be carried out to achieve and keep the road assets as defined in the Specifications on that upgraded road section.
ITB 1.1	The Works under the Contract package will consist of upgrading of Kakarbhitta-Laukahi Section of East-West Highway (Section 04) from Km 095+760 to Km 111+500 with two phases viz: Phase 1: Upgrading Works Upgrading of existing road from 2-Lanes to 4 Lanes and Service Lanes, Structures, Bridges, etc. including Defect Notification Period. Phase 2: Performance Based Maintenance (PBM) Works 1. Maintenance Works consisting of all activities to be carried out by the Contractor to achieve and keep the road asset as defined in the Performance Based Maintenance Specifications, and all activities related to their management. 2. Emergency Works consisting of activities needed to reinstate any road assets which have been abnormally damaged as a result of natural or manmade phenomena such as storms, flooding, earthquakes, major accidents, etc. and which are not covered under monthly lump sum rates of maintenance works.
ITB 2.1	The Borrower is: Nepal
ITB 2.1	The name of the Project is SASEC Highway Enhancement Project (SHEP)

ITB 3.1	Add the following paragraph at the end sub clause 3.1. During evaluation process and/or even after recommendation for award If the Employer determines, based on reasonable evidence, that a bidder has engaged in corrupt, fraudulent, collusive or coercive practices, or other integrity violations, including the failure to disclose any required information which constitutes a fraudulent practice, in competing for, then the Employer shall, and expel the bidder from the evaluation and or contract award process, and the provisions of Clause 19.7 (C) shall apply. The Employer may recommend for blacklisting to the concerned authorities.
ITB 4.1	After the last paragraph of ITB 4.1 add: Throughout the bidding documents, including under Section 1, Section 2, Section 3, and Section 4, the expressions “Joint Venture” or “JV” shall have the same meaning as stipulated under the Conditions of Contract Sub-Clause 1.1.6.11; and “JV Undertaking” as stipulated in PCC Sub-Clause 1.1.6.12. Similarly, in the context of Joint Venture, throughout the bidding documents, the word “leader”, as stipulated under the Conditions of Contract Sub-Clause 1.14, is synonymous with the word “Representative” and with the words “lead partner” and with “Lead Partner”; the word “member” is synonymous with the word “partner” and with “Partner”, and the word “members” is synonymous with “partners” and with “Partners”. The words “JV Undertaking” is synonymous with “JV Agreement” and “Joint Venture Agreement”.

B. Contents of Bidding Documents

ITB 7.1	For <u>clarification purposes</u> only, the Employer's address is: The Project Director Project Directorate (ADB), Department of Roads, Bishalnagar, Kathmandu Tel No.: +977 1 4537492/4537493 Fax. No.: +977 1 4537498 E-mail: pdadb@dor.gov.np
ITB 7.4	A Pre-Bid meeting shall take place. It will be at the following date, time and place: Date : 17th September, 2026 Time : 13:00 hours (Nepal Standard Time) Place: Project Directorate (ADB). Bishalnagar, Kathmandu A site visit conducted by the Employer will not be organized.

C. Preparation of Bids

ITB 10.1	The language of the Bid is English.
ITB 11.2 (g)	The Bidder shall submit with its Technical Bid the following additional documents: • Firm/Company Registration Certificate (by all Firms in case of Joint Venture) • VAT Registration Certificate (Mandatory for domestic and resident foreign bidders only) • Tax Clearance Certificate/Tax return submission evidence/evidence of time extension (Mandatory for domestic and resident foreign bidders only) • Business Registration (License) Certificate • Bank Voucher/Cash Receipt for cost of Bid Document • Power of Attorney authorizing the Bid signatory • In case a Bidder is a Joint Venture, the Bidder shall submit a JV Undertaking document/JV agreement, as follows:

	- JV Undertaking, setting out the legal undertaking between the two or more partners as a JV. This document shall be signed by all JV partners, and shall be addressed to the Employer and shall include: - a)each such member's undertaking to be jointly and severally liable to the Employer for the performance of the Contractor's obligations under the Contract; b) identification and authorization of the lead partner of the JV; and c) identification of the separate scope or part of the Works (if any) to be carried out by each JV partner . The Undertaking shall indicate precisely the role of each partner of the JV, indicating distribution of responsibilities of each partner in execution of the Works, in respect of works execution and resource mobilization (construction equipment, key personnel, financing), and percentage share of responsibility, in the following format: <table><tr><th>Sl. No.</th><th>Name of the Partner</th><th>Role of each Partner (Identify Lead Partner / Each Partner)</th><th>Distribution of responsibilities in execution of the Works</th><th>% Participation</th></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	Sl. No.	Name of the Partner	Role of each Partner (Identify Lead Partner / Each Partner)	Distribution of responsibilities in execution of the Works	% Participation															
Sl. No.	Name of the Partner	Role of each Partner (Identify Lead Partner / Each Partner)	Distribution of responsibilities in execution of the Works	% Participation																	
ITB 12.1	The units and rates in figures entered into the Bill of Quantities and Day-work Schedule should be typewritten or if written by hand, must be in print form Bill of Quantities and Day-work Schedule not presented accordingly may be considered nonresponsive.																				
ITB 13.1	Alternative Bids shall not be permitted.																				
ITB 13.2	Alternative times for completion shall not be permitted.																				
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: Not Applicable																				
ITB 14.4	Add the following at the end of ITB 14.4: - The Bidder shall quote any unconditional discounts and the methodology for their application, on prices quoted in the bid so that the discounts can be evaluated by simple arithmetic calculation during financial evaluation of the bids, to arrive at the net total price of the bid. If the net total price cannot be calculated after application of the methodology of the discount(s) quoted, the bid shall be considered without taking into account the discount offered by the bidder in the Letter of Price Bid, in accordance with ITB 12.1.																				
ITB 14.5	The prices quoted by the Bidder shall be adjustable. The formula for adjusting the prices and explanatory details are specified in the GCC Clause 13.8. Bidder shall fill out the Tables of Adjustment Data in Section 4 (Bidding Forms).																				
ITB 15.1	The unit rates and the prices shall be quoted by the Bidder entirely in: Nepalese Rupees (NRs.)																				
ITB 15.4	The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by: Nepal Rastra Bank, Kathmandu, Nepal																				

ITB 17.1	Add the following at the end of Sub-Clause: Any information and documentary evidence not submitted as per section 4 (Bidding forms) will not be used to establish the bidder's qualification and shall be excluded from the evaluation, even if such documents are submitted elsewhere in the bid.
ITB 18.1	The bid validity period shall be 180 days.
ITB 19.1	The Bidder shall furnish a bid security in the amount of NRs.93 Million or its equivalent in freely convertible foreign currency. <i>Add the following at the end of the Sub-Clause:</i> If the bid Security is issued by a bank located outside Nepal, it shall be counter guaranteed by a commercial bank established in Nepal.
ITB 19.2	The ineligibility period will be: Not Applicable
ITB 19.4	Subject to the succeeding sentences, any bid not accompanied by an irrevocable and callable bid security shall be rejected by the Employer as nonresponsive. If a bidder submits a bid security that (i) deviates in term, amount, and/or period of validity, or (ii) does not provide sufficient identification of the Bidder (including, without limitation, failure to indicate the name of all future Joint Venture or, where the Joint Venture has not yet been constituted, the names of the all future Joint Venture Partners), the Employer shall request the Bidder to submit a compliant bid security within Fourteen (14) days of receiving such a request. Failure to provide a compliant bid security within the prescribed period of receiving such a request shall cause the rejection of the Bid.
ITB 19.7	Add ITB 19.7(c) as follows: ; or (c) if it is determined under ITB 3.1 that the Bidder or any of its officers, directors, employees, personnel, sub consultants, subcontractors, service providers, suppliers or manufacturers has directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract.
ITB 20.1	Add the following at the end of the Sub Clause: In addition to the original of the bid, the number of copies is: One (1). In addition to this, the bidders are requested to submit a soft copy of the duly filled BOQ to facilitate the evaluation process. However, the soft copy of BOQ shall not form part of the bid. In case of any discrepancy between the Hard Copy and the Soft Copy of BOQ, the Hard Copy shall prevail.
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: An organizational document, board resolution or its equivalent, or power of attorney specifying the representative's authority to sign the Bid on behalf of, and to legally bind, the Bidder. If the Bidder is an intended or an existing joint venture, the power of attorney should be signed by all partners and specify the authority of the named representative of the joint venture to sign on behalf of, and legally bind, the intended or existing joint venture. If the joint venture has not yet been formed, also include evidence from all proposed joint venture partners of their intent to enter into a joint venture in the event of a contract award in accordance with ITB 11.4.
ITB 20.2	The Bidder shall submit an acceptable authorization within Fourteen (14) days.

D. Submission and Opening of Bids

ITB 21.1	Bidders shall submit their Bids by hand. Bidders shall not have the option of submitting their bids electronically. For the bid submission purpose, the cost of the bidding document, i.e. NRs. 20000.00 can be deposited as follow. <table><tr><td>Name of Bank</td><td>Name of Office</td><td>Revenue Account No.</td><td>Office Code</td><td>Revenue Heading No.</td></tr><tr><td>Rastriya Banijya Bank Thamel Branch</td><td>Department of Roads, Project Directorate (ADB)</td><td>1000100200010000</td><td>337013518</td><td>14229</td></tr></table>	Name of Bank	Name of Office	Revenue Account No.	Office Code	Revenue Heading No.	Rastriya Banijya Bank Thamel Branch	Department of Roads, Project Directorate (ADB)	1000100200010000	337013518	14229
Name of Bank	Name of Office	Revenue Account No.	Office Code	Revenue Heading No.							
Rastriya Banijya Bank Thamel Branch	Department of Roads, Project Directorate (ADB)	1000100200010000	337013518	14229							
ITB 21.1 (b)	Electronic bidding submission procedure shall be: Not Applicable										
ITB 22.1	For bid submission purposes only, the Employer's address is: Attention: Project Director, Project Directorate (ADB), Department of Roads Street address: Bishalnagar City: Kathmandu Country: Nepal The deadline for bid submission is: Date: 8th October, 2026 Time: 12:00 hours (Nepal Standard Time)										
ITB 25.1	The opening of the Technical Bid shall take place at: Project Directorate (ADB) Department of Roads, Bishalnagar Bishalnagar, Kathmandu Country: Nepal Date: 8th October, 2026 Time: Immediately after the deadline for submission of bids. Electronic bid opening procedure shall be as follows: Not Applicable										
ITB 25.5	The letter of Technical Bid shall be initialed by Three (3) representatives of the Employer attending Bid opening.										
ITB 25.10	The letter of Price Bid and Bill of Quantities shall be initialed by Three (3) representatives of the Employer attending Bid opening.										

E. Evaluation and Comparison of Bids

ITB 32.2	Qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates shall not be permitted.
ITB 33.1	The Employer does not intend for the contractor to execute any specific elements of the Works through nominated subcontractors.

ITB 35.1	The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: Nepalese Rupees The source of the selling exchange rate shall be: Nepal Rastra Bank, Kathmandu, Nepal The date for the selling exchange rate shall be: 28 days prior to the deadline for submission of bids.
ITB 36.1	Domestic preference shall Not apply.
ITB 38.4 (b)	Add the following in ITB 38.4(b): If the bid price of the lowest evaluated bidder is lower than 15% of the “reference price” defined below, the bidder shall be required to increase the amount of performance security as follows: (i) Performance security of 15% will apply in case the arithmetically corrected price of the lowest evaluated bidder is within the range of lower than - 15% up to - 25% of the reference price. (ii) Performance security of 20% will apply in case the arithmetically corrected price of the lowest evaluated bidder is lower than - 25% of the reference price. The “reference price” to be used for increasing the performance security shall be the average of all the arithmetically corrected, substantially responsive bid prices, together with the Employer’s estimate (treated as one of the substantively responsive bids).
ITB 41.1	The Standstill period shall apply. The duration of standstill period will be Ten (10) days from the date of notice of Intention for award of contract. The Employer shall, at the start of the Standstill period, notify in writing each bidder that submitted a bid, of its intention to award a contract to the successful bidder at the end of Standstill period. The notification (using the form included in Section 9 (Contract Forms) shall include the following information: (a) the name of each Bidder who submitted the Bid; (b) the bid prices as read out at bid opening; (c) the name and evaluated prices of each bid that was evaluated; (d) the name of bidders whose bids were rejected and the reasons for their rejection; (e) the name of the winning bidder, and the price it offered, as well as the duration and summary scope of the contract awarded; and (f) a statement of the reason(s) the bid of the unsuccessful bidder to whom the notification is addressed was unsuccessful, unless the price information under (e) of this paragraph already reveals the reason.

G. Award of Contracts

ITB 46.1	The procedures for Bidding-related Complaints are referenced in the “Procurement Regulations for ADB Borrowers (Appendix 7).” The Bidder should submit its complaint following these procedures, in writing, to: The Project Director Project Directorate (ADB), Department of Roads, Bishalnagar, Kathmandu Email address: pdadb@dor.gov.np Fax number: +977 1 4537488

FOR REFERENCE ONLY

Section–3 - Evaluation and Qualification Criteria

- Without Prequalification -

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders. In accordance with ITB 32 and ITB 36, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section 4 (Bidding Forms).

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1. Evaluation

In addition to the criteria listed in ITB 37.2 (a)–(f), other relevant factors are as follows:

1.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to successfully implement the contract considering its proposed site organization, method statement, mobilization, and construction schedule (to be described by the Bidder in sufficient detail to demonstrate the adequacy of its work methods, scheduling, and material sourcing) including the extent to which they are presented in a consistent manner and comply with requirements stipulated in Section 6 (Employer's Requirements) without material deviation, reservation, or omission.

Noncompliance with equipment and personnel requirements described in Section 6 (Employer's Requirements) shall not normally be a ground for bid rejection, and such noncompliance will be subject to clarification during bid evaluation and rectification prior to contract award.

1.2 Completion Time

An alternative Completion Time, if permitted under ITB 13.2, will be evaluated as follows:

Not Applicable

1.3 Technical Alternatives

Technical alternatives, if permitted under ITB 13.4, will be evaluated as follows:

Not Applicable

1.4 Specialist Subcontractors

Not Applicable

1.5 Quantifiable Nonconformities and Omissions

Subject to ITB 14.2 and ITB 37.2, the evaluated cost of quantifiable nonconformities, including omissions, is determined as follows:

Pursuant to ITB 31.3, the cost of all quantifiable nonmaterial nonconformities shall be evaluated, including omissions in Daywork where competitively priced but excluding omission of prices in the Bill of Quantities. The Employer will make its own assessment of the cost of any non-material nonconformities and omissions for the purpose of ensuring fair comparison of Bids.

1.6 Domestic Preference

Not Applicable

1.7 Other Criteria

1.7.1 Environmental, Health and Safety Management Plan (EHSMP)

Any bid not accompanied by the EHSMP may be rejected by the Employer as nonresponsive. If a Bidder submits a EHSMP that is not commensurate with the risks and impacts of the proposed works and activities in the bidding document, the Employer may issue a request for clarification to request for further information from the Bidder. The Bidder must submit the requested information within **5 working days** of receiving such a request. Failure to provide a satisfactory response to the request for further information within the prescribed period of receiving such a request may cause the rejection of the Bid.

1.8 Multiple Contracts

Not Applicable

1.9 Joint Venture Participation

There should not be more than three partners in the Joint Venture. **Lead Partner must have maximum share participation in the JV**. Any change in constitution or percentage participation in JV shall not be permitted at any stage after the bid submission otherwise, the bidder shall be treated as non-responsive.

2. Qualification

2.1 Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	one Partner	

2.1.1 Nationality

Nationality in accordance with ITB Sub-clause 4.2.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms– ELI - 1– ELI - 2 with attachments

2.1.2 Conflict of Interest

No conflicts of interest in accordance with ITB Sub-clause 4.3.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid

2.1.3 ADB Eligibility

Not having been declared ineligible by ADB, as described in ITB Sub-clause 4.4.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid

2.1.4 Government-Owned Entity

Bidder required to meet conditions of ITB Sub-clause 4.5.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms – ELI-1– ELI-2 with attachments

2.1.5 United Nations Eligibility

Not having been excluded by an act of compliance with a United Nations Security Council resolution in accordance with ITB Sub-clause 4.8	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid

2.2 Historical Contract Non-Performance

2.2.1 History of Non-Performing Contracts

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Non-performance of a contract ^a did not occur as a result of contractor default since 1st January 2021.	Must meet requirement	Must meet requirement	Must meet requirement ^b	N/A	Form CON-1

2.2.2 Suspension Based on Execution of Bid-Securing Declaration

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Not under suspension based on execution of a Bid-Securing Declaration pursuant to ITB 4.6.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid

2.2.3 Pending Litigation and Arbitration

Pending litigation and arbitration criterion shall not apply.

2.2.4 Declaration: Environmental, Health and Safety Past Performance

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Declare any contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, health and safety contractual obligations in the past five years.	Must make the declaration. If the bidder proposes Specialist Sub-contractor/s to meet EQC 2.4.2, those Specialist Sub-contractor/s must also make the declaration	Not applicable	Each partner must make the declaration. If the bidder proposes Specialist Sub-contractor/s to meet EQC 2.4.2, those Specialist Sub-contractor/s must also make the declaration	Not applicable	Form CON-2

^aNonperformance, as decided by the Employer, shall include all contracts where (i) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract; and (ii) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where the Employer's decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

^b This requirement also applies to contracts executed by the Bidder as Joint Venture partner.

2.3 Financial Situation

2.3.1 Historical Financial Performance

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Submission of audited financial statements or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last Five (5) years to demonstrate the current soundness of the Bidder's financial position. As a minimum, (i) the Bidder's net worth for the last year calculated as the difference between total assets and total liabilities should be positive.	must meet requirement	not applicable	must meet requirement	not applicable	Form– FIN - 1 with attachments

2.3.2 Average Annual Construction Turnover

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	Lead Partner	
Minimum average annual construction turnover of NRs. 4885.00 Million calculated as total certified payments received for contracts in progress or completed, within the last Five (5) years .	must meet requirement	must meet requirement	must meet 15% of the requirement	must meet 60% of the requirement	Form– FIN - 2

2.3.3 Financial Resources

If the bid evaluation process and the decision for the award of the Contract takes more than 1 year from the date of bid submission, Bidders may be asked to resubmit their current contract commitments and latest information on financial resources supported by latest audited accounts or audited financial statements, or if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, and the Bidders' financial capacity, will be reassessed on this basis.

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	Lead Partner	
For Single Entities: The Bidder must demonstrate that its financial resources defined i- FIN - 3, less its financial obligations for its current contract commitments defined i- FIN - 4, meet or exceed the total requirement for the Subject Contract of NRs 815.00 Million	must meet requirement	not applicable	not applicable	not applicable	Form FIN – 3 and Form FIN – 4
For Joint Ventures: (1) Lead partner must demonstrate that its financial resources defined i- FIN - 3, less its financial obligations for its own current contract commitments defined i- FIN - 4, meet or exceed its required share of NRs 490.00 Million from the total requirement for the Subject Contract. AND	not applicable	not applicable	not applicable	must meet requirement	Form FIN – 3 and Form FIN – 4
(2) Each partner must demonstrate that its financial resources defined i- FIN - 3, less its financial obligations for its own current contract commitments defined i- FIN - 4, meet or exceed its required share of NRs. 122.00 Million from the total requirement for the Subject Contract. AND	not applicable	not applicable	must meet requirement	not applicable	Form FIN – 3 and Form FIN – 4
(3) The joint venture must demonstrate that the combined financial resources of all partners defined i- FIN - 3, less all the partners' total financial obligations for the current contract commitments defined i- FIN - 4, meet or exceed the total requirement for the Subject Contract of NRs. 815.00 Million	not applicable	must meet requirement	not applicable	not applicable	Form FIN – 3 and Form FIN – 4

2.4 Construction Experience

2.4.1 Contracts of Similar Size and Nature

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	Lead Partner	
1. Participation** as a contractor, JV partner, or subcontractor, in at least two contracts that have been satisfactorily and substantially completed*** within the last Seven (7) years and that are similar to the proposed works, where the value of the Bidder's participation under each contract exceeds NRs. 3910.00 Million . The similarity of the Bidder's participation shall be based on ⁴ construction of at least one road with 12 km length of four (4) lanes or more in each contract.	must meet requirement	must meet requirement	Must meet requirement as follows: Participation in at least one contract that has been satisfactorily and substantially completed*** within the last 7 years and that is construction of minimum two lane 5 km length road where the value of the Bidder's participation exceeds NRs. 600.00 Million or equivalent.	Must meet requirement as follows: Participation in at least one contract that has been satisfactorily and substantially completed*** within the last 7 years and that is minimum four lane 12 km length road, where the value of the Bidder's participation exceeds NRs. 3910.00 Million or equivalent.	Form EXP – 1*
2. The bidder shall have satisfactorily and substantially completed***at least one contract for Civil Work in Road, Railway, Airport, Bridges or Tunnel of minimum value NRs 3910.00 Million , either in Nepal or	must meet requirement	Not Applicable	Not Applicable	must meet requirement	Form EXP – 1 ⁵

⁴For contracts under which the Bidder participated as a Joint Venture partner or Subcontractor, only the Bidder's share, by value, shall be considered to meet this requirement. For contracts implemented by a Joint Venture contractor, if the Bidder comprises the same Joint Venture, the 'Single Entity' requirements will apply.

⁵In addition to the submission requirement Form EXP - 1, the Bidder shall provide the following supporting documents:

1. Signed Contract Agreement, and
2. Taking-Over Certificate, Contract Completion Certificate or Performance Certificate,

in sufficient detail to verify the contract name, value and completion time (or substantial completion). If the documents are other than in English, an accurate certified translation of these documents in English shall be provided.]

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	Lead Partner	
in any other country outside the country of incorporation of the Bidder. In case of a Bidder comprises JV, the Lead Partner of the Bidder must satisfy this requirement. To satisfy this requirement (S. No. 2), the contract under consideration shall have been executed under FIDIC Condition of Contract.					

* Submission requirements: Form EXP – 1 shall be supported by documents such as Signed Contract Agreement, Taking-Over Certificate or Contract Completion Certificate indicating the contract name, value. Completion date (or percentage of substantial completion), activities performed by Joint Venture partners, and other relevant details.

** Only the value of contract as executed by the bidder in its own name should be indicated and shall be considered. Where an eligible work was undertaken by a group (Joint Venture/Consortium), only that portion of the work which is undertaken by the concerned bidder shall be considered and the remaining done by the other partners of the group shall be excluded. This is to be substantiated with a specific certificate from the employer who had awarded this work. In case specific division of works undertaken by the group partners is not stated in the submitted documents, then the percentage participation of the bidder in the group as stated in the submitted documents (JV/Consortium agreement or employer's certificate) shall be considered as the value of the work done by the bidder/partner of JV.

*** The Contract is considered as substantially and satisfactorily completed if 90% or more of the work is physically completed, up to 28 days prior to the Bid submission, which is to be substantiated by a certificate from the employer who has awarded the work to the bidder;
Or if 90% or more of the awarded contract value or revised contract value whichever is lower has been certified for payment, up to 28 days prior to the Bid submission. This is to be substantiated by a certificate from the employer.

Without such certificate(s), any claimed experience of such work shall not be considered.

2.4.2 Construction Experience in Key Activities

2.4.2 (a) Must be complied with by the Bidder. In case of a Joint Venture Bidder, the Bidder or at least one of the partners must meet the requirement in the key activity. For contracts under which the Bidder participated as a Joint Venture partner, only the Bidder's designated scope of works under the contracts shall be considered to meet this requirement.

Table A

Criteria	Compliance Requirements		Documents
Requirement	Single Entity	Joint Venture	Submission Requirements
For the above or other contracts executed during the period stipulated in 2.4.1 (1), a minimum construction experience is required in the following key activities:	must meet requirement	must meet requirement	Form EXP - 2
(a) Production rate of construction of roads with Bituminous concrete works of 15,000.00 cum per year completed in any one year within the last Seven (7) years.	Must meet requirement	must meet requirement	
(b) Production rate of construction of at least total length of 80.00m multilane (two-lane or more) bridges per year completed in any one year within the last Seven (7) years.	must meet requirement	must meet requirement	
(c) Production rate of construction of at least 960.00 m cast in-situ bored pile of minimum pile diameter 1000 mm for foundation of bridge per year completed in any one year within the last Seven (7) years.	must meet requirement	must meet requirement	

Note:

1. Production rate of any activity in a particular Contract shall be computed by dividing the total quantity of that activity by the total time of completion in a year. In such a way production rate of the activity within different contracts will be calculated and will be summed up to compute the total production rate for the evaluation purpose. The bidder has to mention the work in each year and the evidence must be certified by the employer who had awarded the contract. Otherwise, the production rate will be computed as mentioned above.

2.4.3 Specific Experience in Managing Environmental, Health and Safety Aspects

Criteria	Compliance Requirements		Documents
Requirement	Single Entity	Joint Venture	Submission Requirements
For the contracts in 2.4.1 and 2.4.2 above and/or any other contracts [substantially completed and under implementation] as prime contractor, Joint Venture partner, or Subcontractor between 1st January 2021 and Bid submission deadline, experience in managing EHS risks and impacts in the following aspects: i. Occupational Health and Safety ii. Environment Management Plan	Must meet requirements	One member must meet requirements	Form EXP – 3

FOR REFERENCE ONLY

Section 4 - Bidding Forms

- Without Prequalification -

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

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Letter of Technical Bid

Note-

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

Date:

OCB No.:

Invitation for Bid No.:

To: *[insert complete name of the Employer]*

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) 8.
- (b) We acknowledge that we have read and understand ADB's Anti Corruption Policy (1998) and Integrity Principles and Guidelines (2015), both as amended from time to time.
- (c) We offer to execute in conformity with the Bidding Documents the following Works: *[insert narrative]*
- (d) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of 180 (One Hundred Eighty days) days starts from the date fixed for the bid submission deadline in accordance with ITB 22.1, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (e) Our firm, including any Subcontractors or Suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB 4.2.
- (f) We, our directors, key officers, key personnel, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers or Suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3.

If there is any conflict of interest, please state details:

- (i) Parties involved in the conflict of interest: _____
- (ii) Details about the conflict of interest: _____

- (g) We are not participating, as a Bidder, either individually or as partner in a Joint Venture, in more than one Bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers submitted in accordance with ITB 13.
- (h) Our firm, Joint Venture partners, our respective direct and indirect shareholders, directors, key officers, key personnel, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers or Suppliers for any part of the contract, are not subject to, or not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Asian Development Bank or a debarment imposed by the

Asian Development Bank in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the Asian Development Bank and other development banks.¹

- (i) Our firm, Joint Venture partners, our respective direct and indirect shareholders, directors, key officers, key personnel, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers or Suppliers for any part of the contract, are not under ongoing investigation and/or sanctions proceedings by the Asian Development Bank or any multilateral development bank.

If under ongoing investigation and/or sanction proceedings by the Asian Development Bank or any multilateral development bank, please state details:

- (i) Name of the multilateral development bank: _____
(ii) Reason for the ongoing investigation / allegations: _____

- (j) Our firm, Joint Venture partners, our respective direct and indirect shareholders, directors, key officers, key personnel, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers or Suppliers for any part of the Contract, are not temporarily suspended, debarred, declared ineligible, or subject to any national and/or international sanctions by any country, any international organization, any multilateral development bank and other donor agency.

If so temporarily suspended, debarred, declared ineligible, or subject to any national and/or international sanctions by any country, any international organization, any multilateral development bank and other donor agency, please state details (as applicable to each Joint Venture partner, their respective direct or indirect shareholders, directors, key officers, key personnel, associate, parent company, affiliate, subsidiaries, Subcontractors, consultants, sub-consultants, manufacturers, service providers and/or Suppliers):

- (i) Name of Institution: _____
(ii) Period of the temporary suspension, debarment, ineligibility, or national or international sanction [start and end date]: _____
(iii) Reason for the temporary suspension, debarment, ineligibility, or national or international sanction: _____

- (k) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers, Suppliers, key officers, directors and key personnel have never been charged or convicted with any criminal offense (including felonies but excluding misdemeanors) or infractions and/or violations of ordinance; nor charged or found liable in any civil or administrative proceedings in the last 10 years; or undergoing investigation for such, or subject to any criminal, civil or administrative orders, monitor ship or enforcement actions.

If so charged, convicted/found liable, under ongoing investigation, or subject to orders, monitor ship or enforcement actions, please state details:

- (i) Nature of the offense, violation, proceedings, investigation, and/or monitor ship or enforcement actions: _____
(ii) Court, area of jurisdiction and/or the enforcement agency: _____
(iii) Resolution [i.e. dismissed; settled; or convicted/duration of penalty]: _____
(iv) Other relevant details [please specify]: _____

- (l) Our firm, Joint Venture partners, our respective direct and indirect shareholders, directors, key officers, key personnel, associates, affiliates or subsidiaries, including any Subcontractors, consultants, sub-

¹ These institutions include African Development Bank, European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IADB), and the World Bank Group. According to paragraph 9 of the Agreement, other international financial institutions may join upon the consent of all Participating Institutions and signature of a Letter of Adherence by the international financial institution substantially in the form provided (Annex B to the Agreement). Upon adherence, such international financial institution shall become a Participating Institution for purposes of the Agreement. Bidders are advised to check www.adb.org/integrity for updates.

consultants, manufacturers, service providers or Suppliers, can make and receive electronic fund transfer payments through the international banking system or otherwise discharge the Employer's obligation upon initiation of wire transfer.

If unable to make or receive funds through the international banking system or otherwise discharge the Employer's obligation upon initiation of wire transfer, please state the details:

- (i) Nature of the restriction: _____
- (ii) Jurisdiction of the restriction: _____
- (iii) Other relevant details: _____

- (m) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers or Suppliers, key officers, directors and key personnel are not from a country which is prohibited to export goods or services to, or receive any payments from the Employer's country and/or are not prohibited to receive payments for particular goods or services by the Employer's country 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.

- (n) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract.¹

Name of Recipient	Address	Reason	Amount
.....			
.....			

- (o) We understand that it is our obligation to notify the Employer of any changes in connection with the matters described in paragraphs (f), (h), (i), (j), (k), (l), (m) and (n) of this Letter of Technical Bid.

- (p) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB 4.5].²

- (q) We have not been suspended nor declared ineligible by the Employer based on execution of a Bid-Securing Declaration in accordance with ITB 4.6.

- (r) At any time following submission of our Bid, we shall permit, and shall cause our Joint Venture partners, directors, key officers, key personnel, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub consultants, manufacturers, service providers or Suppliers for any part of the contract to permit ADB or its representative to inspect our site, assets, accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB. We understand that failure of this obligation may constitute obstructive practice that may result in debarment and/or contract termination.

- (s) Regardless of whether the contract will be awarded to us, we shall preserve all accounts, records and other documents related to bid submission for at least 3 years from the date of submission of the bid or the period prescribed in applicable law, whichever is longer.

- (t) If we are awarded the contract, we shall preserve all accounts, records and other documents related to the procurement and execution of the contract for at least 5 years after completing the works contemplated in the relevant contracts or the period prescribed in applicable law, whichever is longer.

¹ If none has been paid or is to be paid, indicate "None".

² Use one of the two options as appropriate.

- (u) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section 6 (Employer's Requirements) and our technical proposal, or as otherwise agreed with the Employer.
- (v) We certify on behalf of the Bidder, that the information provided in the bid has been fully reviewed, given in good faith, and to the best of our knowledge is true and complete. We understand that it is our obligation to inform the Employer of any changes to the information as and when it becomes known to us. We understand that any misrepresentation that knowingly or recklessly misleads, or attempts to mislead may lead to the automatic rejection of the Bid or cancellation of the contract, if awarded; and may result in remedial actions, in accordance with ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2015, as amended from time to time).

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

FOR REFERENCE ONLY

Letter of Price Bid

Note-

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

Date:

OCB No.:

Invitation for Bid No.:

To: *[insert complete name of the Employer]*

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) 8.
- (b) We acknowledge that we have read and understand ADB's Anti-corruption Policy (1998) and Integrity Principles and Guidelines (2015), both as amended from time to time.
- (c) We offer to execute in conformity with the Bidding Documents and the Technical Bid submitted for the following Works. *[insert narrative]*
- (d) The total price of our Bid, excluding any discounts offered in item (d) below is:

[amount of foreign currency in words], [amount in figures], and [amount of local currency in words], [amount in figures]

The total bid price from the Summary of Bill of Quantities should be entered by the bidder inside this box. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the bid.

- (e) The discounts offered and the methodology for their application are: *[insert discounts and methodology for their application if any]*
- (f) Our Bid shall be valid for a period of *[insert bid validity period as specified in ITB 18.1 of the BDS]* days starts from the date fixed for the bid submission deadline in accordance with ITB 22.1, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (g) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents.
- (h) We understand that this bid, together with your written acceptance thereof included in your notification of award through the issuance of Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed.
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

- (j) At any time following submission of our Bid, we shall permit, and shall cause our Joint Venture partners, directors, key officers, key personnel, associates, parent company, affiliates or subsidiaries, including any Subcontractors, consultants, sub-consultants, manufacturers, service providers or Suppliers for any part of the contract to permit ADB or its representative to inspect our site, assets, accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB. We understand that failure of this obligation may constitute obstructive practice that may result in debarment and/or contract termination.
- (k) Regardless of whether the contract will be awarded to us, we shall preserve all accounts, records and other documents related to bid submission for at least 3 years from the date of submission of the bid or the period prescribed in applicable law, whichever is longer.
- (l) If we are awarded the contract, we shall preserve all accounts, records and other documents related to the procurement and execution of the contract for at least 5 years after completing the works contemplated in the relevant contracts or the period prescribed in applicable law, whichever is longer.
- (m) We confirm and stand by our commitments and other declarations made in connection with the submission of our Letter of Technical Bid.
- (n) We certify on behalf of the Bidder, that the information provided in the bid has been fully reviewed, given in good faith, and to the best of our knowledge is true and complete. We understand that it is our obligation to inform the Employer of any changes to the information as and when it becomes known to us. We understand that any misrepresentation that knowingly or recklessly misleads, or attempts to mislead may lead to the automatic rejection of the Bid or cancellation of the contract, if awarded; and may result in remedial actions, in accordance with ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2015, as amended from time to time).

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

.....

Bid Security Bank Guarantee

[Bank's name, and address of issuing branch or office]¹

Beneficiary: [Name and address of the Employer]

Date:

Bid Security No.:

We have been informed that [name of the Bidder] (hereinafter called "the Bidder") has submitted to you its bid dated [please specify] (hereinafter called "the Bid") for the execution of [name of contract] under Invitation for Bids No. [please specify] ("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 words] [amount in figures] 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 its Bid during the period of bid validity specified by the Bidder in the Letters of Technical and Price Bid; 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, or (iii) fails or refuses to furnish a domestic preference security, if required.

This guarantee will expire (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder, or (ii) 28 days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.²

[Authorized signature(s) and bank's seal (where appropriate)]

¹ All italicized text is for use in preparing this form and shall be deleted from the final document.

² Or the employer may use "Uniform Rules for Demand Guarantees (URDG) ICC Publication No. 458" as appropriate.

Bid-Securing Declaration

Date: *[insert date (as day, month and year)]*

Bid No.: *[insert number of bidding process]*

Alternative No.: *[insert identification No if this is a bid for an alternative]*

To: *[insert complete name of the Employer]*

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with the Borrower for the period of time of *[insert number of years as indicated in ITB 19.2 of the BDS]* starting on the date that we receive a notification from the Employer, if we are in breach of our obligation(s) under the bid conditions, because we

- (a) have withdrawn our Bid during the period of bid validity specified in the Letters of Technical and Price Bid; or
- (b) do 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 our Bid by the Employer during the period of bid validity, (i) fail or refuse to execute the Contract, if required; or (ii) fail or refuse to furnish the Performance Security, in accordance with the ITB; or (iii) fail or refuse to furnish a domestic preference security, if required.

We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) 28 days after the expiration of our Bid.

Signed: *[insert signature of person whose name and capacity are shown]*

In the capacity of *[insert legal capacity of person signing the Bid-Securing Declaration]*

Name: *[insert complete name of person signing the Bid-Securing Declaration]*

Duly authorized to sign the bid for and on behalf of *[insert complete name of the Bidder]*

Dated on _____ day of _____, _____ *[insert date of signing]*

Corporate Seal *[where appropriate]*

AFFILIATE COMPANY GUARANTEE

Name of Contract/Contract No.: _____

Name and address of Employer: _____

[together with successors and assigns].

We have been informed that [name of Contractor] (hereinafter called the "Contractor") is submitting an offer for the above-referenced Contract in response to your invitation, and that the conditions of your invitation require its offer to be supported by an affiliate company guarantee.

In consideration of you, the Employer, awarding the Contract to the Contractor, we [name of affiliated company] irrevocably and unconditionally guarantee to you, as a primary obligation, that (i) throughout the duration of the Contract, we will make available to the Contractor our financial, technical capacity, expertise and resources required for the Contractor's satisfactory performance of the Contract; and (ii) we are fully committed, along with the Contractor, to ensuring a satisfactory performance of the Contract.

If the Contractor fails to so perform its obligations and liabilities and comply with the Contract, we will indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) which arise from any such failure for which the Contractor is liable to the Employer under the Contract.

This guarantee shall come into full force and effect when the Contract comes into full force and effect. If the Contract does not come into full force and effect within a year of the date of this guarantee, or if you demonstrate that you do not intend to enter into the Contract with the Contractor, this guarantee shall be void and ineffective. This guarantee shall continue in full force and effect until all the Contractor's obligations and liabilities under the Contract have been discharged, when this guarantee shall expire and shall be returned to us, and our liability hereunder shall be discharged absolutely.

This guarantee shall apply and be supplemental to the Contract as amended or varied by the Employer and the Contractor from time to time. We hereby authorize them to agree on any such amendment or variation, the due performance of which and compliance with which by the Contractor are likewise guaranteed hereunder. Our obligations and liabilities under this guarantee shall not be discharged by any allowance of time or other indulgence whatsoever by the Employer to the Contractor, or by any variation or suspension of the works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Contractor or the Employer, or by any other matters, whether with or without our knowledge or consent.

This guarantee shall be governed by the law of the same country (or other jurisdiction) that governs the Contract and any dispute under this guarantee shall be finally settled under the [Rules or Arbitration provided in the Contract]. We confirm that the benefit of this guarantee may be assigned subject only to the provisions for assignment of the Contract.

Signed by:..... Signed by:

[signature]

[signature]

.....

.....

[name]

[name]

.....

.....

[position in parent/subsidiary company]

[position in parent/subsidiary company]

Date:.....

-- Note --

If permitted in accordance with ITB 32.2 of the BDS, the Bidder shall provide the Affiliate Company Guarantee Form filled out and signed by each subsidiary, parent entity or affiliate that the Bidder submits for consideration of the Employer in determining its qualifications.

Technical Proposal

The Bidder shall submit Technical Proposal separately for each Phase 1: Upgrading Works and Phase 2: Performance Based Maintenance Works in the forms and sheets as attached in the Bidding Forms in the following pages.

Phase 1: Upgrading Works

Personnel

The bidder shall propose for deployment full complement of staff necessary for the successful execution of the works.

Equipment

The bidder shall provide required construction equipment and ensure their maintenance for efficient and continuous work progress. Bidder will also provide proper work shop and other maintenance facilities at site.

Site Organization

The bidder is required to submit proposed site organization structure (organogram) showing the management, supervisory and quality control units indicating their lines of communication and responsibility shown in an organogram.

Method Statement

The bidder shall state all major works, site camp facilities (sanitary, water supply, telecommunication, inspection vehicles etc.), road alignment, earth work, pavement work, drainage structure, bridges & culverts works etc. The bidder is required to describe works how to start and complete different sections of works.

Mobilization Schedule

The bidder shall mobilize personnel, equipment, deployment of work force, collection of construction materials and prepare a mobilization bar chart. Likewise, the bidder will provide site camp, stack yard etc. at different working places for efficient execution of works.

Construction Schedule

The bidder shall submit Schedule using MS Project or equivalent project management software showing sequence of works for items in Bill of Quantities (BOQ) together with program and progress of works.

Environmental, Health and Safety Management Plan (EHSMP)

The Bidder shall submit an outline Environmental, Health and Safety Management Plan (EHSMP) commensurate with the risks and impacts of the proposed works and activities. These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Contractor, and its subcontractors.

Environmental, Health and Safety Code of Conduct

The Bidder shall initial and submit the EHS Code of Conduct form as part of its bid.

Phase 2: Performance Based Maintenance Works

Personnel

The bidder shall propose for deployment full complement of staff necessary for the successful execution of the performance based maintenance works and services.

Equipment

The bidder shall provide required equipment for the performance based maintenance works and ensure their maintenance for efficient and continuous work process. Bidder will also provide proper work shop and other maintenance.

Site Organization

The bidder is required to submit proposed site organization structure (organogram) showing the management supervisory and quality control units indicating their lines of communication and responsibility shown in as organogram.

Method Statement

The bidder shall state how he will execute the performance based maintenance works and shall submit a draft Program of Performance and a proposal for the Daily Inspections of Operational Service Levels.

Environmental, Health and Safety Management Plan (EHSMP)

The bidder shall submit Environmental, Health and Safety Management Plan (EHSMP) and its implementation schedule.

Environmental, Health and Safety Code of Conduct

The Bidder shall initial and submit the EHS Code of Conduct form as part of its bid.

FOR REFERENCE ONLY

Personnel

Form PER – 1: Proposed Personnel

Bidder should provide the details of the proposed personnel and their experience record in the relevant Information Forms below for each candidate:

The Bidder shall provide separately for each Phase 1: Upgrading Works and Phase 2: Performance Based Maintenance Works

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name
5.	Title of position*
	Name
6.	Title of position*
	Name
etc.	Title of position*
	Name

-- Note --

* As listed in Section 6 (Employer's Requirements).

Form PER – 2: Resume of Proposed Personnel (For both Phase 1 and Phase 2)

The Bidder shall provide all the information requested below. Use one form for each position.

Position		
Personnel information	Name	Date of birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager / personnel officer)
	Fax	E-mail
	Job title	Years with present employer

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

[illegible]

Equipment

Form EQU: Equipment (Bidder shall provide the details of equipment for both Phases 1 and 2)

The Bidder shall provide adequate information and details to demonstrate clearly that it has the capability to meet the equipment requirements indicated in Section 6 (Employer's Requirements), using the Forms below. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

Site Organization

(For Both Phases)

FOR REFERENCE ONLY

Method Statement

(For Both Phases)

FOR REFERENCE ONLY

Mobilization Schedule

The Mobilization Schedule should reflect the no-objection request and approval step for Site Specific Environmental, Health and Safety Management Plan as per Contract Conditions.

(For Both Phases)

FOR REFERENCE ONLY

Construction Schedule
(for Both Phases)

FOR REFERENCE ONLY

Environmental, Health and Safety Management Plan (EHSMP)

The Bidder shall submit an outline Environmental, Health and Safety Management Plan (EHSMP) commensurate with the risks and impacts of the proposed works and activities. These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Contractor, and its subcontractors.

In developing these strategies and plans, the Bidder shall have regard to the EHS provisions of the contract and EHS risks including those as may be more fully described in Section 6 (Employer's Requirements).

FOR REFERENCE ONLY

Environmental, Health and Safety Code of Conduct

Environmental, Health and Safety Code of Conduct for Contractor's Personnel Form

Note to Bidder

The minimum content of the EHS Code of Conduct form as set out by the Employer shall not be substantially modified. However, the Bidder may add requirements as appropriate, including to take into account Contract-specific issues/risks.

The Bidder shall initial and submit the EHS Code of Conduct form as part of its bid.

ENVIRONMENTAL, HEALTH AND SAFETY CODE OF CONDUCT FOR CONTRACTOR'S PERSONNEL

We are the Contractor, [enter name of Contractor]. We have signed a contract with [enter name of Employer] for [enter description of the Works]. These Works will be carried out at [enter the Site and other locations where the Works will be carried out]. Our contract requires us to implement measures to address environmental, health and safety risks related to the Works.

This EHS Code of Conduct is part of our measures to deal with environmental, health and safety risks related to the Works. It applies to all our staff, laborers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each sub-contractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "Contractor's Personnel" and are subject to this EHS Code of Conduct.

This EHS Code of Conduct identifies the behavior that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

REQUIRED CONDUCT

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this EHS Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
 - (a) ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
 - (b) wearing required personal protective equipment;
 - (c) using appropriate measures relating to chemical, physical and biological substances and agents; and
 - (d) following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
6. report violations of this EHS Code of Conduct; and
7. not retaliate against any person who reports violations of this EHS Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

RAISING CONCERNS

If any person observes behavior that he/she believes may represent a violation of this EHS Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done by call [] to reach the Contractor's hotline (*if any*) and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

CONSEQUENCES OF VIOLATING THE ENVIRONMENTAL, HEALTH AND SAFETY CODE OF CONDUCT

Any violation of this EHS Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this EHS Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this EHS Code of Conduct, I can contact [enter name of Contractor's contact person(s) with relevant experience]] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: _____

Date: [day month year]: _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: [day month year]: _____

Bidders Qualification

To establish its qualifications to perform the contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

FOR REFERENCE ONLY

Form ELI - 1: Bidder's Information Sheet

Bidder's Information			
		Information of the Bidder	If the Bidder is a subsidiary or branch, information of any parent company/companies
Names	Full legal name(s)		
	Full trading name(s) (if any)		
Addresses	Registered address(es)		
	Trading address(es)		
	Postal address(es) (if different from trading address)		
Type of organization			
Country of constitution/incorporation/registration			
Year of constitution/incorporation/registration			
Corporate or registration number			
In case of a Joint Venture, legal name of each partner			
Bidder's authorized representative (name, address, telephone number(s), fax number(s), e-mail address)			
Attached are copies of the following documents: 1) In case of a single entity, articles of incorporation or constitution and company incorporation/registration of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2. 2) Authorization to represent the firm or Joint Venture named above, in accordance with ITB 20.2. 3) In case of a Joint Venture, a letter of intent to form a Joint Venture or Joint Venture agreement, in accordance with ITB 4.1. 4) In case of a government-owned enterprise, any additional documents not covered under 1 above required to comply with ITB 4.5.			

Form ELI - 2: Joint Venture Information Sheet

Each member of the Joint Venture and Specialist Subcontractor must fill out this form separately.

Joint Venture / Specialist Subcontractor Information			
Bidder's legal name			
		Information of Joint Venture Partner or Specialist Subcontractor	If any Joint Venture Partner or Specialist Subcontractor is a subsidiary or branch, information of any parent company/companies
Names	Full legal name(s)		
	Full trading name(s) (if any)		
Addresses	Registered address(es)		
	Trading address (es)		
	Postal address (es) (if different from trading address)		
Type of organization			
Country of constitution/incorporation/registration			
Year of constitution/incorporation/registration			
Corporate or registration number			
Joint Venture Partner's or Specialist Subcontractor's authorized representative information (name, address, telephone number(s), fax number(s), e-mail address)			
Attached are copies of the following documents. 1) Articles of incorporation or constitution and company incorporation/registration of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2. 2) Authorization to represent the firm named above, in accordance with ITB 20.2. 3) In the case of a government-owned enterprise, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5.			

Form CON - 1: Historical Contract Non-Performance

Each Bidder must fill out this form in accordance with Criteria 2.2.1 and 2.2.3 of Section 3 (Evaluation and Qualification Criteria) to describe any history of nonperforming contracts and pending litigation or arbitration formally commenced against it.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Table 1: History of Nonperforming Contracts			
Choose one of the following:			
☐ No nonperforming contracts.			
☐ Below is a description of nonperforming contracts involving the Bidder (or each Joint Venture partner if Bidder is a Joint Venture).			
Year	Description	Amount of Non performed Portion of Contract (\$ equivalent)	Total Contract Amount (\$ equivalent)
[insert year]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for nonperformance: [indicate main reason(s)]	[insert amount]	[insert amount]
Table 2: Pending Litigation and Arbitration (Not Applicable)			
☐			

!

Form CON – 2: EHS Performance Declaration

Each Bidder must fill out this form in accordance with Criterion 2.2.4 of Section 3 (Evaluation and Qualification Criteria).

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

In case of a Specialist Subcontractors, each Specialist Subcontractor must fill out this form and provide the Specialist Subcontractor's name:

Specialist Subcontractor: _____

Environmental and Health and Safety Performance Declaration in accordance with Section 3 (Evaluation and Qualification Criteria)			
☐ No suspension or termination of contract: An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental or Health and Safety performance since the date specified in Section 3 (Evaluation and Qualification Criteria), Criterion 2.5. ☐ Declaration of suspension or termination of contract: The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related to Environmental or Health and Safety performance since the date specified in Section 3 (Evaluation and Qualification Criteria), Criterion 2.5. Details are described below: ☐ Declaration of request for replacement of Key Environmental, Health and Safety Personnel: The following contract(s) has/have experienced a request by the Employer to replace Environmental, Health and Safety Personnel for reasons related to Environmental or Health and Safety performance since the date specified in Section 3 (Evaluation and Qualification Criteria), Criterion 2.5. Details are described below: ☐ Declaration of past fatality resulted from EHS issues on site: The following contract(s) has/have experienced a fatality resulted from EHS issues on site since the date specified in Section 3 (Evaluation and Qualification Criteria), Criterion 2.5. Details are described below:			
Year	Suspended or terminated portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
[insert year]	[insert amount and percentage]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for suspension or termination: [indicate main reason(s) e.g. discharge over environmental limit, workers did not have required health and safety permits to undertake high risk work, work carried out was not adhered to approved construction methodology and quality control plan]	[insert amount]
[insert year]	[insert amount and percentage]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for suspension or termination: [indicate main reason(s)]	[insert amount]
...	...	[list all applicable contracts]	...

Performance Security called by an employer(s) for reasons related to EHS performance		
Year	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
[insert year]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for suspension or termination: [indicate main reason(s) e.g. discharge over environmental limit, workers did not have required health and safety permits to undertake high risk work, work carried out was not adhered to approved construction methodology and quality control plan]	[insert amount]
Key EHS personnel replacement requested by the Employer for reasons related to EHS performance		
Year	Contract Identification and Reasons	Personnel replacement action and results
[insert year]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for requesting for replacement: [indicate main reason(s)]	[insert description]
Fatality due to EHS issues on Site		
Year	Contract Identification	Follow-on actions taken by the contractor
[insert year]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Description of fatality event: Causation:	[insert description]

Form FIN - 1: Historical Financial Performance

Each Bidder must fill out this form.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name below:

Joint Venture Partner: _____

Financial Data for Previous Years [Nrs or Equivalent]				
Year 1:	Year 2:	Year 3:	Year 4:	Year 5:

Information from Balance Sheet

Total Assets (TA)					
Total Liabilities (TL)					
Net Worth = TA – TL					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital = CA - CL					

Most Recent Working Capital	To be obtained for most recent year and carried forward to FIN - 3 Line 1; in case of Joint Ventures, to the corresponding Joint Venture Partner's FIN – 3.

Information from Income Statement

Total Revenues					
Profits Before Taxes					
Profits After Taxes					

- ☐ Attached are copies of financial statements (balance sheets including all related notes and income statements) for the last five (5) years, as indicated above, complying with the following conditions:
1. Unless otherwise required by Section 3 of the Bidding Document, all such documents reflect the standalone financial situation of the legal entity or entities comprising the Bidder and not the Bidder's parent companies, subsidiaries, or affiliates.
 2. Historical financial statements must be audited by a certified accountant.
 3. Historical financial statements must be complete, including all notes to the financial statements.
 4. Historical financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN - 2: Average Annual Construction Turnover

Each Bidder must fill out this form.

The information supplied should be the Annual Turnover of the Bidder or each member of a Joint Venture in terms of the amounts billed to clients for each year for work in progress or completed, converted to US dollars at the rate of exchange at the end of the period reported.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name below:

Joint Venture Partner: _____

Annual Turnover Data for the Last 5 Years (Construction only)			
Year	Amount Currency	Exchange Rate	NRs. Or Equivalent
Average Annual Construction Turnover			

Form FIN – 3: Availability of Financial Resources

Bidders must demonstrate sufficient financial resources, comprising Working Capital supplemented by credit line statements or overdraft facilities to meet the Bidder's financial requirements for

- (a) its current contract commitments, and
- (b) the subject contract.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name below:

Joint Venture Partner: _____

Financial Resources		
No.	Source of financing	Amount (NRs or equivalent)
1	Working Capital (to be taken from FIN - 1)	
2	Credit Line ^a	
Total Available Financial Resources		

^a To be substantiated by a letter from the bank issuing the line of credit. In case of Credit Line, only (i) the unutilized credit limit and overdraft facilities, and (ii) dedicated lines of credit issued specific to this project, in Form Fin-6 shall be considered.

Form FIN- 4: Financial Requirements for Current Contract Commitments

Bidders (or each Joint Venture partner) should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name below:

Joint Venture Partner: _____

Current Contract Commitments						
No.	Name of Contract	Employer's Contact (Address, Tel, Fax)	Contract Completion Date	Outstanding Contract Value (X) ^a	Remaining Contract Period in months (Y) ^b	Monthly Financial Resources Requirement (X / Y)
1						
2						
3						
4						
Total Monthly Financial Requirement for Current Contract Commitments						NRS..

- ^a Remaining outstanding contract values to be calculated from 28 days prior to the bid submission deadline (NRS. Or equivalent based on the foreign exchange rate as of the same date).
- ^b Remaining contract period to be calculated from 28 days prior to bid submission deadline.

FOR REFERENCE ONLY

Form FIN - 5: Self-Assessment Tool for Bidder's Compliance to Financial Resources (Criterion 2.3.3 of Section 3)

This form requires the same information submitted in Forms FIN - 3 and FIN - 4. All conditions of "Available Financial Resources Net of CCC $\geq$ Requirement for the Subject Contract" must be satisfied to qualify.

Form FIN - 5A: For Single Entities

For Single Entities: (A)	Total Available Financial Resources from FIN - 3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN - 4 (C)	Available Financial Resources Net of CCC $D = (B - C)$	Requirement for the Subject Contract (E)	Results: Yes or No [D must be greater than or equal to E] (F)
_____ (Name of Bidder)				NRs 815.00 Million	

Form FIN - 5B: For Joint Ventures

For Joint Ventures: (A)	Total Available Financial Resources from FIN - 3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN - 4 (C)	Available Financial Resources Net of CCC $D = (B - C)$	Requirement for the Subject Contract (E)	Results: Yes or No [D must be greater than or equal to E] (F)
Lead Partner:					
_____ (Name of Partner)				NRs.490.00 Million	
Each Partner:					
_____ (Name of Partner 1)				NRs.122.00 Million	
_____ (Name of Partner 2)				NRs.122.00 Million	
All partners combined	$\Sigma D =$ Sum of available financial resources net of current contract commitments for all partners		$\Sigma D =$ _____	NRs.815.00 Million	

Note -

Form FIN - 5 is made available for use by the bidder as a self-assessment tool, and by the employer as an evaluation work sheet, to determine compliance with the financial resources requirement as stated in 2.3.3. Failure to submit Form FIN - 5 by the Bidder shall not lead to bid rejection.

Form FIN- 6: Format of Bank over draft/ unutilized Credit Limit Certificate

(To be filled on Letter Head of Bank)

No.....

Date:.....

OVER DRAFT/ UNUTILIZED CREDIT LIMIT CERTIFICATE

This is to certify that M/s (Name of Bidder)..... having Registered Office at (address) and Corporate/Head Office at, a customer of our bank, is a reputed company with a good financial standing.

If the contract(s) for the work(s) mentioned below is awarded to above firm, we shall be able to provide over draft/ unutilized credit facilities to the extent of ...[state the currency and amount in figure]..... (.....in words) to meet their working capital requirements for executing the Project(s).

Contract Package Identification No.	Country	Name of Project Contract Package (s)	Amount of Overdraft / Unutilized Credit Facilities in [state the currency, eg USFD}
		Total	

FOR REFERENCE ONLY

Form EXP – 1: Contracts of Similar Size and Nature

Fill out one (1) form per contract.

The exchange rate to be used to calculate the value of the contract for conversion to a specific currency shall be the selling rate of borrower's national bank on the date of the contract.

Contract of Similar Size and Nature		
Contract No. of	Contract Identification	
Award Date	Completion Date	
Total Contract Amount	NRs. or Its Equivalent	
If partner in a Joint Venture or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail		
Description of the Similarity in Accordance with Criterion 2.4.1 of Section 3 (Evaluation and Qualification Criteria)		
1. Participation** as a contractor, JV partner, or subcontractor, in at least two contracts that have been satisfactorily and substantially completed*** within the last Seven (7) years and that are similar to the proposed works where the value of the Bidder's participation under each contract exceeds NRs 3910.00 Million. The similarity of the Bidder's participation shall be based on¹ construction of at least one road with 12 km length of four (4) lanes or more in each contract.		

¹For contracts under which the Bidder participated as a Joint Venture partner or Subcontractor, only the Bidder's share, by value, shall be considered to meet this requirement. For contracts implemented by a Joint Venture contractor, if the Bidder comprises the same Joint Venture, the 'Single Entity' requirements will apply.

2.The bidder shall have satisfactorily and substantially completed*** at least one contract for Civil Work in Road, Railway, Airport, Bridges or Tunnel of minimum value NRs 3910.00 Million , either in Nepal or in any other country outside the country of incorporation of the Bidder. In case of a Bidder comprises JV, the Lead Partner of the Bidder must satisfy this requirement. To satisfy this requirement (S. No. 2), the contract under consideration shall have been executed under FIDIC Condition of Contract.	

FOR REFERENCE ONLY

Form EXP - 2: Construction Experience in Key Activities

Fill out one (1) form per contract. Each contract shall be supported by documents such as Signed Contract Agreement, Taking-Over Certificate or Contract Completion Certificate.

Each Bidder must fill out this form.

If complied by Specialist Subcontractor, each Specialist Subcontractor must fill out this form and provide the Specialist Subcontractor's name:

Specialist Subcontractor: _____

Contract with Similar Key Activities		
Contract No. of	Contract Identification	
Award Date	Completion Date	
Total Contract Amount	NRs. or Its Equivalent	
If partner in a Joint Venture or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail		
Description of the Key Activities in Accordance with Criterion 2.4.2 of Section 3 (Evaluation and Qualification Criteria)		
(a) Production rate of construction of roads with Bituminous concrete works of 15,000.00 cum per year completed in any one year within the last Seven (7) years.		
(b) Production rate of construction of at least total length of 80.00m multilane (two-lane or more) bridges per year completed in any one year within the last Seven (7) years.		
(c) Production rate of construction of at least 960.00 m cast in-situ bored pile of minimum pile diameter 1000 mm for foundation of bridge per year completed in any one year within the last Seven (7) years.		

Form EXP – 3: Specific Experience in Managing Environmental, Health and Safety Aspects

Fill out one form per contract.

Each Bidder must fill out this form.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

1. Key Requirement no 1 in accordance with Criterion 2.4.3 of Section 3: _____

Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor	Member in JV	Management Contractor	Subcontractor
Total Contract Amount			NRs. or Its Equivalent	
Details of relevant experience				

2. Key Requirement no 2 in accordance with Criterion 2.4.3 of Section 3: _____

3. Key Requirement no 3 in accordance with Criterion 2.4.3 of Section 3: _____

Schedules

Schedule of Payment Currencies

For insert name of Section of the Works

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. In such a case, the Employer should prepare separate tables for each Section of the Works.

Name of Payment Currency	A Amount of Currency	B Rate of Exchange to Local Currency	C Local Currency Equivalent $C = A \times B$	D Percentage of Net Bid Price (NBP) $\frac{100 \times C}{NBP}$
Local Currency		1.00		
Foreign Currency #1				
Foreign Currency #2				
Foreign Currency #3				
Net Bid Price				100.00
Provisional Expressed in Currency	Sums Local	1.00		
BID PRICE				

Note

The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by the source specified in BDS 15.

Tables of Adjustment Data

Table A - Local Currency

Index Code	Index Description	Source of Index	Base Value and Date	% Range of Weighting	Bidder's Proposed Weighting
A	Nonadjustable	-	-	15	
B	Labour	National Salary and Wage Index: Construction Labour published by Nepal Rastra Bank		5-15	
C	Materials	National Wholesale Price Index: Construction Material: Published by Nepal Rastra Bank		50-60	
D	Machinery and Equipment	National Wholesale Price Index: Machinery and Equipment: Published by Nepal Rastra Bank		15-25	
			Total	100%	1.00

Table B - Foreign Currency

Name of Currency:

If the Bidder wishes to quote in more than one foreign currency, this table should be repeated for each foreign currency.

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Currency in Type/Amount	Equivalent in FC1	Bidder's Proposed Weighting
A	Nonadjustable	--	--	--	--	0.15
B						
C						
D						
E						
F						
G						
				Total		1.00

Note -

As per GCC 1.1.3.1, "Base Date" means the date 28 days prior to the latest date for submission of the bid.

Tables of Adjustment Data shall only be included if prices are to be quoted as adjustable prices in accordance with ITB 14.5.

Bill of Quantities

A. Preamble

1. The Bill of Quantities shall be read in conjunction with the Instruction to Bidders, Bidding Data, General and Particular Conditions of Contract, Standard Specifications and Special Provisions, 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 Engineer 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 Engineer may fix within the terms of the Contract.
3. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all constructional 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.
4. 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 covered by other rates and prices entered in the Bill of Quantities. The units and rates in figures entered into the Bill of Quantities should be typewritten or if written by hand, must be in print form. Bill of Quantities not presented accordingly may be considered nonresponsive.
5. 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.
6. The **Bid Price** is inclusive of all Environmental, Health and Safety management and compliance cost.
7. General directions and descriptions of work and materials are not necessarily repeated or 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.
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 Engineer in accordance with the Conditions of Contract.
9. The method of measurement of completed work for payment shall be in accordance with the Specifications (see Part II: Employer's Requirement, Section 6B and 6C of these documents).
10. Arithmetic errors will be corrected by the Employer as follows:
 - (a) 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.
 - (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.

11. Bidders shall price the Bill of Quantities in Nepalese Rupees (NRs.) only and shall indicate in the "Schedule of Payment Currencies" the percentage expected for payment in foreign currency or currencies.
12. Payment for Performance Based Maintenance (PBM) Works and Services measured in kilometre- month shall include the cost of all the activities that is required to be carried out by the Contractor as per the Specifications during performance based maintenance period except determined under Emergency Works, subject only to any reduction as provided in the relevant Section of the Specifications.

B. Dayworks Schedule

General

1. Work shall not be executed on a Daywork basis except by written order of the Engineer. Bidders shall enter basic rates for Daywork items in the Schedules, which rates shall apply to any quantity of Daywork ordered by the Engineer. Nominal quantities have been indicated against each item of Daywork, and the extended total for Daywork shall be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for Daywork shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

Daywork Labor

2. In calculating payments due to the Contractor for the execution of Daywork, 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 Daywork to the time of return to the original place of departure, but excluding meal breaks and rest periods. Only the time of classes of labor directly doing work ordered by the Engineer and for which they are competent to perform 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.
3. The Contractor shall be entitled to payment in respect of the total time that labor is employed on Daywork, calculated at the basis rates entered by him in the Schedule of Daywork Rates: 1. Labor. The rates for labor shall be deemed to cover all costs to the Contractor, including (but not limited to) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances, and any sums paid to or on behalf of such labor for social benefits in accordance with (Country of Borrower) law, as well as Contractor's profit; overheads; superintendence; liabilities and insurance and allowance to labor; timekeeping and clerical and office work; the use of consumable stores water, lighting, and power; the use and repair of stagings, scaffolding workshops and stores portable power tools, manual plant and tools; supervision by the Contractor's staff, foremen, and other supervisory personnel; and charges incidental to the foregoing. The rates shall be stated in the Nepalese Rupees (NRs.) but the payments will be made on currency proportions as indicated in the "Schedule of Payment Currencies".

Daywork Material

4. The Contractor shall be entitled to payment in respect of materials used for Daywork (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 Daywork Rates: 2. Materials and shall be deemed to include overhead charges and profit as follows;
 - (a) 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. The rates shall be stated in the Nepalese Rupees (NRs.) but the payments will be made on currency proportions as indicated in the "Schedule of Payment Currencies".
 - (b) the cost of hauling materials for use on work ordered to be carried out as Daywork from the store or stockpile on the Site to the place where it is to be used shall also be deemed included in the same rate.

Daywork Equipment

5. The Contractor shall be entitled to payments in respect of Contractor's Equipment already on Site and employed on Daywork at the basic rental rates entered by him in the Schedule of Daywork Rates: 3. Contractor's Equipment. The said rates shall be deemed to include due and complete allowance for

depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricants, and other consumables, and all overhead profit and administrative costs related to the use of such equipment. The cost of drivers, operators, and assistants shall also be included in the rate of the equipment and no separate payment shall be made for it.

6. In calculating the payment due to the Contractor's Equipment employed on Daywork, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Engineer, the traveling time from the part of the Site where the Construction Plant was located when ordered by the Engineer to be employed on Daywork and the time for return journey thereto shall be included for payment.
7. The basic rental rates for Contractor's Equipment employed on Daywork shall be stated in Nepalese Rupees (NRs.) but the payments will be made on currency proportions as indicated in the "Schedule of Payment Currencies".

Units of Measurement

The following units of measurement and abbreviations are used:

Unit	Abbreviation	Unit	Abbreviation
a) cubic meter	m ³ or Cum	b) millimeter	mm
c) hectare	ha	d) month	Month
e) hour	Hr	f) number	Nos
g) kilogram	Kg	h) square meter	m ² or Sqm
i) kilometer	km	j) kilometer month	Km-Month
k) lump sum	sum	l) person day	per day
m) meter	Rm or m	n) week	wk
o) metric ton (1,000 kg)	Metric ton	p) square millimeter	mm ² or sq mm
q) litre	lt or ltr	r) person month	per mon
s) vehicle Month	Vel - Mon	t) provisional sum	PS
u) Man day	M-day		

C. Work Items (Bill of Quantities)

FOR REFERENCE ONLY

Department of Roads
Project Directorate (ADB)
 Bishalnagar, Kathmandu

Name of Works and Location: Upgrading Kakarbhitta-Laukahi (Ch 95+760~111+500) Section of EWH

Bill of Quantities (BoQ)

Construction Period : 24 Months
 Defect Notification Period (DNP): 12 Months
 Performance Based Maintenance : 60 Months

Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
Part 1		General					
1.1.1	[SS/SP 119]	Insurances for the loss of damage to works, plant, material, equipment, property and personnel injury or death, as per technical specification and to the satisfaction of Engineer all complete. i) Insurance cover for works, plant and equipment Employer's staffs, Contractor's employees and labour all complete	Job	1.00			
1.1.2	[SS/SP 119]	Insurances for the loss of damage to works, plant, material, equipment, property and personnel injury or death, as per technical specification and to the satisfaction of Engineer all complete. ii) Insurance cover for third party property and person all complete	Job	1.00			
1.2	[SS/SP 103,a(1)]	Supplying, maintaining and operating the vehicle for the Employer's use at site, as per technical specification and to the satisfaction of Engineer all complete. The vehicles shall remain the property of the Contractor upon completion of the contract . i) Type 1 vehicle for the Employer's use at site.	Vehicle-Month	24.00			
1.3	[SS/SP 103,a(2)]	Contractor's material testing laboratory at site					
1.3.1		Providing laboratory space, laboratory equipment, human resources, transportation facilities, maintaining and operating, etc. of the material testing laboratory at site, as per technical specification and to the satisfaction of Engineer all complete.	Month	24.00			
1.3.2		Providing furniture and equipment at the material testing laboratory at site, all complete. The furniture and equipment of the lab shall remain the property of the Contractor upon completion of the contract, as per technical specification and to the satisfaction of Engineer all complete.	Job	1.00			
1.4	[SS/SP 109]	Maintenance of road					
1.4.1		Routine Maintenance of road during construction and defect notification period, as per technical specification and to the satisfaction of Engineer all complete (Chainage 95+760 ~111+500).					
1.4.1.i		During Construction Period	Km-Month	378.00			
1.4.1.ii		During Defect Notification Period	Km-Month	189.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
1.4.2		Recurrent/Responsive maintenance of the road during construction period, as per technical specification and to the satisfaction of Engineer all complete. (Chainage 95+760 ~111+500).	Km-Month	378.00			
1.5	[SS/SP 110]	Provision and installation of site information notice board, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Nos	2.00			
1.6	[SS/SP 116]	Prepare and supply of project record (video documentary) of the site before, during and after the site works, all complete as per technical specification and to the satisfaction of Engineer.	Set	1.00			
1.7	[SS/SP 125]	GIS Data Creation: Preparation and submission of as built drawing showing newly laid road, drainage, existing utilities (electrical, telecommunication water and sewer lines) in a format suitable for transferring to GIS database at the completion of each section, all complete as per design drawings, technical specification and to the satisfaction of Engineer.	Job	1.00			
		Sub total Part 1: General					
Part 2 Road Works							
2.1		Site Clearance					
2.1.1	[SS/SP 201]	Clearing and Grubbing of jungle including uprooting, carrying and disposing of vegetation, grass, bush, sapling and trees of girth up to 300 mm (measured at a height of 1m above the ground level), as per technical specification and to the satisfaction of Engineer all complete.	Sqm	102450.00			
2.1.2	[SS/SP 201]	Felling Trees (the girth measured at a height of 1m above ground level) including cutting of trunks and branches, removing the roots, stacking serviceable materials and disposal of unserviceable materials to suitable place, all complete, as per specification.					
2.1.2.i.		i) Above 300mm-600mm girth size	Nos	592.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.1.2.ii.		ii)Above 600mm-900mm girth size	Nos	290.00			
2.1.2.iii.		iii) Above 900mm - 1800mm girth size	Nos	693.00			
2.1.2.iv.		iv) Above 1800mm - 2500mm girth size	Nos	14.00			
2.1.2.v.		v) Above 2500mm girth size	Nos	84.00			
2.1.3	[SS/SP 202]	Dismantling of existing structures like culverts, bridges, retaining wall and other structure comprising of masonry, cement concrete, wood work, steel work, including scaffolding wherever necessary, sorting the dismantled Material, disposal of unserviceable Material and stacking the serviceable Material with all lifts and lead at appropriate location as instructed by the Engineer, technical specification and to the satisfaction of Engineer all complete.					
2.1.3.i.		i) Stone masonry in cement sand mortar	Cum	9314.03			
2.1.3.ii.		ii) Gabion masonry	Cum	1811.76			
2.1.3.iii.		iii) Concrete (plain, Reinforced and prestresses)	Cum	2946.17			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.1.3.iv.		iv) Dry stone masonry/soling	Cum	1077.12			
2.1.3.v.		v) Hume Pipe upto 600mm dia	Rm	221.80			
2.1.3.vi.		vi) Hume Pipe above 900mmdia	Rm	34.90			
2.1.3.vii.		vii) Brick masonry	Cum	796.33			
2.1.3.viii.		viii) Steel Works	Mt	73.24			
2.1.3.ix.		ix) Railing/ fencing	Rm	1275.00			
2.1.4	[SS/SP 1003]	Scarifying Existing Bituminous Road Surface, to a depth of existing surface and disposal of scarified materials with all lifts and lead as per Drawing and instruction of the Engineer all complete.	Sqm	119633.02			
2.1.5	[SS/SP 202]	Dismantling of Kilometer Stone: Dismantling of kilometer stone including cutting of earth, foundation and disposal of dismantled Material with all lifts and at appropriate location as instructed by the Engineer and back filling of pit, as per design drawings, technical specification and to the satisfaction of Engineer all complete.					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.1.5.i.		i) 5 Km Post	Nos	3.00			
2.1.5.ii.		ii) 1 Km Post	Nos	12.00			
		Sub total Part 2.1-Site Clearance					
2.2		Earthwork					
2.2.1	[SS-905, SS/SP 900]	Roadway Excavation in all types of soil as per Drawing and technical specifications including removal of stumps and other deleterious matter, all lifts and lead, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	107877.87			
2.2.2	[SS- 909, 910, SS/SP 900]	Construction of Embankment; Providing, laying, spreading and compacting including slope compaction embankment with suitable material, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	227466.97			
		Sub total Part 2.2- Earth Works					
2.3		Structures					
2.3.1	[SS- 907, SS/SP 900]	Earth work in Excavation of Foundation of structures, in all types of soil including construction of shoring and bracing, removal of stumps and other deleterious matter and backfilling with approved Material, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	87832.88			
2.3.2	[SS/SP-3118]	Providing and laying of Stone Soling/Packing Works for levelling in line and level, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	11976.23			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.3.3	[SS/SP 2000]	Providing and placing machine mixed Cement Concrete in M15/40 for PCC works, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	7993.81			
2.3.4	[SS/SP 2000/3100]	Providing and placing machine mixed Cement Concrete in M25/20 for RCC longitudinal drain pre cast/ cast in situ , as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 2000/3100]	Cum	21159.56			
2.3.5	[SS/SP 2000]	Providing and placing machine mixed Cement Concrete in M25/20 for RCC works in Retaining structures & Cross Drainage Structures , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	18336.26			
2.3.6	[SS/SP 2000/3100]	Providing and placing machine mixed Cement Concrete in M30/20 for RCC works in Cross Drainage Structures as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	519.61			
2.3.7	[SS/SP 2000]	Providing and laying , fitting and placing HYSD bar reinforcement for RCC structure, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt.	3077.64			
2.3.8	[SS/SP 301]	Providing and fixing of Reinforced Soil Wall Structure with M35/20 Precast Reinforced Concrete Panel Facia with Flexible Para web or equivalent as primary reinforcement for composite soil reinforcement system, made of polyester core with polyethylene coating with design life >100 years with light and heavy cavity connectors and covers, I bolts, EPDM Pads, Laying of Geo-textiles, drainage gallery filling with boulders etc. as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 301]	Sqm	6690.00			
2.3.9	[SS/SP 2400]	Providing and assembling mechanically woven double twisted Gabion mattresses (Heavy zinc coated Hexagonal mesh type 100 x 120 mm, mesh wire 3mm, selvage wire 3.9mm, lacing wire 2.4 mm), placing in position including stretching, forming compartment, tying the sides and diaphragms with binding wire in each mesh, tying with bracing wires and tie wires and tying down the lid providing and Filling Stone/ Boulder in gabion boxes / mattress etc. including dressing, bedding,bonding all complete as per specification and drawing.[SS/SP 2400]	Cum	3142.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.3.10	[SS/SP 2600]	Providing and laying of Stone Masonry Work in Cement Mortar 1:4 in Foundation, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	381.92			
2.3.11	[SS/SP 700]	Providing and Laying Reinforced Cement Concrete Flush jointed Hume Pipe for drain works Providing and Laying Reinforced cement concrete NP3 Flush jointed pipe for culverts including fixing with cement mortar 1:2 as per design drawings, technical specification and to the satisfaction of Engineer all complete.					
2.3.11.i		i) 600 mm internal dia.	Rm	200.00			
2.3.11.ii		ii) 900 mm internal dia.	Rm	90.00			
		Sub-Total Part 2.3- Structure					
2.4		Pavement Works					
2.4.1	[SS-1004, SS/SP-1000]	Providing and laying Capping Layer: Providing and laying sub-grade with approved Material obtained from borrow pits all complete as per design drawings, technical specification and to the satisfaction of Engineer.	Cum	5690.16			
2.4.2	[SS/SP 1003]	Construction of Subgrade by compacting Original Ground supporting sub-grade. Loosening of the ground up to a level of 500 mm below the sub-grade level, watered, graded and compacted in layers as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	59816.51			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.4.3	[SS/SP 1201]	Providing and laying Granular Sub-Base Material on prepared surface, mixing at OMC, and compacting to achieve the desired density, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	126837.22			
2.4.4	[SS 1208, SS/SP 1200]	Providing, laying, spreading and compacting graded crushed stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC laying in uniform layers by paver finisher in Base Course on well prepared surface and compacting to achieve required density as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	98712.15			
2.4.5	[SS/SP 1302]	Providing and applying Prime Coat MC30/70 by Mechanical Means with Hot Bitumen (including cutter) on prepared surface of granular base including cleaning of road surface and spraying by mechanical means as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Ltr	260905.55			
2.4.6	[SS/SP 1302]	Providing and applying Tack Coat with hot Bitumen (VG-30) by Mechanical Means at specified rate i) over the non-bituminous (base course and ii) bituminous surfaces (DBM) including cleaning as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Ltr	293032.55			
2.4.7	[SS/SP 1308]	Providing and laying in uniform layers by paver finisher Dense Bituminous Macadam using crushed aggregates of specified grading, premixed with bituminous binder (VG-30) and filler, as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 1300]	Cum	20949.70			
2.4.8	[SS/SP 1309]	Providing and laying in uniform layers by paver finisher Bituminous Concrete / Asphalt Concrete using crushed aggregates of specified grading, premixed with bituminous binder (VG-30) and filler as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	17486.05			
		Sub total Part 2.4-Pavement Works					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.5		Median, Kerbs and Footpath					
2.5.1	[SS 1205, SS/SP 1200]	Providing and laying Median and Island above road level with approved Material deposited including compaction as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	22645.00			
2.5.2	[SS/SP 3113]	Supplying & laying of 1.5mm thick HDPE Geomembrane of standard quality over the prepared median base in proper line and slope including lining and joining the sheets with approved technology for 100% water tightness as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	44300.00			
2.5.3	[SS/SP 2414]	Providing and laying Filter material in median complete as per drawing and Technical specification	Cum	13689.18			
2.5.4	[SS/SP 2404]	Providing , laying and fixing of Geotextile (filter fabrics) above the filter material layer of median as per Drawing and Specification all complete.	Sqm	41251.50			
2.5.5	[SS/SP 3100,3111, 2404]	Providing and laying Subsurface Drain in the base of median with perforated pipe of 160 mm internal diameter of HDPE closely jointed, and wrapped with geo-textile, perforations ranging from 3 mm to 6 mm depending upon size of crushed stone filter material surrounding the pipe, as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 3100, 2404]	Rm	15450.00			
2.5.6	[SS/SP 1400]	Providing and laying of M25 grade cement concrete Half Battered Kerb with 12 mm thick 1:3 cement sand mortar bedding and joints including foundation excavation levelling but excluding foundation concrete for foundation or sand gravel material, as per Drawing and Technical Specifications all complete. i) Type A (L=300mm, Breadth=165mm, Height=325mm)	Rm	92,070.08			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.5.7	[SS/SP 2000]	Providing and placing machine mixed Cement Concrete in M15/40 for PCC works , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	1,636.53			
2.5.8	[SS/SP 2000]	Providing and placing machine mixed Cement Concrete in M20/40 for PCC works , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	437.70			
2.5.9	[SS/SP 1200]	Providing and laying Granular Sub-Base Material for base of footpath, mixing at OMC, and compacting to achieve the desired density, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	5446.47			
2.5.10	[SS/SP1400]	Providing and laying min M30 multi blended Interlocking Concrete Block of 60mm thick with tactile blocks as required for footpath conforming NS standard over 50mm thick stone dust bed in footpath including excavation for sand bedding, as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP1400]	Sqm	56443.13			
2.5.11	[SS/SP 900]	Foundation Excavation for brick masonry works to support footpath edge in all types of soil including back filling after completion of work, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	1276.80			
2.5.12	[SS/SP 3118]	Providing and laying of Stone Soling/Packing Works for levelling in line and level, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	478.81			
2.5.13	[SS/SP 2500]	Providing and laying Brick Masonry Work at the edge of the foot path in 1:4 Cement mortar in structure complete, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	1500.60			
		Part 2.5-Kerbs and Footpath					
2.6		Road Furniture and Traffic Safety Measures					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
2.6.1	[SS/SP 1500, 1501]	Providing and fixing of Retro-Reflectorized Warning, Regulatory and Informatory Sign made of high intensity grade sheeting, fixed over aluminum sheeting, mild steel channel iron post 75mmx40mmx4.8mm firmly fixed to the ground by means of properly designed foundation with M15/40 grade cement concrete 30cmx30cm,30cm below ground level as per design drawings, technical specification and to the satisfaction of Engineer all complete.					
2.6.1.i.		i) Type A: 90 cm equilateral Triangle, with single MS Channel 75x40x4.8mm	Nos	25.00			
2.6.1.ii.		ii) Type B: 75 cm circular, with single MS Channel 75x40x6mm	Nos	52.00			
2.6.1.iii.		iii) Type C: 80 cm x 60 cm rectangular, with single MS Channel 75x40x4.8mm	Nos	25.00			
2.6.1.iv.		iv) Type D: 60 cm x 45 cm rectangular, with single MS Channel 75x40x4.8mm	Nos	25.00			
2.6.1.v.		v) Type E: 50 cm x 100 cm rectangular hazard plate, with MS channel 75x40x4.8mm	Nos	40.00			
2.6.1.vi.		vi) Type F: 130 cm x 90 cm Route Confirmation, Place Identification, Bridge Name Plate etc., with double MS Channel 75x40x4.8mm	Nos	46.00			
2.6.2-A	[SS/SP 1502]	Providing and erecting galvanized Steel Trusses for Over Head signs with vertical and lateral clearance as per drawing and installed structural design requirements, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt.	21.68			

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2.6.2-B	[SS/SP 1502]	Providing and erecting over head signs with a corrosion resistant 2mm thick aluminum alloy sheet reflectorized with microprismatic retro-reflective type over a designed support system, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	189.00			
2.6.3	[SS/SP 1500, 1501]	Providing and Painting two coats after filling the surface with synthetic enamel paint in all shades on concrete / plaster surfaces, as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 1500]	Sqm	36740.25			
2.6.4.i	[SS/SP 1500, 1504]	Providing and laying of Hot applied thermoplastic compound at least 2mm thick including reflectorizing glass beads as per DOR Traffic sign manual/Specifications.The finished surface to be level, uniform and free from streaks and holes, as per design drawings, technical specification and to the satisfaction of Engineer all complete.[SS/SP 1500]	Sqm	14318.56			
2.6.4.ii	[SS/SP 1500, 1504]	Providing and laying of Hot applied thermoplastic compound at least 5mm thick including reflectorizing glass beads as per DOR Traffic sign manual/Specifications.The finished surface to be level, uniform and free from streaks and holes, as per design drawings, technical specification and to the satisfaction of Engineer all complete.[SS/SP 1500]	Sqm	403.20			
2.6.5	[SS/SP 1500, 1505]	Providing and fixing of Road Stud 100x100mm die-cast in aluminum, resistant to corrosive effect of salt and grit, fitted with lenses reflectors, installed in concrete or asphaltic surface by drilling hole 30mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 1500]	Nos	300.00			
2.6.6	[SS/SP 1500, 1506]	Providing and Fixing Reinforced cement concrete M20 grade Kilometer Post including painting and printing, as per design drawings, technical specification and to the satisfaction of Engineer all complete.					
2.6.6.i.		i) Standard Fifth kilometer post	Nos	8.00			

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2.6.6.ii.		ii) Standard one Kilometer post	Nos	24.00			
2.6.7	[SS/SP 1500, 1507]	Providing and installation of 150 mm * 150 mm 1.5 m long RCC M20 grade (with F3 finish form works) Delineators (road way indicators, hazard markers, object markers), 80-100 cm high above ground level, painted black and white in 20 cm wide strips and with reflective element, buried or pressed into the ground as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Nos.	130.00			
2.6.8(a)	[SS/SP 1500, 1510]	Providing and Fixing Reinforced Cement Concrete Crash Barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-40 grade concrete with expansion joints filled with pre-molded asphalt filler board, keyed to the structure on which it is built and installed as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	2081.38			
2.6.8(b)	[SS/SP 1500, 1510]	Providing and laying , fitting and placing HYSD bar reinforcement for RCC crash barrier, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	281.79			
2.6.9	[SS/SP 1500, 1511]	Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m center to center, 1.8 m high, 1.1 m below ground/road level metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	1740.00			
2.6.10	[SS/SP 1500, 1511]	Providing and erecting a "Thrie" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 85 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m center to center, 2.1 m high, 1.3 m below ground/road level metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 546 mm long, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	360.00			

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2.6.11	[SS/SP 3115]	Providing and installation of 1.2 m height Median Fencing for control of unauthorized crossing of the highway, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	7650.00			
2.6.12	[SS/SP 1500]	Providing and construction (including solar light system) of Bus Stop Shelter at bus bay, all complete as per design drawings and to the satisfaction of Engineer all complete.	Nos	13.00			
		Sub-Total-2.6-Road Furniture and Traffic Safety Measures					
		Sub-Total of Part 2 Road Works					
Part:3		Bridge and Overpass Structures Works					
3.1		Foundation					
3.1.1	[SS/SP 900, 907]	Earthwork in Excavation for foundation of structure in all type of soil including shoring, strutting, bracing, dewatering and disposal with necessary haulage and lift, removal of stumps and other debris matter and backfilling in foundation and behind the abutment with approved Material as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	7620.25			
3.1.2	[SS/SP 3118]	Providing and laying of Stone Soling/Packing Works for levelling in line and level, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	416.72			
3.1.3	[SS/SP 1200]	Providing and laying Granular sub-base on prepared surface, mixing at OMC, and compacting to achieve the desired density, complete as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	141.71			
3.1.4	[SS/SP 2000]	Providing and placing machine mixed Cement Concrete in M15/40 for PCC works , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	180.22			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
3.1.5	[SS/SP 1800 and 2000]	Providing and placing machine mixed Cement Concrete M30/20 , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	2175.69			
3.1.6	[SS/SP 2000]	Providing machine mixed Cement Concrete M35/20 for Pile and foundation works , as per design drawings, technical specification and to the satisfaction of Engineer all complete.[SS/SP 2000]	Cum	3465.30			
3.1.7	[SS/SP 1600]	Providing, boring and installing Bored Cast-in-situ RCC Pile including Installation of Permanent Steel Pile Casing from the bottom of pile cap to 0.5m below maximum scour level as per Design Drawing excluding Reinforcement and Concrete, including all consumables, and removal of excavated earth with necessary lifts and lead as per design drawings, technical specification and to the satisfaction of Engineer all complete.					
3.1.7 i).	[SS/SP 1600]	i) Pile diameter - 1000 mm	Rm	336.00			
3.1.7 ii)	[SS/SP 1600]	i) Pile diameter - 1200 mm	Rm	2424.00			
3.1.8	[SS/SP 2000]	Providing and laying , fitting and placing uncoated Mild steel / HYSD reinforcement as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 2000]	Mt	698.32			
3.1.9	[SS/SP 1600]	Providing and driving Sheet Piles for the protection of existing structure upon the instruction from the Engineer and as per technical specification all complete. [SS/SP 1600]	Sqm.	2700.00			
		Sub-Total 3.1-Foundation					
3.2		Substructure					

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3.2.1	[SS/SP 1800/2000]	Providing and placing machine mixed Cement Concrete M30/20 , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	1199.73			
3.2.2	[SS/SP 1800/2000]	Providing and placing machine mixed Cement Concrete M35/20 , with weep holes of 110 mm dia HDPE pipe as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	280.98			
3.2.3	[SS/SP 2000]	Providing and laying , fitting and placing HYSD bar reinforcement complete as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	14.60			
3.2.4	[SS/SP 900]	Providing and filling with graded Pervious Filter Material behind abutment in layer with necessary watering and compaction, as per design drawings technical specification and to the satisfaction of Engineer all complete.	Cum	440.18			
3.2.5	[SS/SP 2400]	Providing, laying and fixing of Geotextile (filter fabric) as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	733.66			
		Total 3.2: Sub-Structure					
3.3		Superstructure					
3.3.1	[SS/SP 1800 and 2000]	Providing and placing machine mixed Cement Concrete M30/20 for Deck Slab as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	573.16			
3.3.2	[SS/SP 1800 and 2000]	Providing and placing machine mixed Cement Concrete M35/20 for Deck Slab as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	253.80			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
3.3.3	[SS/SP 1302]	Providing and applying Tack coat with hot Bitumen (VG-30) at specified rate on the prepared non-bituminous/bituminous surfaces including cleaning as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Ltr	1904.30			
3.3.4	[SS/SP 1309]	Providing and laying Bituminous concrete/ Asphalt concrete using crushed aggregates of specified grading, premixed with bituminous binder (VG-30) and filler as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	176.16			
3.3.5	[SS/SP 1800, 2000 and 2100]	Providing and placing machine mixed Cement Concrete M45/20 for Post tensioned Precast Main Girders , as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 1800, 2000 and 2100]	Cum	311.16			
3.3.6	[SS/SP 1800 and 2000]	Providing and placing machine mixed Cement Concrete M45/20 for Cross Girders , as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 1800 and 2000]	Cum	40.77			
3.3.7	[SS/SP 1800, 2000]	Providing and placing machine mixed Cement Concrete M30/20 for Main Girders , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	206.94			
3.3.8	[SS/SP 1800 and 2000]	Providing and placing machine mixed Cement Concrete M30/20 for Cross Girders , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	38.90			

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3.3.9	[SS/SP 1800 and	Providing and placing machine mixed Cement Concrete M30/20 for Crash Barrier, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	101.22			
3.3.10	[SS/SP 2100]	Providing, fitting and fixing High Tensile Steel Wires/Strands (Tendons) including all accessories for stressing operation and grouting as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	26.49			
3.3.11	[SS/SP 2000]	Providing and laying , fitting and placing HYSD bar reinforcement complete as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	199.90			
3.3.12	[SS/SP 2119]	Lifting, Transporting (from yard to bridge site) and installation of the pre-cast bridge girder to the required line and level as shown in the drawing, as per technical specification and to the satisfaction of Engineer all complete. {* this rate is applicable for various sized of precast girder}	Nos	12.00			
3.3.13	[SS/SP 1901]	Providing and fixing of Expansion Joints (Strip Seal Type) including necessary accessories, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	65.70			
3.3.14	[SS/SP 1901]	Providing and fixing of Expansion Joints (Slab Seal Type) including necessary accessories, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	43.80			

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3.3.15	[SS/SP 1902]	Providing and fixing of accessories POT-PTFE Bearing as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Nos	24.00			
3.3.16	[SS/SP 1902]	Providing and fixing of Elastomeric Bearing as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Nos	36.00			
3.3.17	[SS/SP 3100]	Providing and fixing of Drainage Spouts as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Nos	112.00			
3.3.18	[SS/SP 2200, 3100]	Providing and fixing of factory fabricated GI Pipe Railing as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Kg	9833.08			
3.3.19	[SS/SP 2200]	Providing and fixing of Steel Plates and other parts including utility hangers as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	26.13			
		Sub-Total 3.3-Superstructure					
3.4		Pedestrian Over Pass/Box Bridge					
3.4.1	[SS/SP 1800, 2000]	Providing and placing machine mixed Cement Concrete M25/20 for RCC works , as per design drawings, technical specification and to the satisfaction of Engineer all complete.[SS/SP 1800 and 2000]	Cum	816.17			

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3.4.2	[SS/SP 2000]	Providing and laying , fitting and placing HYSD bar reinforcement complete as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	75.18			
3.4.3	[SS/SP 2510]	Providing and laying 12.5 mm thick cement plaster on ceiling surface with 1:3 cement sand mortar in perfect line and level including scaffolding, curing etc. as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	518.81			
3.4.4	[SS/SP 1500]	Providing and Applying One Coat of self primer and Two or more Coat of Enamel Painting or equivalent as Exterior Coating as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	518.81			
3.4.5	[SS/SP 1500]	Applying One Coat of self primer and Two or more Coat of Enamel Painting , as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	414.94			
3.4.6	[SS/SP 2200]	Providing, fabricating and fixing of MS Railing for Overhead Pedestrian crossing as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Mt	11.25			
		Sub-Total 3.4-Box Bridge					
3.5		River Training and Protection Works					
3.5.1	[SS/SP 900, 907]	Earthwork in Excavation for foundation of structure in all type of soil including shoring, strutting, bracing, dewatering and disposal with necessary haulage and lift, removal of stumps and other deleterious matter and backfilling with approved Material as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	2100.00			
3.5.2	[SS- 909, 910, SS/SP 900]	Construction of Embankment: Providing, laying, spreading and compacting including slope compaction embankment with borrow material, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	2498.28			

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3.5.3	[SS/SP 2400]	Providing and assembling mechanically woven double twisted Gabion mattresses (Heavy zinc coated Hexagonal mesh type 100 x 120 mm, mesh wire 3mm, selvage wire 3.9mm, lacing wire 2.4 mm), placing in position including stretching, forming compartment, tying the sides and diaphragms with binding wire in each mesh, tying with bracing wires and tie wires and tying down the lid providing and Filling Stone/ Boulder in gabion boxes / mattress etc. including dressing, bedding,bonding all complete as per specification and drawing.	Cum	3877.92			
3.5.4	[SS/SP 2404]	Providing, laying and fixing of Geotextile (filter fabric) as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	3652.00			
3.5.5	[SS/SP 2900, 900]	River Channelization including debris clearance in all types of soil and disposal to the appropriate location as instructed by the Engineer, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	185000.00			
		Sub-Total 3.5-River Training and Protection Works					
3.6		Pile Testing Works					
3.6.1	[SS/SP 1614]	Conducting PDA-Pile Dynamic Analyzer test on working piles including analysis and reporting per bridge as per design drawings, technical specification, general practice and to the satisfaction of Engineer all complete.	Nos	18.00			
3.6.2	[SS/SP 1614]	Conducting Static Pile load test on working piles including analysis and reporting per bridge as per design drawings, technical specification, general practice and to the satisfaction of Engineer all complete.	Nos	4.00			

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		Sub-Total 3.6-Pile Testing Works					
		Sub-Total of Part 3: Bridge Works					
Part 4		Bridge Maintenance Works					
4.1		Deck Surface, Parapet and Railing					
4.1.1	[SS/SP 2712]	Removal of existing asphaltic wearing coat asphaltic concrete including disposal with all lift and lead as per design drawings, technical specification, general practice and to the satisfaction of Engineer all complete.	Cum	16.88			
4.1.2	[SS/SP 2712]	Removal of existing cement concrete wearing coat including disposal with all lift and lead all complete as per design drawings, technical specification, general practice and to the satisfaction of Engineer all complete.	Cum	52.69			
4.1.3	[SS/SP 1302]	Providing and applying Tack Coat with hot Bitumen (VG-30) at specified rate on the prepared non-bituminous/bituminous surface including cleaning as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Ltr	101.27			
4.1.4	[SS/SP 1309]	Providing and laying Bituminous concrete/ Asphalt concrete using crushed aggregates of specified grading, premixed with bituminous binder (VG-30) and filler as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Cum	8.44			
4.1.5	[SS/SP 2703]	Providing and replacement of Damaged Concrete Railing as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 2700]	Rm	2.00			

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4.2	[SS/SP 2714]	Providing and replacement of Expansion Joints as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	23.20			
4.3	[SS/SP 2706]	Providing and Sealing of cracks/porous concrete by injection process through nipples/Grouting cement Mortar (1:1) /providing application of gunite/shotcrete to repair damaged section on slab, girder, beam etc with high early strength, low rebound sprayable thixotropic repair mortar mixed by machine all complete as per design drawings, technical specification and to the satisfaction of Engineer.	Sqm	5.00			
		Total Part 4 Bridge Maintenance Works					
Part 5		Environmental Mitigation, wildlife friendly, Social and Bio-engineering Works					
5.1		Bio-engineering Works					
5.1.1	[SS/SP 2800]	Supply and Planting containerised Indigenous Tree and Shrub Seedlings , including pitting, transplanting, composting on toe of embankment slopes and on the footpath in urban area in plain areas. Pit size 30 cm diameter * 30 cm depth. Mix compost with soil and backfill into pit to 1/4 of pit volume, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Nos	3664.00			
5.1.2	[SS/SP 2800]	Collection, preparation including site preparation and laying of live Palisade Construction, Brush Layering and Fascines using hardwood cuttings of selected species of min 1m length pleased in bundles to give 4 running meters of cutting per meter of Fascines, including backfilling of trench and careful compaction, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	9232.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
5.1.3	[SS/SP 2800]	Planting rooted grass slips on embankment slopes in plain areas, at spacing within the row. The first row is 0.75 m from the edge of the pavement and subsequent rows are spaced at intervals down the embankment, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Sqm	3437.82			
5.1.4	[SS/SP 2800]	Providing and planting flowering plants and shrubs in central verge/median (200 plants and 800 shrubs in two rows in one km length of the road where width of verge/median is 3m and above, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	Rm	15450.00			
		Sub-Total 5.1- Bio-Engineering Works					
		Sub-Total of Part 5 Environmental Mitigation, wildlife friendly, Social and Bioengineering Works					
Part 6	[SS/SP 3117]	Construction and Shifting of HT/LT Lines works					
6.1		Material					
6.1.1		Steel Telescopic Pole 13m (Octagonal fully galvanised)	Nos	732.00			
6.1.2		ACSR Wolf Conductor	Km	45.00			

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Bill of Quantities (BoQ)

Construction Period : 24 Months
 Defect Notification Period (DNP): 12 Months
 Performance Based Maintenance : 60 Months

Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.1.3		33 kV Pin Insulator with Spindle, Nut bolts, Washer, TopTie including all accessories	Set	1272.00			
6.1.4		33 kV Disc Insulator with 70KN Tension set grapher, Ball and socket eye (3 disc in 1 set)	Set	246.00			
6.1.5		ISMC 100*50*6.4*5* 1900 mm galvanized	Nos	344.00			
6.1.6		Flat Crossarm Brace 50*6*760 mm galvanized	Nos	1272.00			
6.1.7		ISMC 100*50*6.4*5*3300 mm galvanized	Nos	312.00			
6.1.8		ISA 50*50*6*2416 mm Bracing angle galvanized	Nos	199.00			
6.1.9		ISA 50*50*6*2872 mm Bracing angle galvanized	Nos	199.00			
6.1.10		Suitable Pole Clamps for Octagonal Telescopic Pole (Different size, galvanized)	Nos	5255.00			
6.1.11		Back Strap for String Insulator 50*6*404 mm galvanized	Nos	954.00			

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Construction Period : 24 Months
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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.1.12		PSC Pole 11 m	Nos	478.00			
6.1.13		ISMC 100*50*6.4*5*300 mm galvanized	Nos	190.00			
6.1.14		ISMC 100*50*6.4*5* 1200 mm galvanized	Nos	1662.00			
6.1.15		Flat Crossarm Brace 50*6*660 mm galvanized	Nos	380.00			
6.1.16		ISMC 100*50*6.4 *5* 1700 mm galvanized	Nos	1662.00			
6.1.17		ISA 50*50*6* 1000 mm Bracing angle galvanized	Nos	1662.00			
6.1.18		ISA 50*50*6*460 mm Bracing angle galvanized	Nos	1662.00			
6.1.19		ISMC 100*50*6.4*5*2500 mm galvanized	Nos	136.00			
6.1.20		ISMC 100*50*6.4*5*600 mm galvanized	Nos	88.00			

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 Performance Based Maintenance : 60 Months

Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.1.21		Suitable Pole Clamps for PSC Pole (Different size, galvanized)	Nos	3160.00			
6.1.22		11 kV Pin Insulator with Spindle, Nut bolts, Washer, TopTie including all accessories	Set	5094.00			
6.1.23		11 kV Disc Insulator	Nos	708.00			
6.1.24		Dead end clamp (28120HP) for XLPE covered conductor	Nos	708.00			
6.1.25		Ball and Socket eye	Nos	708.00			
6.1.26		11 kV single core XLPE covered conductor 100 sqmm.	Km	172.00			
6.1.27		Cable Tie (PLTT3 F)	Nos	4074.00			
6.1.28		Cable Tie (PLST3 F)	Nos	1020.00			
6.1.29		NTDC 28401 AFA Insulation connector	Nos	672.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.1.30		TNDC 28401 FA TS1 Insulation connector	Nos	240.00			
6.1.31		Pre Insulated Junction Sleeve MJPT	Nos	192.00			
6.1.32		Heat shrinkable end cap for XLPE covered conductor 100 sq.mm .	Nos	128.00			
6.1.33		Nut Bolt with washer (Different size, full thread , galvanized)	Kg	2706.50			
6.1.34		PG Clamp 2 Nut for ACSR DOG conductor	Nos	684.00			
6.1.35		HT Stay Set Complete (Stay Rod M 19* 1 800 mm , Stay Plate 600*600*6 mm , Eye-Bolt 16 mm, Turn Buckle 19 mm, Preformed Tie, Thimble Fully Galvanized with HT Stay Insulator 88KN)	Set	243.00			
6.1.36		Stay Wire 7/8 SWG	Kg	2430.00			
6.1.37		Copper Coated Earthing Rod (6 ft* 19mm Dia.)	Nos	68.00			
6.1.38		PVC Insulated Copper Earthing Wire 8 SWG	Mtr	550.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.1.39		11kV Lightning arrestor (1 set = 3 nos)	Set	24.00			
6.1.40		11kV Drop Out Fuse (1 set = 3 nos)	Set	22.00			
6.1.41		Copper Cable Socket 120 sq.mm Long body	Nos	324.00			
6.1.42		Copper Cable Socket 185 sq.mm Long body	Nos	24.00			
6.1.43		Pig tail with hexagonal nut and washer	Nos	648.00			
6.1.44		AB Cable LT 4C*95 sq.mm	Km	36.00			
6.1.45		Anchor clamp for 95 sq.mm AB Cable	Nos	204.00			
6.1.46		Aluminium bracket for 95 sq.mm AB Cable	Nos	204.00			
6.1.47		Suspension clamp for 95 sq .mm AB Cable	Nos	929.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.1.48		Cable connector for 95 sq.mm AB Cable	Nos	4366.00			
6.1.49		Steel Binder Tape for AB cable	Mtr	1210.00			
6.1.50		Steel Band Buckle for AB Cable	Nos	1213.00			
6.1.51		11 kV, 630A Disconnecting switch	Set	26.00			
6.1.52		D-iron with Shackle Insulator	Nos	510.00			
6.1.53		HDPE pipe	Mtr	500.00			
		Material Cost					
6.2		Works					
6.2.1		Erection of 13m Steel Telescopic pole with concreting foundation	Nos	732.00			
6.2.2		Erection of 11m PSC pole	Nos	478.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.2.3		Stringing of HT 3 wire 150 sq.mm. ACSR conductor	Km	15.00			
6.2.4		Stringing of HT 3 wire 100 sq.mm XLPE covered conductor	Km	56.00			
6.2.5		Stringing of AB cable 4 core 95 sq.mm	Km	8.70			
6.2.6		Installation of Stay set	Set	243.00			
6.2.7		Installation of 11kV Disconnecting switch	Set	26.00			
6.2.8		Shifting of Distribution Transformer (100 KVA to 300 KVA)	Set	21.00			
6.2.9		Shifting of Distribution Transformer (25 KVA to 63 KVA)	Set	1.00			
6.2.10		Dismantling and Re-Installation of 11kV Disconnecting switch	Set	10.00			
6.2.11		Dismantling and Re-Installation of 11kV Auto re-closer switch	Set	1.00			

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Construction Period : 24 Months
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Performance Based Maintenance : 60 Months

Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.2.12		Re-connection of Consumer service cable	Nos	2183.00			
6.2.13		Dismantling of 13m Steel Telescopic pole	Nos	212.00			
6.2.14		Dismantling of 11m STP pole	Nos	90.00			
6.2.15		Dismantling of 10m STP pole	Nos	152.00			
6.2.16		Dismantling of 9m STP pole	Nos	120.00			
6.2.17		Dismantling of 11m PSC pole	Nos	230.00			
6.2.18		Dismantling of 9m PSC pole	Nos	479.00			
6.2.19		Dismantling of 8m PSC pole	Nos	101.00			
6.2.20		Dismantling of HT 3 wire 150 sq.mm ACSR conductor	Km	15.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.2.21		Dismantling of HT 3 wire 100 sq.mm ACSR conductor	Km	21.40			
6.2.22		Dismantling of HT 3 wire 100 sq.mm XLPE covered conductor	Km	10.57			
6.2.23		Dismantling of HT 3 wire 50 sq.mm ACSR conductor	Km	0.06			
6.2.24		Dismantling of HT 3 wire 50 sq.mm XLPE covered conductor	Km	0.26			
6.2.25		Dismantling of HT 3 wire 30 sq.mm ACSR conductor	Km	4.66			
6.2.26		Dismantling of LT 4 wire 100 sq.mm ACSR conductor	Km	3.10			
6.2.27		Dismantling of LT 4 wire 50 sq.mm ACSR conductor	Km	11.74			
6.2.28		Dismantling of LT 4 wire 30 sq.mm ACSR conductor	Km	4.80			
6.2.29		Dismantling of LT 2 wire 30 sq.mm ACSR conductor	Km	2.35			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
6.2.30		Dismantling of LT 2 wire 50 sq.mm ACSR conductor	Km	1.86			
6.2.31		Dismantling of LT 2 wire 100 sq.mm ACSR conductor	Km	0.30			
6.2.32		Dismantling of AB cable 4C*95 sq.mm	Km	0.49			
6.2.33		Dismantling of AB cable 4C*50 sq.mm	Km	2.11			
6.2.34		Dismantling of AB cable 4C*25 sq.mm	Km	0.09			
6.2.35		Dismantling of Stay set	Set	139.00			
		Labour Cost					
		Sub-Total of Part 6- Construction and Shifting of HT/LT Lines					
Part 7	[SS/SP 3119]	Trenching, Ducting and construction of RCC Route Indicator and Joint Chamber of Nepal Telecom					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
7.1		Earth work in Excavation in all type of soil for foundation of structures including construction of shoring and bracing removal of stumps and deleterious matter and backfilling with approved material deposited including compaction ,as per design drawings, technical specification and to the satisfaction of Engineer all complete. [SS/SP 907]	Cum	9312.62			
7.2		Construction of RCC M20 grade joint Chamber of OFC joint (inner size 1mX1mX1m) not more than @1900m c/c including excavation and backfilling, compaction, stone soling, coverslab as per design drawings, technical specifications and to the satisfaction of engineer all complete	Nos.	21.00			
7.3		Supplying, transporting, placing and fixing 100mm diameter medium type GI pipe 110 dia at culverts, bridge, causeway etc as per design drawings, technical specifications and to the satisfaction of engineer all complete	Rm	310.00			
7.4		Transporting from site yard, laying and fixing of 40/33 PL-HDPE duct pipe (connecting with duct coupler and sealing end by end plug) in line and level with (along and crossing the road) necessary fittings and laying of warning tape, duct integrity test all complete as per design drawing, specification and satisfaction of Engineer all complete. [NTC shall provide warning tape, 40/33 PI-HDPE Duct pipe and duct accessories at site office of contractor]	Rm	31838.00			
7.5		Supplying, Transporting, Placing and Fixing of 1.5 inch dia HDPE pipe pressure of 6kg/cm2 at road crossing in line and level with necessary fittings all complete as per design drawing, specification and satisfaction of Engineer all complete. [SS/SP 700]	Rm	400.00			
		Sub-Total of Part 7- Trenching, Ducting and construction of RCC Route Indicator and Joint Chamber of Nepal Telecom					-
Part 8		Performance Based Maintenance Works and Services					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
8.1	[SS/SP 2900]	Performance based maintenance and regular maintenance (length workers & Supervisors) works and services including all activities all complete as per design drawings, technical specification and to the satisfaction of Engineer. i)Year#1	km-month	189.00			
8.2	[SS/SP 2900]	Performance based maintenance and regular maintenance (length workers & Supervisors) works and services including all activities all complete as per design drawings, technical specification and to the satisfaction of Engineer. ii)Year#2	km-month	189.00			
8.3	[SS/SP 2900]	Performance based maintenance and regular maintenance (length workers & Supervisors) works and services including all activities all complete as per design drawings, technical specification and to the satisfaction of Engineer. iii)Year#3	km-month	189.00			
8.4	[SS/SP 2900]	Performance based maintenance and regular maintenance (length workers & Supervisors) works and services including all activities all complete as per design drawings, technical specification and to the satisfaction of Engineer. iv)Year#4	km-month	189.00			
8.5	[SS/SP 2900]	Performance based maintenance and regular maintenance (length workers & Supervisors) works and services including all activities all complete as per design drawings, technical specification and to the satisfaction of Engineer. v)Year#5	km-month	189.00			
		Sub-Total of Part 8-Performance Based Maintenance Works and Services					
Part 9		Schedule of Day Works					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
9.1		Labour					
9.1.1		Skilled Labour	M-day	25.00			
9.1.2		Unskilled Labour	M-day	80.00			
		Sub-Total of Part 9.1-Labour					
9.2		Material					
9.2.1		RCC NP3 Hume Pipe 450mm Diameter	Rm	30.00			
9.2.2		RCC NP3 Hume Pipe 600mm Diameter	Rm	30.00			
9.2.3		RCC NP3 Hume Pipe 900mm Diameter	Rm	20.00			
9.2.4		HDPE 4 kg/cm ² Pipe 110 mm diameter	Rm	24.00			

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
9.2.5		Stone	Cum	30.00			
9.2.6		Cement	Mt.	15.00			
9.2.7		Reinforcement(8,10,12,16,20,25mm)	Mt.	90.00			
9.2.8		Aggregate(10-40mm size)	Cum	50.00			
9.2.9		Sand	Cum	40.00			
9.2.10		machine made mechanically selvedged gabion crates of various sizes including binding wire, all complete	Sqm	50.00			
		Sub-Total of Part 9.2-Material					
9.3		Plant / Equipment					
		The rates shall include all cost of operating on site including fuel, lubricant, driver and associated labour wages, overhead and profit. Only time actually employed on the work shall be paid.					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
9.3.1		Tipper (4- 6 m3 capacity)	Hr.	20.00			
9.3.2		Truck (8-10 T capacity)	Hr.	20.00			
9.3.3		Loader (1-1.5 m3 capacity)	Hr.	10.00			
9.3.4		Excavator (>0.75 Cum capacity)	Hr.	10.00			
9.3.5		Motor Grader (> 135 HP capacity)	Hr.	10.00			
9.3.6		Vibratory Roller (> 10 ton Capacity)	Hr.	10.00			
9.3.7		Water Bowser (5000 ltr capacity)	Hr.	10.00			
		Sub-Total of Part 9.3-Plant/Equipment					
		Sub-Total Part-9					
Part 10		Provisional Sums					

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
10.1	[SS/SP 111]	Environmental monitoring, enhancement, mitigation works, environment awareness campaign, as per design drawings, technical specification and to the satisfaction of Engineer all complete.	PS	1.00	1,965,251.43	One Million Nine Hundred Sixty-Five Thousand Two Hundred Fifty-One and Forty-Three Paisa Only	1,965,251.43
10.2	[SS/SP 111]	Implementation of EMP, development of grass land, construction of waterhole for wildlife, etc. as per design drawings, technical specification and to the satisfaction of Engineer all complete.	PS	1.00	742,028.57	Seven Hundred Forty-Two Thousand Twenty-Eight and Fifty-Seven Paisa Only	742,028.57
10.3	[SS/SP 111]	Compensatory Tree Plantation and take care min 5 years in the location provided by the GoN authority, as per technical specification and to the satisfaction of Engineer all complete.	PS	1.00	600,302.16	Six Hundred Thousand Three Hundred Two and Sixteen Paisa Only	600,302.16
10.4	[SS/SP 100,105]	Social compliance and safe guards: Compensation for relocation public and private Infrastructures including provision of required materials and accessories, additional assistance to vulnerable groups, subsistence allowance, RP Implementation activities, including awareness and skill enhancement training for GESI implementation as per technical specification and to the satisfaction of Engineer all complete.	PS	1.00	5,887,118.70	Five Million Eight Hundred Eighty-Seven Thousand One Hundred Eighteen and Seventy Paisa Only	5,887,118.70
10.5	[SS/SP 105]	Compensation for relocation and shifting of Water supply pipelines and unforeseen conditions	PS	1.00	72,500,000.00	Seventy-Two Million Five Hundred Thousand Only	72,500,000.00
10.6		Additional testing of material or works as required by the Engineer.	PS	1.00	603,366.67	Six Hundred Three Thousand Three Hundred Sixty-Six and Sixty-Seven Paisa Only	603,366.67
10.7		Fund for emergency works and services during PBM.	PS	1.00	18,101,000.00	Eighteen Million One Hundred One Thousand Only	18,101,000.00
10.8		Supervision Charge, Line shutdown charge and notice broadcasting charge of Nepal Electricity Authority	PS	1.00	5,276,544.19	Five Million Two Hundred Seventy-Six Thousand Five Hundred Forty-Four and Nineteen Paisa Only	5,276,544.19

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Item No.	Spec. Clause	Work Description	Unit	Quantity	Rate in figure(NRs)	Rate in Words (NRs)	Amount(NRs)
		Sub total Part 10-Provisional Sum					105,675,611.72
					(A.) Total		
					(B.)Total Provisional Sum (PS)		105,675,611.72
					(C.)Total without PS (A-B)		
					(D.) VAT @ 13% of C		
					(E.)Grand Total =B+C+D		

Section 5 - Eligible Countries

This Section contains the list of eligible countries.

Regional Members

1.	AFG	Afghanistan	26.	MON	Mongolia
2.	ARM	Armenia	27.	MYA	Myanmar
3.	AUS	Australia	28.	NAU	Nauru
4.	AZE	Azerbaijan	29.	NEP	Nepal
5.	BAN	Bangladesh	30.	NZL	New Zealand
6.	BHU	Bhutan	31.	NIU	Niue
7.	BRU	Brunei Darussalam	32.	PAK	Pakistan
8.	CAM	Cambodia	33.	PAL	Palau
9.	PRC	China, People's Republic of	34.	PNG	Papua New Guinea
10.	COO	Cook Islands	35.	PHI	Philippines
11.	FIJ	Fiji	36.	SAM	Samoa
12.	GEO	Georgia	37.	SIN	Singapore
13.	HKG	Hong Kong, China	38.	SOL	Solomon Islands
14.	IND	India	39.	SRI	Sri Lanka
15.	INO	Indonesia	40.	TWP	Taipei, China
16.	JPN	Japan	41.	TJK	Tajikistan
17.	KAZ	Kazakhstan	42.	THA	Thailand
18.	KIR	Kiribati	43.	TIM	Timor-Leste
19.	KOR	Korea, Republic of	44.	TON	Tonga
20.	KGZ	Kyrgyz Republic	45.	TUR	Turkiye
21.	LAO	Lao PDR	46.	TKM	Turkmenistan
22.	MAL	Malaysia	47.	TUV	Tuvalu
23.	MLD	Maldives	48.	UZB	Uzbekistan
24.	RMI	Marshall Islands	49.	VAN	Vanuatu
25.	FSM	Micronesia, Federated States of	50.	VIE	Viet Nam

Non-regional Members

1.	AUT	Austria	11.	LUX	Luxembourg
2.	BEL	Belgium	12.	NET	The Netherlands
3.	CA	Canada	13.	NOR	Norway
4.	DEN	Denmark	14.	POR	Portugal
5.	FIN	Finland	15.	SPA	Spain
6.	FRA	France	16.	SWE	Sweden
7.	GER	Germany	17.	SWI	Switzerland
8.	IRE	Ireland	18.	UKG	United Kingdom
9.	ISR	Israel	19.	USA	United States
10.	ITA	Italy			

Government of Nepal
Ministry of Infrastructure Development

Department of Roads

Project Directorate (ADB)

Bishalnagar, Kathmandu, Nepal

SASEC Highway Enhancement Project (SHEP) (ADB Loan No: 4316-NEP)

East-West Highway (H-01),
Kakarbhatta – Laukahi (Section - 4)
From Km 95+760 to km 111+500

Contract No. SHEP/OCB/KL/06

Phase 1: Upgrading Works

(Upgrading of existing road from 2-Lanes to 4 Lanes and Service Lanes, Structures, Bridges, etc. including Defect Notification Period)

Phase 2: Performance Based Maintenance Works

(Maintenance works consisting of all activities to be carried out to achieve and keep the road assets as defined in the PBM Specifications)

Bidding Document

Part II Employer's Requirements

Section6A	Standard Specifications
Section6B	Special Provisions to Standard Specifications
Section 6C	Environmental, Health and Safety Management Requirement
Section6D	Drawings (In Separate Volume)
Section 6E	Supplementary Information Regarding Works to Be Procured
Section6F	Personnel Requirements
Section6G	Equipment Requirements
Section6H	Check List for OCHS Including Arrangement for Protection against COVID-19

August, 2026

Preface

This Bidding Document for the Procurement of Works (Single Stage – Two Envelope) has been prepared by the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads, Project Directorate (ADB), and is based on the **Standard Bidding Document issued by the Asian Development Bank dated December 2021**

ADB's SBD Works has the structure and the provisions of the Master Procurement Document entitled "Bidding Documents for the Procurement of Works", prepared by multilateral development banks and other public international financial institutions, except where ADB-specific considerations have required a change.

FOR REFERENCE ONLY

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This Section contains the criteria to determine the lowest evaluated bid and the qualifications of the Bidder to perform the contract.

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FOR REFERENCE ONLY

Specification

The Specification comprises the following documents:

- Section 6A: Standard Specifications;
- Section 6B: Special Provisions to the Standard Specifications (including all Appendices);
- Section 6C: Environmental, Health and Safety Management Requirement;
- Section 6F:
 - Personnel Requirements: Phase1
 - Personnel Requirements: Phase2;
- Section 6G:
 - Equipment Requirements: Phase1
 - Equipment Requirements: Phase 2; and
- Section 6H: Check list for OCHS including arrangement for protection against COVID-19

FOR REFERENCE ONLY

Section 6A: Standard Specifications

Standard Specifications for this contract shall be the “**Standard Specifications for Road and Bridge Works-2073 (with amendment 2078/2022)**” issued under the authority of the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads.

The Standard Specifications may be purchased from the Department of Roads, Quality, Research and Development Center, Chakupat, Lalitpur.

FOR REFERENCE ONLY

Section 6B: Special Provisions to the Standard Specifications

The Special Provisions contained herein shall be read in conjunction with Section 6A: **the Standard Specifications for Road and Bridge Works-2073 (with amendment 2078/2022)** issued by the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads, and shall supplement, replace, or supersede the Section 6A: Standard Specifications as appropriate. Where there is any ambiguity or discrepancy between the Standard Specifications and the Special Provisions, the Special Provisions shall have preference and shall govern.

FOR REFERENCE ONLY

Section 100 – General

Add clause 103a after clause 103 with the heading “ Vehicle, Survey Equipment and Site Laboratory” as following:

103a, Vehicles, Survey Equipment and Site Laboratory

(1) Vehicles for the Employer

1.1 General Requirements

The Contractor shall provide a new plain-colored motor vehicle as described in the **Appendix-5** for the exclusive use of the Employer, for any purpose in connection with the Works. The Contractor shall obtain approval from the Employer before supplying the vehicle. The vehicle shall be licensed and insured for use on the public highway with comprehensive insurance cover for any qualified driver, together with any authorized passengers and the carriage of goods or samples.

The Contractor shall provide a competent and qualified driver holding a valid driver's license having an experience of minimum 5 years as a driver of similar vehicle types. The Contractor shall provide fuel, oil and maintenance in conformity with the vehicle manufacturer's recommendations.

The Contractor shall provide a suitable replacement for any vehicle that is out of service for more than 24 hours. Vehicles shall be provided and maintained in accordance with the above for as long as they are required by the Employer. Vehicles shall be reverted to the Contractor when no longer required by the Employer.

1.2 Measurement

Provisions of the vehicles for the Employer shall be measured as the number of months the vehicles are provided and maintained. Measurement shall be made during the total period the vehicle is in use by the Employer. Vehicle not provided for the full 24-hour day will be measured for payment on pro- rata basis of the actual hours available out of the 24-hour day.

1.3 Payment

Payment for vehicles shall be made at the unit price per vehicle month for each vehicle as contained in the Bill of Quantities. Payment shall include the supply of the vehicle and driver, fuel, oil, insurance, license, maintenance, spares, repairs, and all other running and maintenance costs.

(2) Provision of Site Laboratory

2.1 General Requirements

The Contractor shall provide, operate, and maintain an adequately equipped site Laboratory complete with all utilities, services, apparatus, and fittings as set out in **Appendix - 7** and **Appendix - 8** to undertake the required testing to ensure the quality of the materials and the works. The Contractor shall also supply and provide, at the laboratory the standards listed and set out in **Appendix - 1**. The laboratory space including lab office and lab arrangement shall be with plinth area of approximately 120 sq

m with two (2) rooms plus one additional large hall, outside covered veranda and toilet bathroom.

The Site Laboratory shall be located within 500 m of the site and the lab building may be located at the rented building or newly constructed on rented land. The laboratory shall be available up to the end of the project.

The complete laboratory facilities shall include the provision of land, site grading, access roads, covered parking facilities for vehicles, construction of building and all necessary appurtenance such as electricity, drainage systems, fences and utilities etc.

The contractor shall supply furniture, fittings, equipment, vehicle, manpower and materials to provide fully functional site laboratory.

The site laboratory shall be ready to use within 10 weeks from the date of the Engineer's notice to commence the Works. Alternative arrangement for testing shall be made by the date of commencement of works.

The Contractor shall be fully responsible for the equipment including:-

- Maintaining, calibrating and servicing equipment as required.
- Repairing all defects including accidental damage as required.
- Replacing any lost or stolen items.
- Effecting insurance of the equipment against damage or loss.
- The tests which cannot be performed at site shall be carried out off the site at renowned laboratory acceptable to the Engineer.

The site lab shall be made available for testing as long as it is required including any period after the Completion of construction during which it is required for final measurement purposes.

At the completion of the project the furniture and equipment shall be the property of the Contractor.

2.2 Measurement

Providing laboratory space, maintaining and operating the material testing laboratory at site, etc., all complete, shall be measured on monthly basis as provided in the Bill of Quantities. It includes establishing the site laboratory which includes construction/renting of lab building, required consumables, maintenance and operation of the site laboratory and supply of laboratory personnel and staff at laboratory for day to day works and testing etc.

Providing furniture and equipment etc., all complete for the material testing laboratory at site shall be measured on Lump Sum basis as provided in the Bill of Quantities. It includes supply and fixing of a complete set of equipment, furniture and other requisite items, etc, detailed in the Appendices.

2.3 Payment

Payment for providing laboratory space, maintaining and operating the material testing laboratory at site, etc. all complete shall be made against the respective item of the Bill of Quantities.

Payment for providing furniture and equipment etc., all complete for the material testing laboratory at site shall be made in the respective Lump Sum item as provisioned in the Bill of Quantities. The Lump sum payment shall be made in two installments. First installment of 70% of item rate shall be made upon the completion of supply and installation of the equipment and furniture to the satisfaction of the Engineer. The remaining second 30% of the item rate shall be made upon the completion of 100% of the Works.

Payment shall represent full and final payment for the Contract Items and the Contractor shall not be entitled to any further compensation. The Contractor shall provide such facilities during the extended time period as long as the Employer may require.

In the event the Contractor fails to maintain, repair or replace any equipment item, the Employer shall carryout such maintenance, repairs or replacement and the Employer shall deduct the cost from any monies due to the Contractor.

The rate quoted by the Contractor for the lump sum pay items shall deem to cover the full contract period including any Extensions of Time (EOT). No additional payment shall be made for the period of any Extension of Time (EoT) for such items.

104 Accommodation of Traffic

Delete Clause 104 in its entirety and substitute with the following:

Change heading of Clause 104 Accommodation of Traffic to Clause 104 Traffic Management Provisions as follows:

104 Traffic Management Provisions

(1) Scope

This Clause covers the requirements to be met by the Contractor in relation to traffic management provisions at construction sites which include management of regular traffic on existing road or proposed temporary works (diversions), management of construction traffic and traffic control and guidance schemes in order to ensure safe and reasonably efficient operation of vehicular and pedestrian traffic along the subject road corridors.

The passage over or through the Works shall be used by the public or the representative of the Employer or by public traffic or by vehicles of the Employer, whether connected with the Contract or not and that shall not constitute use or occupation by the Employer. So, the Contractor shall make proper traffic management provisions at construction sites to open the traffic during construction and provide the alternate route for traffic in case of closure of a particular section.

(2) Preparation of Traffic Management Plan

The Contractor shall prepare Traffic Management Plan (TMP) based on the guidelines provided by the Engineer and submit it to the Engineer for approval prior to the commencement of construction. The Plan shall show the means and methods of operation and control of existing as well as its construction traffic during the construction works. The means and methods of managing traffic shall be suitable and adequate for ensuring safety of all road users as well as Contractor's own workers and to the satisfaction of the Engineer. The Traffic Management Plan shall include but not be limited to the following.

- i. Traffic control equipment the Contractor proposes to use for the Works;
- ii. Traffic control signage including location and sign descriptions;
- iii. How and when the Contractor proposes to use traffic control flagmen;
- iv. Traffic control means during non-working periods;
- v. Traffic control means and devices for night and off-peak periods;
- vi. Lane closure plan, where the Contractor intends to close the road partially;
- vii. Traffic diversion plan, where the Contractor proposes to close the road fully.

The general traffic management requirements will be as given below.

(3) General Traffic Management Requirements

The following conditions shall apply in regard to traffic management:

- (i) The Contractor shall keep existing roads open to traffic during the performance of the Works, provided that when approved by the Engineer the Contractor may bypass traffic over a detour. The Contractor shall at all times keep roads and footpaths, affected by his operations, free from soil and materials spillage;
- (ii) The Contractor shall keep the length of the construction area in such condition that traffic will be accommodated safely. Traffic control devices and services shall be provided and maintained both inside and outside the Project limits as needed to facilitate traffic guidance should this be necessary;
- (iii) In order to facilitate the better traffic management as well as convenience to road users, the construction works shall be divided into the stretches of less than 5 Km each and the contractor shall prepare the work schedule for construction works on each stretch such that no major construction works shall be carried out in adjoining stretches and submit it for Engineer's approval. Construction works shall not be carried out in adjoining stretches without prior written instruction of the engineer.
- (iv) Prior to the start of construction operations, the Contractor shall erect such signs, barricades, and other traffic control devices as may be required by the plans, specifications or as directed by the Engineer. Traffic control devices shall be operated only when they are needed and only those devices that apply to conditions actually in existence shall be operable. The Contractor shall obtain prior approval from the competent authority (Traffic Police) of the plans and specification of the proposed traffic management works before the commencement of work;
- (v) Temporary fences shall be placed to provide a visual barrier between the work area and adjacent traffic or buildings and at locations directed by the Engineer;
- (vi) Any devices provided under this Clause that are lost, stolen, destroyed, or deemed unacceptable while their use is required on the Project shall be replaced by the Contractor without additional compensation;
- (vii) During non-working hours and following completion of a particular construction operation, all warning signs, except those necessary for the safety of the public, shall be removed or entirely covered with either metal or plywood sheeting so that the sign panel will not be visible;

- (viii) The contractor shall keep retro-reflective sheeting on signs, barricades, and other devices. The Contractor shall also promptly correct stretches, rips, and tears in the sheeting. Retro- reflective sheeting shall have a maintain erector-reflection;
- (ix) Night time operations, if any approved by the Engineer, shall be illuminated by a lighting system approved by the Engineer. The lighting system shall be positioned and operated to preclude glare. Incandescent lights will not be permitted;
- (x) The Contractor shall take necessary care at all times during the execution of the works to ensure the existing convenience and safety of residents along and adjacent to the road, and any public highway or other facility that may be affected by the Works. Street lighting shall be relocated as necessary to maintain the same standard of lighting during the course of the works until new lighting facilities are brought in to operation;
- (xi) The Contractor shall thoroughly acquaint himself with existing traffic conditions and understand the importance of maintaining traffic safety and the avoidance of excessive traffic delay. The Contractor shall co-operate with the pertinent agencies regarding traffic control and all details will be subject to the Engineer's approval;
- (xii) The Contractor shall be responsible for investigating and establishing the requirements for traffic control and safety in all work areas and shall submit all details to the Engineer;
- (xiii) The Contractor's requirements shall include, but not be limited to, construction of detours, diversion roads, temporary bridges and approach roads, of traffic control devices and services for the control and protection of traffic through areas of construction;
- (xiv) Any failure of the Contractor to meet these requirements will entitle the Employer to carry out such works as he deems to be necessary and to charge the Contractor with the full cost there of plus ten percent of such cost, which sum will be deducted from any money due or which may become due to the Contractor under the Contract.
- (xv) Road Damage: Contractor will be responsible for all road damage that may occur from the transporting of his materials and equipment to and from the Works and will be responsible for coordinating with all concerned agencies for implementing all necessary repairs and/or restorations. The Contractor shall be required to repair to the satisfaction of the Engineer and at no cost to the Employer any damage that he causes to the road;
- (xvi) When construction under traffic is permitted, the Contractor shall arrange its construction program so that traffic flow is maintained through the Works in accordance with the requirements as laid out by Traffic Police or as approved by the Engineer;
- (xvii) Vehicular access points to and from the site shall be in accordance with the requirements of the best practice design standards, guides and manuals approved by the Engineer. Acceleration and deceleration lanes and tapers shall comply with the traffic volume, speed and sight distance warrants specified in the standards and guides or as approved by the Engineer. Cross section widths for acceleration and deceleration lanes shall be a minimum of 3.5 m. The contractor shall provide

traffic controllers at all entry and exit points.

(4) Temporary Road Works Requirements for Traffic Management

The following conditions shall apply in regard to temporary works:

- (i) The Contractor shall furnish, maintain, and remove on completion of the work for which they are required, all temporary roads and road works such as sleeper tracks and staging over roads, access and service roads, temporary crossings of bridges over streams or unstable ground, and shall make them suitable in every respect for carrying materials for the work, for providing access for traffic for himself or others, or for any other purpose. Such temporary road works shall be constructed to the satisfaction of the Engineer, but the Contractor shall nevertheless be responsible for any damage done to or caused by such temporary road works;
- (ii) Before constructing temporary road works, the Contractor shall make all necessary arrangements, including payment if required, with the public authorities or landowners concerned, for the use of the land and shall obtain the approval of the Engineer. Such approval will be dependent on the Engineer being satisfied with the Contractor's proposals for items such as signing, lighting, and riding quality of the temporary road, together with the proposed maintenance arrangements. Such approval will not, however, relieve the Contractor of his responsibilities under the Contract. Upon completion of the works, the Contractor shall clean up and restore the land to the satisfaction of the Engineer;
- (iii) The Contractor, when required by the Engineer, shall submit for the Engineer's approval drawings giving full details of temporary roads. Such details shall include alignment, profile, pavement construction, signing, lighting, and the duration of the temporary road;
- (iv) The Contractor shall make all arrangements necessary to permit the passage of materials and employees;
- (v) In cases where it is necessary or required by the Engineer, the Contractor shall construct and maintain temporary traffic ramps and furnish all labour and materials required.

(5) Scope of Traffic Management Plan

The Traffic Management Plan submitted by the contractor shall:

- (i) Provide details of the consultative process proposed to ensure consultation with and notification to the community, business, road users, and other stakeholders in advance of alterations to existing traffic conditions. The Contractor's proposed inputs into the communication process shall ensure the timely notification of the Traffic Police, relevant departments, travelling public, emergency services, adjacent landowners and businesses of impending changes to traffic conditions. This process shall take cognizance of any Department's requirements with respect to public notifications;
- (ii) Describe traffic arrangements which provide for any necessary sequencing of the work under the Contract while minimizing disruption and confusion to road users,

- local traffic, emergency vehicles, pedestrians and cyclists;
- (iii) Where required, describe how the construction work area shall be physically and visually isolated from road users;
 - (iv) Provide details of how local access to communities and adjacent private properties and businesses will be maintained;
 - (v) Provide details of arrangements to be made for detouring traffic;
 - (vi) Provide details of all road closures and/or restrictions required to undertake the work under the Contract;
 - (vii) Detail provisions to maintain the specified number of traffic lanes in each direction at the minimum nominated operating speed between the hours stated elsewhere in the contract or as approved by the Engineer;
 - (viii) Provide for participation of a senior member of the Contractor's site personnel on any traffic coordination committee convened by the Department or its designated representative;
 - (ix) Include the names and contact details of the representatives nominated by the Contractor and notified to the Engineer. The Contractor shall nominate a minimum of two representatives with the authority to address traffic management issues, one of whom shall be available at all times outside of the Contractor's normal working hours. The Contractor shall notify the Engineer and Department or its designated representative of the name, address, and telephone number of the nominated persons. Such persons, when requested by the Engineer, traffic shall coordinate and expedite immediate repairs to and maintenance of such part of the work under the Contract as may be considered necessary by the Engineer and shall carry out such work to the satisfaction of the Engineer;
 - (x) If a nominated person leaves the employment of the Contractor during the period of the Contract, the Contractor shall immediately nominate another person and provide the full details of that person.
 - (xi) Include the name of the Nominated Traffic Officer;
 - (xii) Include a schedule of Traffic Guidance Schemes giving a general description of the relevant traffic arrangements and the date when the Traffic Guidance Scheme will be submitted;
 - (xiii) Provide details of the Contractor's organizational structure for traffic management issues, including a list of the duties and responsibilities of each position nominated in that structure;

(6) Traffic Control

The following conditions shall apply in regard to traffic control:

- (i) In order to facilitate traffic through or around the Works, or wherever ordered by the Engineer, the Contractor shall erect and maintain at prescribed points on the work and at the approaches to the work, traffic signs, lights, flares, barricades,

- rubber cones with traffic lamps and other facilities as necessary or required by the Engineer for the proper direction and control of traffic;
- (ii) As necessary for proper control of traffic or when/where directed by the Engineer, the Contractor shall furnish and station competent flagmen whose sole duties shall consist of directing the movement of traffic through or around the work;
 - (iii) The Contractor shall furnish and erect, within or in the vicinity of the project area, such warning and guide signs as may be necessary or ordered by the Engineer;
 - (iv) In order to minimize disruption to traffic flows, the Contractor shall enclose the Site with a temporary fence to provide a visual barrier between his work and adjacent traffic. The temporary fence shall be two meters high, and the movement of men, materials, and plant into and out of the barrier area shall be controlled by flagmen (traffic controllers).
 - (v) The Contractor shall erect a multimedia display device at the start and end points of the road section, which should provide information about the traffic control and traffic management plan for the road users. Likewise, the Contractor should broadcast this information from the local FM Radio as may be necessary or requested by the Engineer.

(7) Number of Lanes for Traffic Control

Insofar as possible, the existing number of traffic lanes shall be maintained insofar as possible during the work, and if diversions are provided, these must be of the same traffic capacity as the original road. Notwithstanding the above, the Engineer may give approval to reductions in traffic capacity if the Contractor can show that these will not cause excessive delay to traffic. If such approvals are given, the Engineer may specify the hours during the day when the reduction in capacity may be applied, and it should be anticipated that these hours may not include the peak period for the traffic movement under consideration.

The Contractor shall cooperate with the pertinent agencies regarding traffic control, and all details will be subject to the Engineer's approval.

(8) Half-Width Construction

The following conditions shall apply to half-width construction:

- (i) Where, in the opinion of the Engineer, a detour is not feasible, construction on existing public roads shall be undertaken only over half of the full width of the roadway. The length of such half-width construction shall be kept as short as possible.
- (ii) Where half-width construction is necessary, work on culverts commenced in the dry season must be completed and the embankments adjacent to them must be reinstated so that at least half the full width shall be available for use by the public throughout the next rainy season.
- (iii) Where single-lane traffic becomes necessary over a particular length of the works or over the approaches thereto, the Contractor, in maintaining through traffic, shall provide a single lane at least three and a half meters wide on the roadway or embankment to be kept open to traffic.

The Contractor shall so conduct his operations as to offer the least possible obstruction, inconvenience, and delay to traffic and shall be responsible for the adequate control of the traffic using such lengths of single lane.

(9) Extraordinary Traffic

The Contractor shall be responsible for carrying out any necessary investigations and obtaining approvals, licenses, escorts, and any other necessary facilities in order to enable his extraordinary traffic to be moved on the roads in the Project Area.

(10) Vertical Clearance

In general, any temporary works placed over roads or diversions used by public traffic should maintain a vertical clearance of at least 4.5 meters. Where required by the Engineer, the Contractor shall erect and maintain suitable approved check-gates, fitted with warning signs indicating the vertical clearance.

(11) Materials for Traffic Control Devices

Materials for traffic control devices shall conform to the requirements set forth below:

- (i) Unless otherwise specified in the contract, sign panels, barricades, cones, vertical panels, and flagger paddles shall have retro-reflective sheeting meeting requirements for retro-reflective material as specified by the Engineer;
- (ii) Sign Panels shall be orange with black legend unless otherwise required;
- (iii) Sign Posts shall be fabricated from untreated softwood, metal, or other materials acceptable to the Engineer. Signs shall be capable of remaining in position during normal traffic flow and wind conditions.
- (iv) Barricades shall be constructed of wood, metal or plastic;
- (v) Cones shall be a minimum of 75 centimeters in height with a broadened base and shall be capable of withstanding impact without damage to the cones or vehicles. All cones shall be orange/white colored and highly visible both in daylight and darkness. Cones shall be capable of remaining bright and in position during normal traffic flow and adverse weather conditions in the area where they are used. Lamps for cones shall be suitable for purpose;
- (vi) Temporary fencing shall be fabricated in panels with timber framework and galvanized metal panels. The panel face towards the traffic shall be painted;
- (vii) Vertical panels shall be constructed of wood, metal or plastic;
- (viii) Warning lights shall be Type A (low intensity flashing), Type B (high intensity flashing), or Type C (steady burn) as approved by the Engineer.

(12) Preparation of Traffic Guidance Scheme

The Traffic Guidance Scheme shall be prepared by suitably qualified and experienced persons and shall be submitted by the Nominated Traffic Officer to the Engineer for a direction as to its suitability, at least 14 days prior to the date of the proposed traffic rearrangement.

Where any change to existing traffic arrangements is proposed or where construction conflicts with normal traffic movements, the Contractor shall prepare a Traffic Guidance

Scheme which clearly details the revised traffic arrangements at all locations affected by the change or conflict. Planning of Traffic Guidance Schemes shall be undertaken in accordance with best practice road works traffic management manual or guide as approved by the Engineer.

The Traffic Guidance Scheme shall show proposed temporary signing and other traffic control device layouts (including temporary barriers, temporary pavement marking and temporary islands) to a suitable scale and be fully dimensioned and shall generally agree with the construction sequence and other requirements shown elsewhere in the Contract. The Traffic Guidance Scheme shall also state the period for which these are to be in place (time and date) and the person who is responsible for installing, maintaining and removing them. Site access arrangements shall form part of the Traffic Guidance Scheme.

Where the Traffic Guidance Scheme includes changes to regulatory signs or devices, the Contractor shall seek prior approval from the Engineer of such regulatory signs certified by the Nominated Traffic Officer with the Traffic Guidance Scheme.

The Contractor and the Engineer shall cooperate to ensure that the Traffic Guidance Scheme receives the Department's direction with respect to suitability at least 14 days prior to the proposed traffic rearrangement. Failure to comply with this requirement may result in deferring the date for traffic rearrangement so as to ensure sufficient time for public notification is maintained. Such deferment shall not be a cause for an extension of time under the Contract.

No traffic rearrangements shall be carried out until 14 days after the Engineer has advised the Contractor that the relevant Traffic Guidance Scheme has been deemed suitable by the Engineer. Engineer may direct the Contractor to consult with Area Traffic Police Officer and seek approval of the traffic guidance scheme from the officer.

(13) Implementation of Traffic Management Plan

The Contractor shall implement the Traffic Management Plan in accordance with the schedule included in the Plan. The Contractor shall provide details of the Traffic Management Plan or any changes to that Plan to any bodies nominated by the Engineer. The Contractor shall monitor the continued effectiveness of the Traffic Management Plan during the Contract and shall revise and update the Plan where necessary.

(14) Implementation of Traffic Guidance Scheme

The Contractor shall implement only those traffic management arrangements that have been deemed suitable by the Engineer. Should the Contractor wish to depart from such arrangements, an amended Traffic Guidance Scheme shall be submitted to the Engineer for determination of suitability prior to implementation of any new arrangements.

Prior to any change to existing traffic arrangements, the Contractor shall ensure that the traffic management arrangements conform to the Traffic Guidance Scheme.

In a daily basis, the Contractor shall ensure that all applicable traffic redirection and/or warning measures and safety requirements are implemented prior to proceeding with any relevant work under the Contract.

The Contractor shall monitor the effectiveness of the Traffic Guidance Scheme and revise it in response to incidents and/or traffic disruptions. Details of a Traffic Guidance Scheme

shall be provided on request to any other body nominated by the Engineer.

(15) Measurement and Payment

Compliance with Traffic Management Provisions (preparation and implementation of traffic management plan, traffic guidance schemes and traffic control scheme, traffic Marshals etc), including construction and maintenance of temporary road diversion works either in full new land length or using existing roads, irrespective of the length and extent of traffic control measures in such diversions; construction and maintenance of temporary bridge diversions; construction of access roads to bridge construction site; etc. shall not be measured and/or no payment shall be made for all materials and works required under this clause. All cost in connection with the work specified herein shall be considered to be included with other related items of the work in the Bill of Quantities.

105 Publicly and Privately Owned Services

Delete Sub-clause (6 and 7) and substitute the following:

- (6) The Contractor may be required to coordinate with the concerned GoN and other authority and carry out the removal or shifting of certain services/utilities on specific instruction from the Engineer for this purpose the contractor shall when required by the Engineer, submit the required document for executing of the works as per the General Condition of Contract for which payment shall be made to him. Such works shall be taken up by the Contractor only after obtaining clearance by the Engineer and ensuring adequate safety measures.
- (7) Payment for Shifting, re-installation, maintenance of water, electricity, drainage, etc., passing through the site made in the respective item as provisioned in the Bill of Quantities and General Condition of Contract. Payment shall represent full and final payment for the Contract Items and the Contractor shall not be entitled to any further compensation.

106 Survey and Setting Out

Delete Sub-clause (1 and 2) and substitute the following:

- (1) During the period of Commencement of Works the Contractor and there presentative of the Engineer shall jointly resurvey the Base Lines, Traverse Point, and Bench Marks and confirm the co-ordinates and levels of the stations. They shall immediately notify the Engineer of any discrepancies and shall agree with the Engineer any amended values to be used during the contract, including replacements for any stations missing from the original stations.
- (2) The Contractor and the representative of the Engineer shall jointly check, replace, and supplement as necessary the station points and agree on any revised or additional station details with the Engineer.

Add the following to Sub-clause (5)

"If at any time the Contractor believes that there exists a discrepancy between the location of the works as defined by the setting out and the apparent location of the works as shown in the plans he shall immediately inform the Engineer and request clarification."

Delete Sub-clause (6) and substitute the following:

"Some survey data of the project site is held by the Engineer, and this survey data will be made available to the Contractor in digital format. But the existing profile and cross sections shall be checked against the survey data by the Contractor and the Engineer, and should any changes be found necessary in the Survey Traverse Points and Bench Marks, after the procedures required in Sub-clauses (1) & (2) above, the existing data set shall be amended accordingly. Should the Engineer consider that design modifications of the center-line and/or gradient are required or if the Contractor find that the existing survey data set is inadequate or inaccurate in any of the Works, the Engineer shall issue detailed Instructions to the Contractor and the Contractor shall perform the necessary modifications in the field, as required, and modify the cross sections accordingly.

The final survey data set so obtained in combination with the final horizontal and vertical alignment of the road shall form the basis for the measurements and payments. Measurement shall be based on a Digital Terrain Model generated from the agreed survey data set with the final designed road horizontal and vertical alignment and road cross-section, including any widening and super-elevation, applied. The model will be used to generate cross-sections complete with cut and fill data at intervals not exceeding 10 meters or as instructed by the Engineer. Measurement of volumes and areas of earthworks and pavement related items, with the Engineer's approval, shall be derived from these cross-sections.

The software currently used for the preparation of survey and design data is SW-Roads developed by Softwel (P) Ltd. of Kathmandu Nepal. Should the Contractor wish to use alternative software he may propose this to the Engineer. He will be required to demonstrate that his proposed alternative is at least as accurate as and is functionally equivalent in all respects to SW-Roads. Should the Engineer agree to the use of alternative software, the Contractor shall be entirely responsible for the adaptation, under the supervision of the Engineer, of all input data to the alternative software requirements and for the training of the Engineer's personnel in the use of the alternative software. In the event that alternative software is approved the Contractor shall supply the Engineer with two, fully licensed, copies of the alternative for the exclusive use of the Engineer."

If required a complete set of Software shall be provided by the Contractor at his own cost for the use of the Engineer in carrying out the checking and approval of the cross sections and quantities.

Delete Sub-clause (8) and substitute the following:

The Contractor shall provide the Engineer with all necessary assistance for checking the setting out, agreement of levels, and any other survey or measurement which the Engineer needs to carry out in connection with the contract during the entire period of contract. Such assistance shall include:

- (a) Provision of suitably qualified surveyors to work under the direction of the Engineer as required.
- (b) Provision of all necessary support for these surveyors including assistant, survey helpers, labours, hand tools, pegs and materials.
- (c) Provision of survey equipment (As per Appendix 5: Survey Instrument Required at Site) as required by the Engineer for survey works.

This equipment shall be in the possession of the Contractor at Site within 10 weeks from

the date of Engineer's notice to commence the Works. The Contractor shall at all-times be responsible for:

- Maintaining, calibrating and servicing equipment as required.
- Repairing all defects including accidental damage as required.
- Replacing any lost or stolen items.
- Effecting insurance of the equipment against damage or loss.

The Contractor shall maintain the survey equipment at site for as long as it is required including any period after the Completion of Works during which it is required for final measurement purposes.

The Contractor shall ensure that the Engineer and his staff have full access to this equipment at all times during the course of the execution of works.

The joint survey, including the preparation of the drawings, calculation of the quantities and obtaining the approval from the Engineer shall be carried out by the Contractor within sixty (60) days from the commencement Date.

The Contractor shall provide the survey equipment as per **Appendix-6**. No separate payment shall be made for the providing survey equipment; the cost shall deem to be included in the other items of works.

108 Diversion Bridges

Delete Clause 108 in its entirety and substitute with the following:

Change heading of Clause 108 Diversion Bridges to Clause 108 Construction and Maintenance of Temporary Diversion Bridges as follows:

108 Construction and Maintenance of Temporary Diversion Bridges

- (1) Temporary diversion bridges shall be provided by the Contractor at the location of the construction of minor bridges, where the existing bridges are dismantled and new bridges are required to be constructed as shown on the Drawings or instructed by the Engineer.
- (2) The Contractor is required to prepare Design, Drawing and Specifications of the temporary diversion bridges. He shall submit his proposal accompanied with sufficient ground and hydraulic information to enable the Engineer to decide on the stability of the structures.
- (3) The temporary diversion bridge shall be double lane crossing with the all provisions of safety arrangements facilitating free flow of two-way traffic during day and night throughout the period till the new constructed bridge is opened for the use. **The diversion bridge may consist of series of pipe culvert, Belly Bridge, slab culvert etc. as per the site conditions and acceptable to the Engineer.**
- (4) The Contractor shall maintain the temporary bridges in a condition satisfactory to the Engineer as long as required until the completion of the construction of bridges at the river location.
- (5) On completion of the construction of bridges, the Contractor shall obtain the

approval of the Engineer before removing the temporary bridges. The materials arising from the removal of the temporary diversion bridges shall become the property of the Contractor

- (6) No separate payment shall be made for the construction and maintenance of diversion bridges for the required period. The cost shall deem to be included in the item of compliance with traffic management provisions.

109 Maintenance of the Road

Delete the fourth paragraph of Sub-clause Clause 109 (1) and substitute:

- (1) The Contractor shall perform the maintenance works as often as required to keep the carriageway, shoulders, adjoining structures and roadside slopes stable all in proper working order to the satisfaction of the Engineer. The Contractor shall strictly adhere to the stipulations of the latest publication of the document **"Road Maintenance Manual"** published by the Department of Roads.

The Contractor shall perform the Routine and Recurrent Maintenance of existing Road including existing bridge over rivers where a separate new bridge contracts are there, as per DoR norms including any type of maintenance works to keep the road pavement "Pot Holes Free (as of original pavement surface)" during the entire construction period.

In the Road stretches where works supervisors and length workers are being engaged by the Department of Roads for the routine maintenance of the Road, the Contractor shall have to engage them under the same terms and conditions regarding the wages and other facilities.

- (2) **Measurement and Payment**

Delete the wording of Sub-clause (2) in its entirety and substitute:

Maintenance of the existing road during both the construction period (Routine and Recurrent/Responsive) and Defect Notification Period (Routine maintenance only) shall be paid at the contract unit rate per km-month commencing on the date for the commencement of the works and terminating at the end of the Defect Notification period including any extension of time granted pursuant to the relevant Clause of the Conditions of Contract.

In the event the Contractor fails to perform such maintenance, the Employer shall effect such maintenance works and cost incurred shall be deducted from any payment due under this Contract Item or from any other monies due to the Contractor.

110 Site Information

Delete the first sentence and replace with the following:

The Contractor shall erect where directed by the Engineer signboards in accordance with **Appendix - 9: Project Signboard** which shall be protected and maintained up to the end of Defect Notification Period.

Add the following:

Project signboards shall be measured as the number of signboards, satisfactorily provided, installed, maintained throughout the Contract period and subsequently

removed.

Payment shall be made at the stated unit rate per signboard. The price shall be full compensation for all materials and labour required to perform the work described.

111 Environmental Protection Works

Delete the second paragraph and substitute:

The Contractor shall take all precautions for safeguarding the environment during the course of construction of the works. He shall abide by all prevailing laws, rules and regulations governing pollution and environmental protection. In particular, the Contractor shall fully comply with the environmental protection mitigation measures specified in the latest version of the project's specific Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) or Environmental Management Action Plan (EMAP), as provided by the Engineer. If any activity of the Contractor may cause damage to the environment in ways not envisaged under project-specific documents, then he shall comply with the measures specified in the latest publication of **"Environmental Management Guidelines"**, and **"Environmental and Social Management Framework"** published by the Department of Roads.

(1) Borrow/Quarry Sites

In the first set of bullet points, delete the words "they may be environmentally unsuitable" in point (iii) and substitute:

"they may lead to general environmental or instability problems or may be environmentally unsuitable in any other way."

At the end of Sub-clause (1) add the following:

"Ten percent (10%) of all payments due to the Contractor in respect of the construction of embankment using borrow material or which are due under any other item of the Bills of Quantities in respect of material won from borrow pits, gravel pits or quarries shall be withheld until the sites of the borrow pits, gravel pits or quarries to which such payments relate have been completely reinstated to the full satisfaction of the Engineer and in accordance with the Specification provisions."

(2) Disposal of Spoil and Construction Waste

Insert additional paragraph to Sub-clause 111 (2) Disposal of Spoil and Construction Waste, between existing first and second paragraphs

Under no circumstances whatsoever shall the Contractor allow spoil from any excavation or cut to fall or be pushed down the slope below. In any situation where this occurs by accident or on purpose, the Contractor shall, at his own cost, remove the debris to a location approved by the Engineer and make good the affected area through appropriate structures and re-vegetation as specified by the Engineer and following guidelines published in the Department of Roads' manual **"Roadside Bio- Engineering"**. Failure in compliance with the Engineer's instruction in respect of spoil disposal will lead to a reduction or with-holding of payment.

Add an additional paragraph after the existing second paragraph

Any construction waste that includes bitumen products, unused cement, fuel, oil or plastics shall be disposed of in a Government-approved or municipal landfill site. If this is not practical then it may be disposed of by burial in a specially excavated pit at a site approved by the Engineer. Land compensation shall be paid by the Contractor for the area occupied by the pit as if for permanent construction. If the land is owned by the Government, then the Contractor must obtain written permission from the appropriate authority for its use in this manner, and must pay any royalties due. The pit shall be located at least 100 metres from any seasonal or permanent water course or spring. A hole shall be excavated below ground level so that, when the original surface profile is regained through backfilling, the disposed waste is covered by at least two metres of soil. Following the closure of the waste disposal site, the Contractor shall provide any structures necessary to prevent erosion and shall re-vegetate the topsoil with appropriate plants.

(3) Provision and Maintenance of Camps, Offices, Stores, Equipment Yards and Workshops

Replace the first paragraph of the Sub-clause 111(3) with the following:

The Contractor shall provide and maintain such accommodation and amenities as necessary for all his staff and labour, employed for the purposes of or in connection with the Contract, including all fencing, water supply (both for drinking and other purposes), electricity supply, sanitation, cookhouses and other requirements in connection with such accommodation or amenities. On completion of the Contract, unless otherwise agreed with the Employer, all the temporary camps/housing provided by the Contractor shall be removed and the site(s) reinstated to its (their) original condition, all to the approval of the Engineer.

All accommodation facilities of whatsoever nature provided by the Contractor shall be provided with adequate sewage and wastewater collection and treatment facilities to a design and of a capacity approved by the Engineer. Under no circumstances shall untreated sewage or wastewater be discharged to the natural environment.

(6) Provision of Safety Clothing and Equipment

Insert new Sub-clause 111 (6)

The Contractor shall provide all laborers, supervisors and site staff with suitable basic safety clothing manufactured to an appropriate ISO standard. This shall include but not necessarily be limited to safety helmets and boots. Gloves shall be issued when any form of hazardous material such as cement and bitumen is being handled, and when there is a risk of hand injury, for example when using hammers and chisels. Eye goggles shall be issued when there is a risk of eye injury, such as when using hammers. Breathing masks shall be issued when there are dusty or smoky conditions.

Additional safety equipment is to be provided by the Contractor to all workers and supervising staff in certain sites. In sites with moving traffic or machinery, fluorescent or brightly coloured waistcoats shall be issued. Where workers are required to venture on to slopes steeper than 40 degrees, safety belt, safety clamps, harnesses and safety ropes shall be provided.

All workers and supervisory staff when on any site shall wear the basic safety clothing specified. Where additional safety equipment is required by nature of the site, then all

workers and supervisory staff when on any part of that site shall use the additional equipment in addition to the basic safety clothing specified.

The Contractor shall provide a set of safety clothing to all members of the Consultant's supervising staff and keep adequate stock for personnel visiting the project.

In hot weather the Contractor shall provide appropriate lightweight safety equipment, such as cotton gloves in place of rubber gloves and canvas boots in place of rubber boots.

The Contractor shall be responsible for ensuring that all his employees and the employees of any Subcontractor and any visitor to the site comply with the Engineer's requirement to use safety clothing and equipment at all times. Failure in compliance with the Engineer's instruction in respect of safety clothing and equipment may lead to as suspension of work and/or education or withholding of payment until the Contractor complies.

(7) Provision of First Aid/Medical Facilities

Renumber existing Sub-clause 111 (6) to 111 (7) Add the following after last paragraph

The Contractor shall provide information to his workers on methods of avoiding sexually transmitted diseases and infection by HIV/AIDS.

The Contractor shall arrange all medical facilities as per Standard Operation Procedure Guideline (SOP) of ADB / Government of Nepal Guideline for COVID-19 Pandemic and any other Pandemic.

(8) Crushing Plants

Renumber existing Sub-clause 111 (7) to 111 (8)

(9) Hot Mix Plants and Batching Plants

Renumber existing Sub-clause 111 (8) to 111 (9)

(10) Hazardous Materials

Delete entire existing Sub-clause 111 (9) Hazardous Materials (all three paragraphs) and substitute Sub-clause 111 (10) Hazardous Materials

Hazardous materials are defined as cement, lime, bitumen and emulsion, paint, fuels, oils, acid of the battery, pesticides and herbicides. The Contractor may not store hazardous materials within 100 metres of seasonal or permanent water courses or springs. They must be housed in secure weather- proof buildings and protected against attacks by vermin and accidental contact by children. Contaminated runoff from storage areas shall be captured in ditches or ponds with an oil trap at the outlet. Water Quality monitoring shall be carried out as per EMP.

Any worker handling hazardous materials must be appropriately equipped as described in Sub-clause 111 (6) above.

Any hazardous material requiring disposal must be handled as described in Sub-clause 111 (2) above.

Explosives, detonators, blasting powder and fuses are also classed as hazardous materials. The Contractor may only bring explosives on to the site with the specific written

permission of the Engineer. In this event, the Contractor is responsible for alerting the appropriate security forces and ensuring that all Government regulations are fully met concerning the transport, storage and use of explosives and associated equipment.

If the Engineer instructs the use of explosives, only controlled methods shall be used as described in Clause 904 Explosives and Blasting.

(11) Air Pollution

Insert new Clause 111 (11)

The Contractor shall avoid creating any high concentration of airborne dust or smoke within 100 metres of a house or other occupied building, or in situations likely to affect people, animals, crops or natural vegetation.

Dust from moving construction plant and road traffic shall be controlled by the regular spraying of water on to road surfaces in Terai and valley bottom sites. In the hill sites, dust control may also be carried out, in addition to regular spraying of water, by the use of speed bumps to restrict traffic speeds to 30 km/h in open ground and 15 km/h within 100 metres of any occupied building. The Contractor is responsible for all water spraying and the erection and maintenance of adequate speed bumps. The Engineer may instruct additional measures at his discretion.

Where earthwork excavations cause dust to blow into areas where it causes a nuisance, the Contractor is responsible for altering the schedule of works to minimize the nuisance. This may involve restricting the timing of work to certain hours of the day or completing works and restoring a dust-free surface as rapidly as possible. The Engineer may instruct additional measures at his discretion. Air quality monitoring shall be carried out as per EMP.

(12) Noise Pollution

Insert new Clause 111 (12)

The Contractor shall take every precaution to control excessive noise resulting in disruption to the local population and to wildlife. All static plant shall be located at least 100 metres from occupied buildings and at least 800 metres from sites deemed by the Engineer to have sensitive wildlife. The Engineer may require the construction of baffles or bunds around noisy plant in order to reduce the pollution caused.

The Contractor shall ensure that no employee plays loud music in any residential camp at any time. Noise level monitoring shall be carried out as per EMP.

(13) Special Provisions for Sensitive Ecology

Add new Clause 111 (13)

In addition to the provisions of other Clauses, the Engineer may require the Contractor to undertake special provisions to protect any plant or animal deemed to be environmentally sensitive or otherwise worthy of unusual protection.

(14) Reinstatement of Environment

Renumber existing Clause 111 (10) to 111(14) Add between existing two paragraphs:

The Contractor shall reinstate the environment of areas polluted by the use or spillage of hazardous materials as defined in Sub-clause 111 (10). All such materials and polluted

soil will be removed to a safe disposal site as described in Sub-clause 111 (2) Disposal of Spoil and Construction Waste. The site will then be restored and re-vegetated as described above. This provision applies in particular to all areas affected by bitumen.

The following sustainable technical requirements shall be carried out by the Contractor during the implementation of the Contract.

- a) Preparation of project reports e.g. IEE/EIA/EMP
- b) Preparation of CEMP (Contractor Environmental Management Plan)
- c) Provide and maintain a healthy and safe work environment and safe systems of work.

(15) Measurement and Payment

Renumber existing Clause 111 (11) to 111 (15) Measurement and Payment

Delete the paragraph and substitute with the following:

No separate measurement and payment shall be made for the works described under this Clause.

In the event that the Contractor fails to comply these provisions then the Engineer shall withhold the equivalent amount required to carry out those activities from the Contractor's IPC and shall release after they are completed. If the Contractor does not provide them in time as per the Specifications or within the time instructed by the Engineer, the Employer upon recommendation of the Engineer may procure by quotation from third party/ies and deduct the cost incurred from the Contractor's payment including logistics, transportation costs, miscellaneous cost, if any, and administration cost.

113 Equivalency of Standards

Add new sub-clause 113(3) the following:

The Contractor shall provide and/or make available the Standards as shown in the Appendices and when requested. There shall be no separate payment for the provision of such standards and payment shall be deemed to be included in the Contractor's rates for the provision of the Laboratory. In the event of the failure of the Contractor to provide documents for the required standards the Engineer may purchase the document and deduct the cost from the payment due to the Contractor for the provision of the Laboratory.

Add the following New Clauses after Clause 116 "Supply of Project Record":

117 Contractor's Establishment on Site

Office, Equipment Yard, workshops, stores etc.

It is the Contractor's responsibility to acquire land for the siting of all his offices, accommodation, stores, testing facilities, equipment yards and workshops and for all temporary works and for the reinstatement of such land on completion of the Contract to the satisfaction of the owners and of the Engineer. The Contractor shall obtain the approval of the Engineer for the siting of offices, accommodation, stores, testing facilities, equipment yards and workshops before such land is acquired and he shall indemnify the Employer against all claims and charges in respect of the occupation, use and

reinstatement of the land. The physical provisions of the Contractors camp shall satisfy the EMAP.

The Contractor is solely responsible for the satisfactory accommodation of all his employees and for complying with all regulations and requirements in this respect.

118 Legal Relations and Responsibility to the Public

The Contractor shall take the steps necessary to comply with the terms of the Conditions of Contract, particularly in respect of the insurances and indemnities required, and he shall comply with all regulations of statutory authorities.

119 Provision of Insurances and Securities

The Contractor shall provide all necessary Insurances, Guarantees and Securities as are required and detailed in the Conditions of Contract, Bill of Quantities or this Specification, for Phase 1: Upgrading Works and Phase 2: Performance Based Maintenance Service.

Measurement and payment for Insurances under the Contractor's All Risks (CAR) policy shall be made on Lump Sum basis as provided in the Bill of Quantities in the following sub-headings of the Bill of Quantities:

- a) Insurance cover for Works, Plant and Materials and the Contractor's Equipment
- b) Insurance cover for third party property and persons.

The lump sum price for Insurance under the Contractor's All Risks (CAR) policy includes all expenditures expected in providing and maintaining from Date of Commencement until the end of the Defect Notification Period an Insurance of Phase 1: Upgrading Works and until the end of acceptance of Memorandum of Final Formal Inspection (Normally 49 months) of Phase 2: Performance Based Maintenance Service, Plant and Materials, the Contractor's Equipment, third party properties and personal injury or death as prescribed in the Contract document, including expenditures resulting from administration work, dealing with and reporting of claims, stamps duties, taxes, etc.

The Contractor shall also require providing insurance of his personnel, employees and labors as prescribed in the Contract document. No separate payment shall be made for the insurance of his personnel, employees and labors and are deemed included in other items of the Bill of Quantities.

No separate payment shall be made for Bank Guarantees and Securities that are required as per the Contract. The costing of such Guarantees and Securities are deemed included in other items of the Bill of Quantities.

In case of any damages to the works during PBM Service for which payment has been made by the Employer and if it is established that the damage is because of the Contractor's faulty construction during the construction or because of any other actives of the Contractor even during PBM then the Contractor shall reconstruct the same. The Cost incurred shall be fully borne by the Contractor and may claim with insurance companies if applicable. Even if the insurance Company does not entertain the Contractor's claim the Contractor shall not be relieved from the obligation. No payment for the reconstruction of the damaged works and PBM Service shall be made by the Employer.

Measurement of the lump sum payment for item of the Insurance for Contractors All Risk

Policy (CAR) shall be made to the Contractor under the relevant items in the Bill of Quantities upon the submission of the acceptable insurance policies with the proof of payment of insurance premiums to the insurance company from the date of commencement to the end of acceptance of Memorandum of Final Formal Inspection for and after approval by the Engineer.

The payment of the quoted lump sum amount for the provision of insurance shall be made after the Contractor submits and obtains approval from the Engineer of the required insurance policies for the period covering from the Commencement Date to the acceptance of Memorandum of Final Formal Inspection of Phase 2: Performance Based Maintenance Service Period and the submission of the proof of the payment of premiums for that period.

The payment shall be made in three installments. The first installment, 80% of the amount under the respective item in the BOQ, shall be made upon approval of the insurance policy by the Engineer, the second installment, 10% shall be made after taking over of the Contract by the Employer and remaining 10% shall be made after successful completion of the Contract including phase 2.

The rate quoted by the Contractor for these lump sum items shall deem to cover the full Contract period including Defect Notification Period and PBM Service Period including any extension of time under the Contract.

120 Extension of Time due to Abnormal Rainfall

Extension of time due to exceptionally adverse climatic conditions as referred to in the relevant Clause of the General Conditions of Contract shall be considered only in respect of the number of days lost during each month which are in excess of the number of working days on which delays might reasonably be expected having due regard to the time of year. The Contractor shall, therefore, make due allowance in his rates for the loss of the following number of working days for each month due to the effects of rainfall as detailed below:

Month	Number of Days	Remarks
January	4	
February	4	
March	4	
April	6	
May	12	
June	20	
July	25	
August	25	
September	15	
October	5	
November	4	
December	4	

The number of days considered for Extension of Time shall be based on the full number of "rain days" occurring during the month less the number of days required to be allowed for the month as detailed above. "Rain days" shall be defined as those days on which the rainfall during the full 24-hour day exceeds 10mm and on which the Contractor is prevented from working on site for the furtherance of the major Works due solely to conditions caused by inclement weather.

The total number of days for extension of time shall be calculated on a month by month basis. Carrying over of days "not used" from one month to the next is not permitted.

For the proper application of this Clause the Contractor shall establish rain gauging stations to a design and using automatic equipment approved by the Engineer. Such stations shall be spaced along the site at intervals not exceeding 10kilometres. In the event of failure to establish such approve drain gauging stations no "rain days" will be measured and no requests for Extension of Time on the basis of inclement weather will be considered.

121 Labor Standards

The Contractor shall abide by international standards in his treatment of workers. There shall be no discrimination between individuals on the basis of race, sex, caste or belief.

(1) Rates of Wages

The Contractor shall pay rates of wages not less favorable than those approved by the Government for the various classes of labor engaged in the same district. All payments shall be in cash unless employees request, in writing, payment by cheque or other negotiable financial instrument. Payment in kind or through trade goods of any sort is prohibited. Food rations, accommodation, or any other allowances will be over and above cash wages complying with the minimum levels described. Men and women shall receive equal rates of pay for the particular grade of work, trade or skill for which they are employed.

(2) Payment of Wages

The Contractor shall pay his employees promptly and regularly at intervals of no more than two weeks, and all employees shall be paid in full and up to date before the issue of the Engineer's Maintenance Certificate.

(3) Records

The Contractor shall keep proper records of the days, dates and hours worked by every employee engaged on the contract, their gender, the class of work in which employed, whether as a casual or permanent employee, and the wages (and allowances if any), paid. These records shall be made available at any time for inspection by the Engineer or the Engineer's representative or any authorized representative of the Government.

(4) Default of Payment of Wages

In the event of default in payment of wages to petty contractors, local labour groups or any worker employed on the contract, by the Contractor or his Subcontractor, and, if a claim with satisfactory proof thereof is received by the Engineer, then the Employer may make the payment upon recommendation by the Engineer of such a claim out of the monies at any time payable under the contract, and the amount so paid shall be deemed

payments to the Contractor under the Contract.

122 Safety Plan and Provisions

(1) Scope

This Clause covers the requirements to be met by the Contractor in relation to the safety provision at construction sites which include workplace health and safety of the workers, all road users (drivers, passengers, pedestrians) and members of the community along the road corridors.

(2) Emergency Response Plan

An emergency response plan to deal with accidents and emergencies, including environmental/public health emergencies associated with hazardous material spills and similar events, shall be prepared for the approval of the Engineer.

(3) First Aid Base

A fully equipped first aid base shall be climatically controlled to maintain the temperature of the inside of the building at 20 degrees Celsius. Arrangements for emergency medical services shall be made to the satisfaction of the Engineer.

(4) On-Site Safety Publicity

The Contractor shall ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons regularly or occasionally on the site. Posters, in Nepali and English, drawing attention to site safety, rescue and industrial health regulations shall be made or obtained from the appropriate sources and shall be displayed prominently in relevant areas of the site.

(5) Safety Training Program

A Safety Training Program is required and shall consist of:

- (a) Initial Safety Induction Courses:** All workmen shall be required to attend a safety induction course within their first week onsite.
- (b) Periodic Safety Training Courses:** Periodic safety course shall be conducted not less than once every six months. All Contractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the contract works. Training courses for all workmen on the Site and at all levels of supervision and management,
- (c) Safety Meetings:** Regular Safety meetings will be conducted on a monthly basis and shall require attendance by the Engineer and safety representatives of Contractors unless otherwise agreed by the Engineer. The minutes of all safety meetings will be taken and sent to the Engineer within seven (7) days of the meeting.
- (d) Safety Inspections:** The Contractor shall regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs shall be kept clear of obstructions and legible to read. Equipment which is damaged, dirty, incorrectly positioned or not in working order, shall be repaired or replaced immediately.

(6) Safety Equipment and Clothing

Safety equipment, materials and protective clothing are required to be available on the site at all times and measures for the effective enforcement of proper utilization and necessary replacement of such equipment and clothing, and all construction plant and equipment used on or around the site shall be fitted with appropriate safety devices. These shall include but not be limited to:

- Effective safety catches for crane hooks and other lifting devices;
- Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists;
- Functioning beeping devices in all trucks and other equipment while reversing as well as operating flashing lights attached to all equipment while in motion.

(7) Requirements for Contractors' Safety Plans

The Contractor will be supplied with copies of the Environmental Management Plan (EMP) prepared by the Engineer. Provisions shall be incorporated by the contractor into all sub-contracts to ensure the compliance with the EMP at all tiers of the sub-contracting. All subcontractors shall be required to appoint a safety representative who shall be available on the site throughout the operational period of the respective sub-contract unless the Engineer's approval to the contrary is given in writing. In the event of the Engineer's approval being given, the safety representative, without prejudice to his other duties and responsibilities, shall ensure, as far as is practically possible, that employees of subcontractors are conversant with appropriate parts of the EMP.

(8) Temporary Evacuations

In the event that temporary evacuations are required due to safety or other considerations appropriate compensation will be provided to all workers.

(9) Measurement and Payment

Unless specified in the contract, no separate payment shall be made for compliance with these Safety Provisions and the costs for compliance shall be deemed to be included in the rates of the relevant Bill of Quantity items.

123 Shop Drawings of Intersections

(1) Scope

This Section covers the requirements to be met by the Contractor in relation to the survey, design, detailed layout of civil works, traffic signs and road marking of the intersections along the contract road corridors. The scope also includes the preparation of construction works traffic management plans which include management of regular traffic on existing main and side roads and management of construction traffic and traffic control and guidance schemes in order to ensure safe and acceptable level of vehicular and pedestrian traffic operation around the subject intersection and adjoin sections of roads.

A set of typical layout plans of various types of intersections are included in the drawings. The scope of this Section is to customize these typical designs to each site and produce shop drawings (plans, profile, cross sections, details, layout of traffic signs, road markings) and submit it to the Engineer for approval prior to the construction of

intersection related works commence.

(2) Land Survey

The contractor shall carry out detailed topographical survey of the intersection sites showing all manmade and physical features. The survey will cover enough area required to determine all necessary elements that may have effect in the design of intersections. The survey map will also show all overhead, at grade and underground utility services and both permanent and temporary roads/ walkways.

The survey plans shall be produced at 1:500 scale with contour interval of 0.5m or as instructed by the Engineer. Where manmade drains exist, invert levels will be shown and drainage line shown clearly on the plan.

(3) Traffic Survey

Before the commencement of construction, Contractor shall undertake 12 hours (commencing 06:00 hrs and ending 18:00 hrs) turning movement traffic counts at all intersections identified in the plans in the manner prescribed by the Engineer. Traffic counts shall be done by pedestrians, cycles/rickshaws, motorcycles, three wheeler, cars (sedan, jeep, microbus), buses (mini and conventional) and all kinds of trucks (mini tippers, conventional trucks) and reported for the period ending each 15min.

Turning movement diagrams shall be plotted by the contractor separately for the AM and PM peak hours. Where peak hours are not distinct, contractor shall seek advice from the Engineer and turning movement diagrams for hours ending specified period shall be presented together with the tabular data of turning movements. Engineer may supply to the contractor samples of the Traffic Count Table and Diagrams for guidance. Two sets of tables and diagrams (one with type of vehicles and other with Equivalent Passenger Car Units (for vehicles) shall be produced and submitted to the Engineer for reference, record and approval.

(4) Drawings

Using the type designs of the intersections (three way median open, three way median closed, four way median open, four way median closed at sections with and without service roads for four lane sections), the contractor shall prepare shop drawings of each intersection and submit to the Engineer for review and approval. Shop drawings of four way or three way intersections with Basic Right (BAR) Turn or Basic Left (BAL) Turn or both treatments to be constructed along two lane sections of road without service roads shall also be prepared by the contractor and submitted to the Engineer for review and approval.

Shop drawings shall be prepared using appropriate CAD software. Hand sketches shall not be accepted. Four colour copies shall be submitted to the Engineer for review and approval at least 21 days prior to the date the contractor wish to commence work at the intersection site. The contractor shall not be allowed to execute any works at intersections without getting approval from the Engineer.

Shop drawings shall include but are not limited to:

- Layout Plans (1:500 or larger as directed) showing all lines and levels as required to enable lay out of the intersection at site accurately;

- At least nine cross sections (for three way intersections) and twelve cross sections (for four way intersections);
- Traffic Signs and road marking layout plans (separate to the layout plans showing civil works/ electrical works);
- Profile / Longitudinal section of each leg (for a length of 40 m for each leg of side roads and 200 m along each leg from the centre of intersections);
- Any other details requested by the Engineer; and
- Traffic Management Plan as per the provision of Section 102

A set of drawings together with the traffic count tables and turning movement diagrams shall be signed and sent back to the Contractor for use in the construction site within one week of the receipt of the same from the contractor. All shop drawings shall be to the satisfaction of Engineer.

(5) Measurement and Payment

No separate measurement and payment for the activities required and the preparation of shop drawings at intersections shall be made. The cost for the required activities and preparation of shop drawings of intersections shall be deemed to be completely covered by the respective items of work relevant to the construction of intersections.

124. Safeguard and GESI Requirement

The Contractor shall comply the requirements of EMP, RP and GESI Action Plan. And the indicators shown in the relevant Plan shall be complied if this is under the obligation of the Contractor as stipulated in the Contract. As per GESI Action Plan the Contractor shall employ at least 10% women for the execution of the work.

The payment shall be made only under the relevant items in the BOQ.

125. GIS Data Creation

The Contractor shall prepare **initial & semi-annual report** and submit to the Employer, 2 sets of softcopy in original formats drawing showing newly constructed road, drainage structures (Culverts, Bridges, side drains, subsurface drains), utilities (electrical, telecommunication, water supply and sewerage lines etc.) including as built drawing in a format (*.shp) suitable for transferring to GIS database at the completion of first phase works.

The "GIS Data Creation" shall be paid at its respective contract unit rate which shall be full and the final compensation to the Contractor as per Clause 112 and for the cost of all activities involved for satisfactory completion of this item.

Section 200 – Site Clearance

201 Clearing and Grubbing

(5) Payment

At the end of this Sub-clause add the following:

No payment shall be made for clearing and grubbing carried out at the sites for quarries or borrows pits, Contractor's facilities, Employer's facilities or any other area other than those areas specifically directed to be cleared and grubbed by the Engineer for the execution of the permanent works.

202 Dismantling Culverts, Bridges, Other Structures and Pavements

(2) General Para (d)

Delete the contents under (d) to (j) and replace with the following:

- (d) All operations necessary for the removal of any existing structure which might endanger new construction shall be completed prior to the start of new work
- (e) All materials obtained from dismantling operations which, in the opinion of the Engineer, cannot be used or auctioned shall be disposed off as directed by the Engineer.
- (f) All materials obtained from dismantling operations which, in the opinion of the Engineer, meet the requirements of the specification, may be used by the Contractor.
- (g) It is envisaged that some reusable construction materials might be obtained from the dismantling of the existing structures in the project road. The Contractor shall be permitted using those construction materials if they meet the standards provisioned in these Specifications. The Contractor is advised to assess the suitability and quote his price accordingly taking into consideration of using those re-usable materials from the dismantled structures.
- (h) Whatsoever written in the above sub sections the materials obtained from the dismantling of electric poles, conductors, stay sets, telephone cabinets, steel telephone poles and solar lights shall be hand overed to the concerned Nepal Electricity office.

(6) Measurement

Delete "(viii) Dismantling pipe culverts no." and substitute:

(viii) Dismantling pipe culverts m.

(7) Payment

At the end of this paragraph add the following words:

This payment shall be made under the respective BOQ item and the quoted rate is deemed to be included with all costs of dismantling, all costs of disposing of scrap

materials, all scrap materials shall be disposed of in an environmentally sound manner approved by the Engineer which shall ensure that the existing environment is maintained free of all forms of contamination, including visual contamination, arising from the disposal of such materials.

FOR REFERENCE ONLY

Section 300 – Soil Improvement

301 Reinforced Soil

Add the following after the Sub-clause (2) "Design":

The Contractor shall design/review reinforced soil structure to cater for all the design loads including earth pressure, surcharge, live loads, seismic loads etc., as per Annexure 300-1 of Standard Specifications for Road and Bridges Works-2073 (with Second Amendment, 2078) and National Highway traffic and other design criteria specified in IRC codes. During the design/review of the reinforced soil wall, the Designer shall consider global stability, external and internal stability under standard and seismic loading. The design of reinforced soil structure shall be based on the actual site conditions and shall match with the approved construction drawings of bridges/flyovers/underpasses/ROB etc.

The Contractor shall submit within **three months from the date of commencement** to the Engineer, the complete proposal including design, computation and working drawing, and also the methodology proposed to be adopted for the works. The submission shall include the following:

- I. Existing ground levels including cross-sections that have been verified by the contractor for each location involving the construction wholly or partially in the original ground.
- II. Layout of walls, detailed design calculations and drawings, material specifications and construction methodology including quality control and quality assurance of different components.
- III. Earthwork requirements, and results of tests conducted on selected fill material.
- IV. Details of drainage systems and any other facilities.
- V. Test results of soil reinforcing structural element from manufacturers/ suppliers.
- VI. Test results of various materials from an independent laboratory acceptable to the Engineer.
- VII. Any other information required in the plans or special provisions or requested by the Engineer.

The Contractor shall furnish design, drawings, method statement, QA plan etc., for approval by the engineer and make his own arrangements to secure the supplies and services needed. The Contractor needs to consider and take due care that the reinforced soil structure is a product of specialized technology.

Section 500 – Quality Control

505 Testing Procedure and Set of Tests

Delete the final words of the second paragraph commencing “as per the prevalent accepted” and substitute with:

“In accordance with National Specifications stipulated by the Engineer. In case no such National Specifications are prevalent then tests shall be carried out in accordance with the directions of the Engineer.”

507 Site Trials or Trials Sections

(3) Production of Materials and Crushing Plant

In the second line of the first paragraph of this Sub-clause; after the words “to be processed using” Insert the following:

“the initial material collection procedures,”

510 Schedule of Tests

Add the following after the second paragraph of the Sub-clause ending with the words “main types of works”.

“The testing frequencies set forth are desirable minimums and the Engineer shall have the full authority to carry out additional tests as frequently as he may deem necessary to satisfy himself that the material and works comply with these Specifications”.

FOR REFERENCE ONLY

Section 600 – Materials and Testing of Materials

603 Sources of Materials

Add the following at the end of the last paragraph of this Clause:

"These provisions regarding delivery and haulage shall not apply to any material salvaged from the site of the works and the Contractor shall be entirely responsible for all haulage and costs of haulage of such salvaged material."

604 Inspection and Acceptance of Materials

Delete the second and third paragraphs of this Clause and substitute with the following:

"A preliminary inspection of the materials may be made at the source for the convenience and accommodation of the Contractor, but neither the presence of the Engineer nor the subsequent testing of work or materials by the Engineer shall relieve the Contractor of his responsibility for furnishing work and materials complying with these Specifications."

The representative of the Engineer shall have free entry at all times to those parts of any plant which concern production of any materials for incorporation into the Works and the Contractor shall ensure that any order for materials which he places includes the necessary provisions to ensure that such free entry is available."

613 Stone, Aggregate, Sand and Fillers

Amend Table 6.5: Tests Procedures Applicable to Stone Aggregate and Fillers as follows:

Add

- iii) a Flat and Elongated Particles for AC ASTM D4791
- xxi) Fine Aggregate Angularity AASHTO T 304 Method A
- xxii) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregates (CAFF) ASTM D5823

Section 700 – Pipe Drains, Pipe Culverts and Concrete Channels

702 Concrete Channeling

In the heading of this Clause after the word “Concrete” add the words “and Stone Masonry”

In Sub-clause (1) Scope after the word “concrete” add the words “and stone masonry”

At the end of Sub-clause (2) Materials add the following additional paragraph:

“Channels may also be constructed of masonry where directed or shown on the drawings. Masonry channels shall be fitted with precast concrete cover slabs where directed or shown on the drawings.”

In Sub-clause (3) Construction (a) Excavation and Bedding after the word “concrete” in the penultimate line add the words “or stone masonry”.

At the start of Sub-clause (3) Construction (b) add:

“The length of the pre cast channel (if any) section shall be uniform throughout and shall be equal to 3m, except where shorter sections are necessary for closures and where otherwise shown on the Drawing. The type and size of channels with its cover are as following:

Type A: L=3000mm, B=1000mm (Opening=700mm), Depth=1050 (Opening=800mm)

Type B: L=3000mm, B=900mm (Opening=600mm), Depth=950 (Opening=700mm)”

At the end of Sub-clause (3) Construction add the following additional item:

(d) Stone Masonry Channels

“Stone masonry channels shall be constructed in accordance with the lines levels and dimensions for the various types of channel shown on the drawings.

They shall be constructed throughout of Random Rubble Stone Masonry set in sand cement mortar having a minimum strength of 5.0 MPa and the stone/mortar matrix shall be complete and solid throughout the whole of the structure.

The joints in the exposed faces of the channels shall be carefully pointed up to provide a neat, well- sealed surface.

Where the channel type requires the provision of a reinforced concrete cover slab these shall be manufactured in an approved casting yard in accordance with the details in the drawings or as directed by the Engineer. The upper surfaces of the channel walls where these are required to carry cover slabs shall be carefully dressed and mortared to provide a smooth, strong, accurate bearing surface.”

- (5) *Delete the contents under sub-section “702 (5): Measurement” and replace with the followings:*

Unless stated otherwise, concrete for precast/cast in situ concrete channeling shall be measured in Cubic meter under relevant item in the BOQ,

Formworks shall not be measured separately. Similarly, reinforcement for precast/cast in situ Concrete-channeling shall be measured in Metric Tons under relevant item in the BOQ.

Excavation and bedding shall be measured as provided under respective Sections of these Specifications.

"Excavation for channels at or near the road edge shall be classified as general roadway excavation and shall be paid as either excavation to spoil or as formation of embankment as appropriate. In the event that channels are directed to be constructed more than 5 meters from the back of the shoulder, excavation for channels shall be paid as excavation for structures."

- (6) *Delete the contents under sub-section "702 (6): Payment" and replace with the followings:*

Concrete and reinforcement for precast/ cast in situ concrete channeling shall be paid as per the respective contract unit rates which shall be the full and the final compensation to the Contractor as per Clause 112. Excavation and bedding shall be paid as provided under respective Sections of these Specifications.

FOR REFERENCE ONLY

Section 900 – Earthworks

902 Definitions and General Requirements

Delete the final sentence of Sub-clause (viii). At the end of the first sentence of Sub-clause (8) add the following:

"The surveyed points thus obtained shall be used to correct or augment the existing survey data referred to in Clause 106 above."

909 Forming of Embankment and Other Areas of Fill

Add the following at end of 4th paragraph after "g)"

h) "the material having CBR less than 8%, however CBR of Sub-grade shall be as stated in clause 1003(1) of these Specifications"

Add after "..... Other areas" in first line of clause 909 (1) "including inside the non-structural fill in reinforced earth wall"

Add the following additional Sub-clause:

"(10) All materials which are deposited in place prior to compaction shall be evenly spread over the whole of the designated area for the layer concerned and in such quantity that the thickness of any one layer, when measured after compaction, shall comply with the requirements specified.

Any new layer less than 75 mm in compacted thickness shall be bonded to the previous layer by scarifying the previous layer to a depth not less than 25 mm or to such greater depth so that the total compacted thickness of the new layer plus the scarified portion of the previous layer will not be less than 100 mm."

The material obtained from the roadway excavation as per the design may be used by the Contractor for the purpose of roadway embankment provided that the excavated soil meet the requirements of the Specification.

918 Payment

At the end of Sub-clause (1) add the following:

The payment for earthwork excavation shall be made in two (2) instalments. First instalment 80% of the unit rate quoted in the Bill of Quantities shall be made after carrying out excavation works. The second instalment of remaining 20% of the unit rate quoted in the Bill of Quantities shall be made after reuse, haulage and safely dispose of the material at the locations approved by the Engineer.

Add new Clause 919 "Catch-water Drains" as follows:

919 Catch-water Drains

"Where directed by the Engineer the Contractor shall excavate catch-water drains to intercept water flowing towards the road alignment and divert it to the nearest watercourse or culvert.

Catch-water drains shall be of the size as directed by the Engineer.

Unless directed to the contrary catch-water drains shall be unlined.

Where instructed by the engineer catch water drains shall be lined with dry stone masonry or with mortared stone masonry as directed.

Where catch water drains fall outside the limits of the general works of cut and fill i.e. beyond 5 m from the back of shoulders they shall be paid for as excavation for structure at the unit rate per cu.m. of including the volume required to be excavated for any lining, under the relevant item in the Bill of Quantities.

Where catch water drains are directed to be lined the lining shall be paid for as dry stone masonry or mortared stone masonry as appropriate under the items for such work in the bills of quantities."

FOR REFERENCE ONLY

Section 1000 – Subgrades

1002 Definitions

(3) Capping Layer

Delete the definition and replace it with:

Capping layers (also known as selected fill or selected or improved subgrade) are layers of subbase materials laid and compacted generally over weaker materials, either to aid the passage of construction traffic or to improve the condition of the layer immediately below the subbase or base layer. Such improvements may be made through the addition of imported material (materials conforming to Clause 1200, Table 12.5, 12.6, and 12.7).

1003 Preparation and Surface Treatment of Formation

In the opening paragraph delete the words of the first sentence following “the sub-base or....” to the end of the sentence and replace with “any embankment or pavement layer”.

Add the following immediately after the opening paragraph:

“Preparation of formation shall also apply to the preparation of the base of embankment and shall include scarification, spreading and compaction of material across the full width of the layer or area. Such preparation shall not be measured twice at any one location.

If instructed by the Engineer, any processing of in-situ material that meets the Specification for subgrade will include scarification to a depth not less than 150 mm or to a depth as agreed with the Engineer, watering, shaping and compaction of the material. Measurement and payment for this processing shall be for the cubic metre of material so processed in accordance with the provisions in this sub-section. In this case the measurement for preparation of formation shall be deemed to be included in the rate for the provision of the layer concerned and no separate payment for preparation of formation will be made.”

(1) Formation of Loose Untreated Materials

In the first sentence, delete the words “particles larger than 60 mm” and replace with “particles larger than 75 mm”.

In the first sentence, delete the words “CBR of not less than 5%” and replace with “The CBR shall be greater than the design CBR.(Refer to design CBR values from Appendix 10)

Add the following after the first paragraph:

The Contractor shall arrange the provision of materials for embankment construction such that out of the suitable material, better quality materials are reserved for the subgrade and lesser quality materials are used in other embankment layers.

In the second paragraph delete the words “in the layers of 150 mm compacted depth” and replace with

“in layers not exceeding 200 mm compacted depth. Greater thicknesses of layer may be compacted provided the contract or can demonstrate that the required compaction throughout the whole layer may be obtained with the proposed equipment.

Add after first sentence in the second paragraph ending with words "150 mm compacted depth" the following:

Where the new formation is to abut an existing embankment as part of road widening, the Contractor shall ensure that any new layer of fill shall be benched into the old embankment for formation in a manner that comply with Clause 912 of these Specifications.

At the end of Clause 1003 add the following additional Sub-clauses:

(6) Widening to Embankment and Use of Existing Pavement Material

Widening of the road embankment, where required, shall proceed from the formation in the following manner:

- a) Scarify the existing sub-grade up to a depth of 500 mm and re-compact it as described in Sub- clause 1003(1).
- b) If the sub-grade is very weak, the sub-grade shall be strengthened by capping layer (Clause 1004) or by blending the scarified sub-grade material with granular material pursuant to Clause 1002 (5) Mechanical Stabilization as per the instruction of the Engineer.
- c) The mechanical stabilization with granular material shall be to ensure a minimum CBR of 8.

No separate payment shall be made for works carried out under Sub-clause 1003.

The contractor may use existing pavement material for the construction of the road pavement layers providing the material so used meets the required Specification for the layer in which the material is used. When this material is used it shall be spread across the full width of the layer. No separate measurement or payment shall be made for this operation.

1004 Capping Layer

Delete the first sentence and replace with:

Where shown on the drawings a Capping (Selected Sub Grade - SSG) Layer (either type 1 or type 2) shall be placed at, or on, the top of the subgrade to a thickness as indicated on the drawings. The materials for this layer may be from borrow pits. The Contractor shall demonstrate that suitable for the purpose. Any use of in-situ material shall be subject to the Engineer's approval.

If instructed by the Engineer any processing of in-situ material that meets the Specification for the capping layer will include scarification to a depth not less than the specified thickness of capping layer or to a depth as agreed with the Engineer, watering, shaping and compaction of the material.

Measurement and payment for this processing shall be for the cubic metre of material so processed in accordance with the provisions in this sub-section. In this case no separate payment for preparation of formation will be made.

(2) Material Requirements

Delete the contents and replace with the following requirements:

Material and Testing Requirements for Capping Layers

Materials conforming to Clause 1200, Table 12.5, 12.6 and 12.7

1005 Mechanical Stabilization

(1) General

Delete the first and second paragraphs and replace with:

The extent of mechanical stabilization shall be at the Contractor's discretion.

(2) Material Requirement

(a) Stabilizer

Delete and replace with:

The Contractor is at liberty to mechanically stabilize any material, whether in-situ or imported, to provide any pavement layer material, provided that the resulting material is in conformity with the Specification.

The type and amount of stabilizer used shall be such that when mixed with the in-situ or imported material the specified requirements for the layer material are achieved.

(b) Stabilized Material Requirements

Delete this sub-section:

(3) Amount of Stabilizer to be added

Delete this sub-section

1007 Measurement

Delete the Contents in the Section 1007 and replace with the followings:

- 1) The scarification of the existing blacktop surface shall be measured in square meter by multiplying average of widths taken at intervals of 10 meter along the centre line of the road multiplying by the respective lengths.
- 2) Loosening, leveling and Compacting original ground support embankment shall be measured in square meter by multiplying average of widths taken at intervals of 10 meter multiplying by the respective lengths.
- 3) Subgrade preparation in existing pavement in cutting or filling shall be made in square meter by multiplying average of widths taken at intervals of 10 meter multiplying by the respective lengths.
- 4) Whatsoever written above, no separate measurement for subgrade preparation shall be made if the formation level is obtained after roadway embankment provided that the compacting original ground support is separately measured.

1008 Payment

Add following paragraph at the end of this sub clause:

In the area/section where "Loosening, leveling and Compacting original ground support embankment" were carried out for formation of sub grade or for formation of road way embankment and if they are measured and paid separately under respective pay item in

the BOQ then only remaining area shall be measured and paid under formation of subgrade preparation in the BOQ.

FOR REFERENCE ONLY

Section 1100 – Road Works Overall Requirements

1101 Horizontal Alignments, Surface Levels and Surface regularity of Pavement Courses

Add the following:

(3) (a) Remedial Work

When upon examination by the Engineer any part of the Works or any plant fails to conform to the Specification requirements, or is at any stage before final acceptance damaged so that it no longer conforms to the requirements of the Specifications, the Engineer shall instruct its complete removal and replacement, at the Contractor's expense, with satisfactory work, plant or material. In special cases the Engineer may instruct the Contractor to apply remedial measures in order to make good any such defects or damage.

The actual remedial measures taken shall be entirely at the Contractor's own cost but subject to the Engineer's approval regarding the details thereof.

In particular remedial measures shall ensure that the final product is in full compliance with the Specifications, shall not endanger or damage any other part of the Works and shall be carefully controlled and submitted to the Engineer for examination when completed or at any intermediate stage as may be required.

For the guidance of the Contractor an indication about what may be required in the more common cases of defects or damage is given below, but the Engineer will in no way be bound to approve of or adhere to the measures indicated, as the actual remedial measures will be dictated by the circumstances of each particular case.

Earthworks

- i) Where a cut slope has been over-excavated, reinstatement by backfilling will not normally be permitted and the entire slope may need to be re-trimmed to obtain a uniform slope;
- ii) Where the floor of a cutting has been over excavated it will normally require backfilling and re- compaction with approved material of higher quality than the cut material. All necessary measures shall be taken to drain ground water that may accumulate in back filled sections;
- iii) Excess widths of fills will need to be trimmed to the design profile;
- iv) Where erosion has occurred on the surface of cuts or fills, the damage shall be made good by backfilling with suitable material and re-trimming. In more serious cases the slope may have to be cut back and backfilled after benching and compacted to the required standard of compaction with suitable small equipment followed by re-trimming.

Local Defects in Pavement Layers

- i) Where remedial measures are taken to make good localized defects the length and width of the area to be repaired by equipment shall be such as to

- accommodate the full width of the equipment used and of a reasonable length to ensure effective repair;
- ii) The depth to which material will have to be removed will depend on the defect and the type of material. Gravel layers will need to be broken up to a depth of at least 75mm and crushed stone will usually need breaking up over its full depth. Asphalt material will normally require removal for its full depth.

FOR REFERENCE ONLY

Section 1200 – Subbase, Base, Hard Shoulder and Gravel Wearing Course

1201 Granular Subbase

(1) Scope

Add at the end "crushed or otherwise".

Add an additional paragraph at the end as follows:

The scope of works includes:

- (a) Construction of new sub base in one or two layers as instructed by the Engineer over carriageway and shoulder in accordance with the stipulations laid down in Clause 1003 and relevant Sub Clauses;
- (b) Construction of sub base layer over shoulders or as shown in the drawing or as instructed by the Engineer utilizing the sub base and base material from the existing pavement in accordance with the stipulations laid down in Clause 1003 and relevant Sub Clauses.

(2) Sources of Material

Add to the second paragraph after ".....or from such other sources"

"or from material obtained during scarification of existing pavement surface granular course if satisfy the required quality for sub base"

(3) Material Requirement

Add to the first paragraph:

"The specific grading requirement shall be controlled before and after the material has been transported, stockpiled, mixed, spread and compacted".

Replace the first paragraph after ".....and physical Requirement 12.2." of sub clause 1201 (3) by the following:

If the thickness of the subbase layer provided in the design permits, the sub base layer shall have two sub layers; drainage layer and the filter layer. The upper layer of the subbase functions as a drainage layer to drain away the water that enters through surface cracks. The lower layer of the subbase should function as the filter/separation layer to prevent intrusion of subgrade soil into the pavement. The aggregate gradation recommended for the drainage layer is granular subbase gradation III and IV. The gradations I, II, V, and VI are recommended for the filter/ separation layer.

If the design thickness of the granular subbase is less than or equal to 200 mm, both drainage and filter layers cannot be provided separately. For such cases, a single drainage-cum-filter layer with GSB gradation V or VI may be provided. The minimum thickness of drainage as well as filter layer shall be 100mm (i.e., minimum thickness of each of these two layers is 100mm). The minimum thickness of the single filter-cum-drainage layer shall be 150mm from functional requirement.

Replace Table 12.2 by following table

Physical properties Test method Requirement	Physical properties Test method Requirement	Physical properties Test method Requirement
Aggregate Impact Value (AIV)	IS 2386-4 or IS 5640	Maximum 40
Liquid Limit	IS 2720-5	maximum 25
Plasticity Index	IS 2720-5	Maximum 6
CBR at 95 % dry density (at IS 2720- part8)	IS 2720-16	Minimum 30 unless specified in the Contract

(5) Laying and Compacting

Add the following at the beginning:

The sub-base shall be constructed after checking that the underlying layer conforms to the specified requirements and has been approved by the Engineer.

Add the following at the end:

The Contractor shall protect and maintain the subbase at his own expense. Maintenance shall include the immediate repair of any damage or defects which may occur and shall be repeated as often as is necessary to keep the subbase continuously intact. Repairs shall be done in such a manner that will ensure restoration to an even and uniform surface and may involve scarifying, watering and re-compacting.

1205 Shoulder Island and Median

Add Sub Clause 3a after sub clause 3[Construction of shoulder]

3a. Construction of Island and Median

Island and median filling material shall be placed and compacted in layers in compliance with the requirement of clause 910 [Compaction of embankment and other area of fill/back fill]. The filling shall be placed in by such method which shall avoid loading the structures (Kerb stone, sub surface drain and geo membrane layer, abutment of culverts, retaining structures near the bridges, abutments of box bridges and twin bridges) in any manner which may affect its stability or overload its underlying foundation material or substructure. The back fill in front of such structures shall be placed first to avoid the possibility of forward movement. Precaution shall be taken to prevent any wedge action against the upright surfaces, and the slopes of bounding the excavation (if any) shall be stepped as directed by the Engineer before filling is placed.

Add following paragraph at the end of the sub clause 6 [Measurement and payment]

Construction of island and median shall be measured in cubic meter by taking cross section at interval of 10m or as directed by the Engineer and shall be paid at their respective contract unit rate which shall be full and final compensation to the contractor as per clause 112 of the Specification.

1208 Wet Mix Macadam Base and Sub base

(3) Material Requirement

Add at the end of 3(b) following:

"Physical requirement for material for wet mix macadam base is B1"

(7) Laying and Compacting

In first line of second paragraph replace "plant" by "paver"

In first line of fifth paragraph replace "As soon as possible" by "Within 30 minutes "

FOR REFERENCE ONLY

Section 1300 – Bituminous Surface and Base Course

1302 Prime and Tack Coat

Replace VG 10 by VG 30 at the Sub Clause 1302(2) "Material" in para 2

(4) Spraying of Prime Coat and Tack Coat

Add the following:

Spray record sheets containing details of ambient temperature, spraying temperature, areas sprayed and quantities of materials used shall be submitted by the Contractor on a daily basis for approval by the Engineer.

Following the prime coat application, the primed, un-blinded surface shall be allowed to cure for a minimum 24 hours, or for a time as agreed with the Engineer, without being disturbed so as to allow the prime coat to fully penetrate the surface unless full penetration and curing has taken place in the opinion of the Engineer in a shorter period. If after this period the prime coat has not sufficiently cured to permit traffic without being picked up and the Contractor wishes to open the section to traffic, the Engineer shall either instruct that the area be left for a further period until the prime coat has fully penetrated and aired to allow traffic to pass or shall permit the Contractor to place mineral aggregate for blinding, at his own cost, applied at a rate and in the places instructed to blot up the excess bitumen. Where the Engineer agrees that blinding is necessary in limited areas to permit the unavoidable movement of traffic, at locations such as road junctions, the Contractor shall place mineral aggregate for blinding applied at a rate and in the places agreed and shall be paid for this work at the rate in the Bills of Quantities.

As soon as the primed surface has cured sufficiently or sufficient mineral aggregate for blinding has been applied to allow traffic to pass over the road without the prime coat being picked up, the road shall, where practicable, be opened to public traffic for a period of 14 days or less if agreed by the Engineer. During this period the primed area under traffic shall be maintained and all damage caused by traffic shall be repaired as instructed by the Engineer at no extra cost. Thereafter, the contractor shall maintain the primed surface and shall protect the surface until the application of surfacing by taking suitable precautions including for example supplying and spreading a protective layer of sand at no extra cost.

(7) Testing

Add the following at the beginning:

Samples of the bituminous material that the Contractor proposes to use, together with a statement as to their source and character shall be submitted and approved before use of such material. The Contractor shall require the manufacturer or producer of the material to furnish material subject to this and all other pertinent requirements. Only satisfactory materials, so demonstrated by service tests, shall be acceptable.

The Contractor shall furnish vendor's certified test reports for each consignment of bituminous material supplied. The reports shall be delivered to the Engineer before permission is granted for use of the material. The furnishing of the vendor's reports shall not be interpreted as basis for final acceptance. All such test reports shall be subject to verification by testing samples of materials received.

1308 Dense Bituminous Macadam

(4) Material

Replace first sentence of (e) aggregate grading and binder content by following:

"When tested in accordance with IS:2386 Part I (wet sieving method), the combined grading of the course and fine aggregate the filler for the particular mixture shall fall within the limits given in Table 13.28 for grading 2."

1309 Asphalt Concrete/ Bituminous Concrete

(2) Material

Replace last sentence of (e) aggregate grading and binder content by following:

"The grading shall be 1 as per table 13.33."

FOR REFERENCE ONLY

Section 1400 – Kerbs and Footpaths

1401 Concrete Kerbs

Replace the grade M20/20 with M25/20 in first paragraph of Clause 1401(2)

Add following at the end of Clause 1401(2):

"The paint shall be non-reflectorized type and shall conform NS: 112."

Add following at the end of Clause 1401(3):

"The road Kerb stones (Road and Bridges) and shall be painted in accordance with IRC 35:2015 and to satisfaction of the Engineer. "

"Painting of Kerb stone shall be commence after completion of the pavement works or as instructed by the engineer"

Add new "Clause 1406: Precast Concrete Property Access Slabs" after "Clause 1405: Cycle Tracks" as follows:

1402 Concrete Footpaths

Replace the grade M20/20 with M30/20 in Clause 1402(2)(a) and 1402(2)(b)

Replace the 50mm thick with 60mm thick in clause 1402(2)(b) in second line.

1406 Precast Concrete Property Access Slabs

The Contractor shall provide and install precast concrete slabs in accordance with the detail shown in the drawings to permit access across lined and unlined side drains wherever directed by the Engineer.

The materials and workmanship used in the fabrication of these slabs shall be entirely in accordance with the requirements of the relevant Clauses of this Specification governing concrete, reinforcement and formwork. Formwork for the slabs shall be such as to provide a class F3 finish throughout.

The measurement of precast concrete property access slabs shall be in numbers of each type of slab fabricated, transported and placed in accordance with the Drawings and these Specifications.

The quantities measured as provided above shall be paid at the respective contract unit rates for each type of slab. The contract unit rates shall be the full and the final compensation to the Contractor for installation where and as directed and shall include for fabrication of the slabs including the concrete of specified grade, reinforcement and form works, transport to the location for installation, any necessary trimming and bedding and placing of the slabs in their final position.

Add new "Clause 1407: Precast Reinforced Cement Concrete (RCC) Covered Drain" after "Clause 1406: Precast Concrete Property Access Slabs" as follows:

1407 Precast Reinforced Cement Concrete (RCC) Covered Drain

The Contractor shall provide and install precast Reinforced Cement Concrete (RCC) covered

drain sin accordance with the details shown in the drawings along the road side wherever directed by the Engineer.

The materials and workmanship used in the fabrication of RCC covered drain shall be entirely in accordance with the requirements of the relevant Clauses of this Specification governing concrete, reinforcement and formwork. Formwork for works shall be such as to provide a class F3 finish throughout.

The measurement of precast Reinforced Cement Concrete (RCC) covered drains shall be in meter of each type of RCC covered drain fabricated, transported and placed in accordance with the Drawings and these Specifications.

The quantities measured shall be paid at the respective contract unit rates for each type of Reinforced Cement Concrete (RCC) covered drains. The contract unit rates shall be the full and final compensation to the Contractor for installation where and as directed and shall include for fabrication of the Reinforced Cement Concrete (RCC) covered drains including the concrete of specified grade, reinforcement and form works, transport to the location for installation, any necessary trimming, bedding and placing in their final position, use of cement sand mortar at joints etc to meet the requirements of the drawings and these Specifications and to the satisfaction of the Engineer.

Add new "Clause 1408 Multi Blended Interlocking Concrete Block for Footpath:" after "Clause 1407: Precast Reinforced Cement Concrete (RCC) Covered Drain" as follows:

1408 Multi Blended Interlocking Concrete Block for Footpath

(1) General

Multi Blended Interlocking Concrete Block Pavements shall be used in footpaths for the pedestrians or as per the instruction of the Engineer. Laying of the blocks shall be done, precisely at the indicated level and profile. The blocks shall be laid to the pattern as shown in the drawings or as directed by the Engineer. The blocks shall be laid as tight as possible to each other. The maximum joint width shall be limited to 4 mm. Fine angular sand as per specification shall be brushed into the joints, and thereafter compaction shall be done with a vibrating plate compactor on a clean surface.

(2) Design Parameters

(a) Block Thickness

The thickness of interlocking blocks shall be 60 mm. The blocks shall be constructed with **M 30/20 grade concrete and shall confirm Nepal Standard.** All blocks should be of the same thickness, with a maximum allowable tolerance limit of ± 3 mm.

(b) Sand Bedding and Jointing

A layer of stone dust /fine sand bedding is provided between block pavement and compacted base with granular sub-base material to provide a cushion between the hard base and the paving blocks and to correct the permitted surface unevenness of sub-base.

The stone dust /fine sand bed should not be too thick lest it would be difficult to control the surface level of the blocks. A layer thickness of 50 mm is found to be satisfactory. The stone dust /fine sand used should be free from plastic clay and should be angular

type.

Joints between blocks are filled by stone dust /fine sand. Normally, the bottom 20 to 30 mm of the joint gets filled with bedding sand, whereas, the remainder space has to be filled with jointing sand by brooming it from the top. The joints are normally 2 to 4 mm wide.

(c) Base Construction

This layer is the important structural layer of a block pavement. The material used for base construction consists of granular sub-base material meeting the standard of Clause 1201 of 75 mm thickness.

(3) Construction

(a) General

The construction of interlocking concrete block involves preparation of sub-grade and sub-base layers, bedding sand and finally the laying of blocks. The block paving can be done entirely by manual labour. However, for efficient construction work, the work force has to be properly trained for this specialized job.

(b) Preparation of Sub-grade

Sub-grade should be compacted in layers of 150 mm to 200 mm thickness as per the use of compaction equipment. The prepared sub-grade should be graded and trimmed to a tolerance of ± 20 mm of the design level.

(c) Sub-base Course

The granular sub-base course shall be constructed following the section 1201 of this Specification.

(d) Placing and Screeding of Bedding Sand

The thickness of the sand bed after compaction should be in the range of 20 - 40 mm, whereas, in the loose form it can be 25 to 50 mm. Bedding sand should not be used to fill-up local depressions on the surface of a sub-base layer. The depressions should be repaired in advance before placing sand. Sand to be used should be uniformly in loose condition and should have uniform moisture content. Best moisture content is between 6 to 8 percent.

The processed sand is spread to the required thickness. The sand is subsequently compacted with plate vibrators weighing 0.6 tonnes or more.

(e) Laying of Blocks

Blocks can be laid generally by manual labour.

As far as possible, laying should proceed in one direction only, along the entire width of the area to be paved.

While locating the starting line, the following should be considered:

- In case of irregular shaped edge restraints or strip, it is better to start from straight stinging line.

- Influence of alignment of edge restraints on achieving and maintaining laying bond.

(4) Measurement and Payment

The measurement and payment of the interlocking concrete block shall be made in Square meter. Payment made at the contract unit rate for interlocking concrete block shall be payment in full compensation for furnishing all labour, material, tools, equipment at site conforming to the Specifications section 112 and as per approved drawings or as directed by the Engineer.

The subbase laid under the stone dust shall be measured in cubic meter and shall be paid under the respective item in the BoQ.

Add new "Clause 1409 Catch pit for rain water" after "Clause 1408: Multi Blended Interlocking Concrete Block for Footpath" as follows:

1409 Catch Pit for Rain water

Catch Pit shall be used for collection of surface water during rainy period. The contractor shall construct the same catch pit as per drawing. Materials used in construction of catch pit shall confirm these specification clauses.

The measurement and payment of the Catch Pit shall be made in number. Payment made at the contract unit rate for Catch pit shall be payment in full compensation for furnishing all labour, material, tools, equipment including all incidental costs necessary for carrying out the works at site conforming to the Specifications as per approved drawings or as directed by the Engineer.

FOR REFERENCE ONLY

Section 1500 – Traffic Signs, Road Marking, Road Marker Stones and Delineators

Add General Requirement before "Clause 1501-Permanent Traffic Sign"

General Requirements

This Clause covers the changes in the requirements to be met by the Contractor in relation to the installation of permanent traffic signs, road markings and various other traffic control devices as provided in the schedule of quantities (BOQ). Construction drawings issued with the contract document contain standard layout plan of traffic signs, road pavement marking and other ancillary traffic control devices. Their locations in the plan, where applicable, are indicative only.

The contractor shall prepare the detailed layout plans showing all traffic signs (cautionary, regulatory and informatory) and pavement parking and other road safety items and submit to the Engineer for approval 21 days prior to the commencement of their installation. The layout plan will be prepared in detail based on the guidelines / templates provided by the Engineer. The plans shall include but are not limited to the following elements of traffic control and safety management:

- i. Traffic signs (cautionary, regulatory, informatory) including speed limit signs;
- ii. Pavement marking / painting including all longitudinal and transverse lines (RRPM included);
- iii. Transverse and longitudinal rumble strips;
- iv. Other traffic calming measures such as raised platforms;
- v. Pedestrian crossing facilities at mid-blocks as well as at intersections zebra/ signalized, wombat);
- vi. Lane control signs, Variable Speed Limit Signs including with gantry girders where required/ shown in the construction plan or as instructed by the Engineer;
- vii. Traffic signals (at intersections and at mid-blocks)
- viii. Roadside barriers (with types and length), hazard markers; and
- ix. Any other traffic control devices and / or road safety measures shown in the BOQ or in the construction drawings.

All traffic signs shall comply and layout requirements shall be in accordance with the Nepal Traffic Sign Manual (NTSM). In cases where the provisions are not described in the NTSM, other international practices such as IRC or AGTM's recommendations will be used.

1501 Permanent Traffic Signs

(2) Materials

(a) Mounting Post

In first line delete: "either 50mm internal diameter steel tube of "heavy" category or"

(11) Payment

Add the following additional paragraph at the end of this Sub-clause:

"The Bills of Quantities provide for two classes of sign for payment purposes:

- i. Single post
- ii. Double or more posts

All signs supported by a single post shall be classed as "single post"

"All signs supported by two or more posts shall be classified as "double post or more posts".

1506 Road Marker Stone

2) Materials

Replace the M15/20 in second sentence by M20/20.

(3) Construction (b) Placing and Painting of Marker Stones

Insert the following additional paragraph at the end of this Sub-clause:

The concrete bedding for marker stones shall have a minimum volume below ground level of 0.25 cu.m. for 5th kilometer marker stones and of 0.125 cu.m. for standard marker stones. In addition, the actual volume of concrete used shall be sufficient to ensure the secured and permanent bedding of the marker stones in position to the satisfaction of the Engineer having due regard to the soil and slope conditions and to the size of the initial excavation. Excavation for foundation pits for marker stones shall be wholly backfilled with concrete including the backfilling of any over excavation which may have taken place.

Insert the following additional Sub Clause (3c) "Reflectorized Enamel Painting Works" after Sub-clause (3b):

(3c) Reflectorized Enamel Painting Works

This Clause covers the enamel painting works of safety and/or warning barrier with black or yellow paint as indicated on the Drawing or instructed by the Engineer.

The colour, width and layout of the painting on safety and/or warning barrier shall be in accordance with the Traffic Signs Manual (latest publication), Department of Roads.

Paint shall comply with the requirements of NS 408/054 or BS 6044 (1987) or as specified in the Contract. If specified in the contract, the paint may also be reflectorized paint, in which case the paint shall be reflectorized by the addition of reflecting beads (balloting). The balloting shall comply with BS 6088:1981 (1993).

The paint shall be delivered to the site in sealed containers bearing the name of the manufacturer and the type of paint.

The viscosity of the paint shall be such that it can be applied without thinning. Under no circumstance thinning shall be allowed.

The paint shall not be applied to damp surfaces or when the relative humidity exceeds 80%, or at temperatures lower than 10o C, or when, in the opinion of the Engineer, wind strength is such that it may adversely affect the painting operations.

Before the paint is applied, the surface shall be clean and dry and completely free form any soil grease, oil, acid or any other material which shall be detrimental to the bond between the

paint and the surface. The portions of the surface where the paint is to be applied shall be properly cleaned by means of watering, brooming or compressed air.

If any material not complying with the requirement is delivered on the site or used in the works, or if any sub-standard work is carried out, such material or work shall be removed, replaced or repaired as required by the Engineer at the Contractor's own cost. Rejected paint which has been splashed or dripped on the surfacing, kerbs, structures or other such surfaces, shall be removed by the Contractor at his own cost, in such a way that the marking or split paint shall not show up again later. After the application of paint, it shall be protected against damage by traffic or other causes. The Contractor is responsible at his own cost for the correction of the painting works damaged by the external means.

1507 Delineator Posts

(4) Erection and Painting

Delete last sentence of first paragraph and substitute with

"Delineator Posts shall be bedded into ground with concrete foundation of grade M10/40 as shown on the drawings".

Add followings new Clauses after "1511 Steel Crash Barrier":

1512 Gabion Safety Barrier

1513 Stone Masonry Safety Barrier

1514 Confident Blocks

1515 Precast New Jersey Barriers

1516 Solar Street Lighting Systems

1517 Tubular Steel Pole

1518 Relocation/Re-erection of Electrical Works

1519 Bus Stop Shelter

1520 Traffic Signal

1511 Steel Crash Barrier

(1) Scope

Add the following at the first paragraph after "W-Beam":

" , thrie beam and W-Beam with under-run"

Add the following at the beginning of the second paragraph after "W-Beam":

" , thrie beam and W-Beam with under-run"

(2) Material

Add the following at the beginning of the first paragraph after "corrugated":

"or plain"

(C) Technical Specification for Steel Crash Barrier and Accessories

Replace "IRC 5-1988" by "IRC 119-2015" at end of the first paragraph

Add the following at the end of the first paragraph:

"However, at the connection part between RCC Crash Barrier and W-Beam or Thrie Beam or vice versa the spacing of the vertical post shall be as per drawing closer than 2 m"

Replace 85 cm by 80 cm in second paragraph

Add the following after second paragraph after:

"The W-Beam with under-run safety barrier shall have post and spacer similar to ones mentioned above for W-Beam type. The rail shall be placed at 70 cm above the ground level. The under-run beam shall be placed in between the ground level and W-Beam."

Add the following at the beginning of the third paragraph after "thrie beam":

"W-Beam with under-run"

On the table S.No. 2 and 3 and, Requirement column add after "length of post 1800mm":

"for W-Beam, 2100 mm for thrie Beam and 1800mm for W-beam with under-run"

and

add after "Length of spacer-330 mm",

"for W-Beam, 546 mm for thrie Beam and 330 mm for W-beam with under-run"

(d) Packing of Steel W-Beam Crash Barrier and Accessories

Add the following at the beginning of the first line after "W-Beam":

", thrie beam and W-Beam with under-run"

(3) Construction Operation

Add at the end of "IV. Installation Posts" following: "The transition between flexible section (W-Beam Barrier) and rigid section (on RCC barrier and/or on Bridges) shall be executed in accordance with the drawings, established practices, and the instructions of the Engineer."

1512 Gabion Safety Barrier

(1) General

This work shall consist of furnishing and erection of stone filled wire crates (Machine Made Gabion) to function as barrier of dimensions and at locations as shown on the drawing (s) or as directed by the Engineer in the same way as the Gabions as described under Clause 2401.

The measurement and payment shall also be as per the same clause.

1513 Stone Masonry Safety Barrier

(1) General

This work shall consist of furnishing and erection of random rubble stone masonry walls to function as barrier of dimensions and at locations as shown on the drawing (s) or as directed by the Engineer in the same way as the Masonry for Structures as described under Clause 2600.

The measurement and payment shall also be as per the same clause.

1514 Confidence Blocks

(1) General

This work shall consist of furnishing and erection of confidence blocks with the respective material on the respective types of structures to function as barrier of dimensions and at locations as shown on the drawing (s) or as directed by the Engineer in the same way as the type of structures as described under the respective Clauses of the Specifications.

The measurement and payment shall also be as per the respective Clause of the Specifications.

1515 Precast New Jersey Barriers

(1) Scope

This Section covers the requirements to be met by the Contractor in relation to the materials, fabrication, transportation and installation of Precast New Jersey (NJ) Barriers along the roads. The purpose of NJ barriers is to reduce the risk of an out-of-control vehicle crossing the main road and colliding with the traffic on service roads or vice versa. These can also be used for barricading construction site from moving traffic during road construction to increase the safety of road workers. NJ Barriers also reduce the risk of a vehicle deflecting back into the traffic stream after colliding with the barriers by allowing the errant vehicles decelerate within tolerable limits and by directing traffic in a prescribed manner.

(2) Applicable Standards

RCC NJ barriers shall comply with the requirements of ASTM 825: Standard Specification for Precast Concrete Barriers or its equivalent BS or NS (where available). If required by the Engineer, the contractor shall demonstrate the functioning of crash barriers employing the standard procedure for safety performance evaluation recommended by the Manual for Assessing Safety Hardware (MASH), previous (NCHRP – 350).

Concrete strength shall be tested in accordance with ASTM C39 or equivalent and average strength values for daily testing shall be equal to or greater than the specified design strength. Cross-sectional and longitudinal dimensions, locations and positioning of anchoring devices and reinforcement shall be acceptable to the Engineer.

Two cubes for each 20 cum of concrete or a minimum of 2 cubes per day's production shall be tested in accordance with ASTM C31 or equivalent procedure. These cubes shall have compression strength required for M25 Grade concrete.

(3) Materials

Cement, aggregates, admixtures and steel reinforcement shall conform to applicable ASTM Specifications or to the relevant Clauses of the Specifications as applicable for the materials used for other similar RCC structures in Clause 2000 of these Specifications.

(4) Manufacture

Concrete mixture shall be proportioned and mixed to meet the minimum strength level and cured as per the methods outlined in Section 7 of the ASTM C 825 specification. Formwork used shall be sufficiently rigid to maintain dimensional parameters. All casting surfaces shall be of smooth and tidy finishes free from honeycombs, porous materials or cement sand plasters. Concrete design strength shall be for M25 in 28 days. Air entrainment shall have air

content of 5 ½ +/- 1% as measured by ASTM test method C 173 or C 231 or equivalent applicable standards.

Concrete surfaces shall be finished at the option of the manufacturer (contractor) but these should be comparable to the F3 finish and be uniform for all sections in the contract lot.

Steel Reinforcement shall be provided as shown in the drawing or as designated by the Engineer. Reinforcement shall be designed by the producer or contractor (as the case may be) and be sufficient to permit handling delivery and placement of sections without damage. Minimum concrete cover is 50 mm, except for end sections where cover may be less. See applicable project or ASTM specifications for specific details.

Barriers shall be assembled as a cage with sufficient mat and bar to maintain shape during casting. Reinforcement design for the ends of barrier sections should be in accordance with the publication "Concrete Median Barrier Research," Volume 2, Research Report, prepared by the Southwest Research Institute for the FHA, to prevent fracture at the joints. Laps, welds and splicing shall be acceptable to the Engineer and develop full strength of reinforcement.

Cross sectional dimensions shall not vary from design by more than 6 mm. Vertical centerline shall not be out of plumb by more than 6 mm. Longitudinal dimensions shall not vary from design by more than 6 mm in 3 m long barriers and not exceed 20 mm per section.

(5) Handling and Transport

Unless otherwise specified, the minimum length of each barrier section will be 3 m long. For straight sections, Engineer may ask the contractor to provide NJ barriers of 6 m long or more (up to 10 m).

Lifting devices (hooks etc) shall not be cast into the side surfaces of the barriers. Anchorage to prevent lateral movement of the barrier shall consist of dowels and keyway joints on interlocking devices shall be as specified by the Engineer. Location of anchoring shall be as specified by the Engineer.

(6) Measurement and Payment

Erection of NJ barriers shall be measured by the linear meter in place and paid under the Bill of Quantity Item. The rate shall include for the manufacture / supply / transportation of new precast barriers (loading, handling, unloading, excavation, foundation preparation (sand pad, leveling, concreting), preparation of surface, laying in the position, fixing correctly to the lines and levels as per drawings or as directed by the Engineer. No separate payment for concrete or reinforcing steel or formworks etc shall be paid. Any barriers that have edges broken, concrete chipped away during transportation shall not be paid not plastering would be allowed to make surface look good.

1516 Solar Street Lighting Systems

(1) Definition

A standalone solar photovoltaic (SPV) street lighting system (SLS) is an outdoor lighting unit used for illuminating a street or an open area. It consists of photovoltaic (PV) module(s), compact Light-emitting diode (LED), lead acid battery, control electronics, inter-connecting wires/cables, module mounting Pole including hardware and battery box. The LED is fixed inside a luminaire which is mounted on the pole. The PV module is placed at the top of the pole at an angle to maximize incident solar radiation, and a battery is placed in a box attached

to the pole. The module is mounted facing south, so that it receives solar radiation throughout the day, without any shadow falling on it. Electricity generated by the PV module will charge the battery during the day time. This system operates from dusk to dawn.

(2) Scope

This section covers the requirements to be met by the Contractor in relation to the materials, fabrication, installation, testing and commissioning of solar street lighting systems. The street light system consists of the specified electrical hardware, mast arm poles, and footing which includes excavation, breaking of concrete or any other hard surface such as road pavement, concreting, erecting poles to lines and levels and curing the concrete and re-instatement of the surface to its original condition and disposal of excess spoil materials: on an all complete net basis.

The solar street lighting system shall be provided along the sections of road passing through built up areas, on areas of high pedestrian activity and at all pedestrian zebra crossings and intersections as shown in the drawings or as directed by the Engineer. Electric poles along the bridges shall be anchored as shown in the bridge drawings or as directed by the Engineer. The Contractor shall be required to submit shop drawings of the anchorage details for Engineer's approval.

(3) Specifications of the Solar Street Lighting System

A. Duty Cycle

The system should automatically switch ON at dusk, operate throughout the night and automatically switch OFF at dawn.

B. PV Modules(s)

- (i) Both crystalline and thin film technology modules are allowed in the system. The PV module should have a certificate of testing conforming to IEC 61215 Edition II / BIS 14286 or IEC 61646 for crystalline and thin film PV modules respectively. The certificate should be from an NABL or IECQ accredited Laboratory;
- (ii) The power output of the module(s) under STC should be a minimum of 150 Wp. Either two modules of minimum 75 Wp output each or one module of 150 Wp output should be used. In case of thin film technology PV modules, the specified values refer to the stabilized power output after the initial degradation. The module efficiency should not be less than 12%;
- (iii) The operating voltage corresponding to the power output mentioned above should be $16.4 \pm 0.2V$;
- (iv) The open circuit voltage of the PV modules under STC should be at least 21.0Volts;
- (v) The terminal box on the module should have a provision for opening for replacing the cable, if required;
- (vi) Each PV module must use a RF identification tag (RFID), which must contain the following information:
 - a. Name of the manufacturer of PV Module.
 - b. Model or Type Number
 - c. Serial Number

- d. Month and year of the manufacture
- e. I-V curve for the module
- f. Peak Wattage of the module at 16.4volts
- g. Im, Vm and FF for the module
- h. Unique Serial No and Model No of the module Until March 2013, the RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.

(vii) A distinctive serial number starting with NSM will be engraved on the frame of the module. The distinctive number starting NSM will also be screen printed on the tedlar sheet of the module.

C. Battery

- (i) Lead Acid, tubular positive plate flooded electrolyte or Gel or VRLA Type;
- (ii) The battery will have a minimum rating of 12V, 150 Ah (at C/10 discharge rate);
- (iii) 75 % of the rated capacity of the battery should be between fully charged and load cut off conditions.

D. Lamp

- (i) The lamp should be 40Watt LED;
- (ii) The light output from the lamps should be around 4000 ± 5 % lumens (for 40 W LED);
- (iii) The lamp should be housed in an assembly suitable for outdoor use, with a reflector on its back;
- (iv) No blackening or reduction in the lumen output by more than 10%, should be observed after 1000 ON/OFF cycles (two minutes ON followed by four minutes OFF is one cycle);

E. Electronics

- (i) The inverter should be of quasi sine wave/ sine wave type, with frequency in the range of 20 - 30 KHz. Half-wave operation is not acceptable;
- (ii) The total electronic efficiency should be not less than 85%;
- (iii) The idle current consumption should not be more than 10mA;
- (iv) The PV module itself should be used to sense the ambient light level for switching ON and OFF the lamp.

F. Electronic Protections

- (i) Adequate protection is to be incorporated under no load conditions e.g. when the lamp is removed and the system is switched ON;
- (ii) The system should have protection against battery overcharge and deep discharge conditions;
- (iii) Fuses should be provided to protect against short circuit conditions;
- (iv) Protection for reverse flow of current through the PV module(s) should be provided;

- (v) Electronics should have temperature compensation for proper charging of the battery throughout the year.

G. Mechanical Hardware

- (i) A metallic frame structure (with corrosion resistance paint) is to be fixed on the pole to hold the SPV module(s). The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that the module(s) can be oriented at the specified tilt angle;
- (ii) The pole should be made of mild steel pipe with a height 6m above the ground level, after grouting and final installation. The pole should have the provision to hold the weatherproof lamp housing. It should be painted with a corrosion resistant paint; All poles will be of slip base type. This type of special purpose Street Lighting Pole addresses the universal problem of high-speed road accidents (over 60km/h) involving roadside collisions with light poles. These poles shall comply with Australian Standards 1158.1.3 or equivalent Indian Standards. Slip Base Poles differ in design which features the two base plates bolted together with the facility of freely coming apart if a crash occurs. This separation lessens resistance and mitigates the overall effects of the impact (and subsequent damage to the vehicle or injury to its occupants); All poles shall be tapered round of specified diameter and consist of standard base-plate mounted with either in-ground section or connection spool on rag bolts, bolts, slip washer and rectangular washers. All poles shall be hot dip galvanized to Australian Standards 4680:2006 or equivalent Indian Standards and shall be either powder coated or painted as approved by the Engineer. The slip base poles shall be in a single and double outreach arm arrangement, curved or straight as approved by the Engineer. Poles shall have security or tamper proof screws for access door covers;
- (iii) A vented, acid proof and corrosion resistant painted metallic box for outdoor use should be provided for housing the battery with a provision of lock and key.

H. Other Features

- (i) The system should be provided with 2 LED indicators: a green light to indicate charging in progress and a red LED to indicate deep discharge condition of the battery;
- (ii) There will be a Name Plate on the system, which will give: (a) Name of the Manufacturer or Distinctive Logo. (b) Serial Number;
- (iii) Components and parts used in the solar street lighting systems should conform to the latest BIS specifications, wherever such specifications are available and applicable;
- (iv) The PV module(s) will be warranted for a minimum period of 25 years from the date of supply and the street lighting system (including the battery) will be warranted for a period of two years from the date of supply. PV modules used in Solar Street Lighting System must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Twelve (12) years and 80% at the end of Twenty-five (25) years. The Warranty Card to be supplied with the system must contain the details of the system;

- (v) Necessary lengths of wires/cables and fuses should be provided;
- (vi) An Operation, Instruction and Maintenance Manual, in English should be provided with the Solar Street Lighting System. The following minimum details must be provided in the Manual: basic principles of photovoltaics; a small write-up (with a block diagram) on the Solar Street Lighting System – describing its components (PV module, battery, electronics and luminaire) and their expected performance; a section on charging and significance of indicators; together with clear instructions about erection of poles and mounting of PV module (s) and lamp housing assembly on the pole.

(4) Measurement and Payment

The solar street lighting system including all the PV modules, battery, lamp, electronics and electronics protection, mechanical hardware including solar light pole including foundation excavation, placing, foundation concreting as per drawings and other features for the complete functioning of the solar street lighting system shall be measured in number or in sets (Nos./Sets) and paid under the respective contract price on BOQ. The contract price and/or rates shall be the full and the final compensation to the Contractor as per Clause 112. **Tubular Steel Pole**

1. Description

- i. The steel tubing used in pole fabrication shall be of steel of any approved process possessing a minimum tensile strength of 42 Kg/sq. mm and a chemical composition of not more than 0.06% sulphur and not more than 0.06% phosphorous.
- ii. The tubing diameter and tubing wall thickness shown in Table 1 for each length of pole are the minimum size to be used in fabricating each length of pole.
- iii. Tubular poles shall be made of welded tubes, swaged and joined together. The upper edge of each joint shall be chamfered at an angle of about 45-degree. The steel poles shall be composed of three sections of diminishing diameters and minimum diameter thickness and lengths of pole shall be as shown in Table 1. Steel Tubular pole street lights are of three types, viz double armed, single armed and dislocated double armed.
- iv. All tubes forming parts of the above supports shall be made from hot insulated seamless or continuously welded steel in accordance with BS 6323 or equivalent applicable Standards.
- v. The bottom section of the poles shall be galvanized with minimum coating of weight not less than 460-gm/-sq. m internally and externally. The length of the bottom section including the base plate to be galvanized shall be as follows:

11 m pole	2.5 m
9 m pole	2.25 m
- vi. The remaining portion of the pole shall be painted with one coat of red oxide primer as specified in IS 2074-1997.
- vii. Each pole shall be provided with a steel top plate 3-mm minimum thickness welded to the end of the section. The top plate shall not project beyond the perimeter of

the top section. Each pole shall also be provided with a welded base plate welded to the bottom of the pole.

viii. The size of the base plate shall be as per governing standard.

2. Tolerance

The following tolerances shall be maintained:

- a. Tolerance of diameter: $\pm 1\%$
- b. Tolerance on weight: $\pm 7.5\%$ on each pole.
 1. $\pm 5\%$ on a bulk load.
- c. Tolerance on thickness: $\pm 10\%$ on each sheet.
- d. Straightness: The finished poles shall not be out of straightness by more than $1/600$ of the height.

3. Tests

The following test (s) shall be performed for the pole furnished.

- a. Tensile test and chemical analysis for sulphur and phosphorous
- b. Deflection test
- c. Permanent set test
- d. Drop test

List of testing equipment available with the manufacturer, for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

Table 15.1 Poles Specification

IS Designation	410 SP-52	410 SP-43	410 SP-31	410 SP-13
Overall Height	11 m	10 m	9 m	8 m
Planting depth, m	1.8	1.8	1.5	1.5
Length, m				
Top (h1)	2.7	2.4	2	1.75
Middle (h2)	2.7	2.4	2	1.75
Bottom (h3)	5.6	5.2	5	4.50
Outside Diameter, mm				
Top (h1)	114.3	114.3	114.3	88.9
Middle (h2)	139.7	139.7	139.7	114.3
Bottom (h3)	165.1	165.1	165.1	139.7
Thickness, mm				
Top (h1)	3.65	3.65	3.65	3.25
Middle (h2)	4.5	4.5	4.5	3.65
Bottom (h3)	4.5	4.5	4.5	4.5
Approximate weight, Kg	175	160	147	101
Crippling load, kgf	307	348	367	301
Application of load from top of pole, m	0.6	0.6	0.3	0.3

**Must be supplied Along with standard Cross Arms and Bracings Angles,
Pole Clamps, GALVANISED STEEL BOLTS, NUTS AND MISCELLANEOUS FASTENING**

COMPONENTS, TRANSFORMER PLATFORMS fabricated from hot-rolled channels, angles and steel members. The steel channels and angles for transformer platform shall be fabricated in accordance with Indian Standards IS: 226-1975 and IS-808-1964 or any revision thereof or other equivalent national or international standard provided that the resulting steel stock is of equal quality and strength. The minimum tensile strength of the steel shall be 4200 kg/cm². Existing Transformer shall be reused.

1. Payment

Up to 10% of the steel tubular poles of the street Lighting will be single armed and dislocated double armed swan types as shown in drawing. Rates for this reduced portion quantity of single armed poles will be proportionately reduced by 20%.

1518 Bus Stop Shelters

(1) General

Bus stop shelter has been provided at bus stops with an aim of a comfortable environment with some protection and basic facilities during waiting periods for the passengers seeking transport service. These structures are constructed with steel RCC frame support, RCC roofing system, aluminum frame glass panels/walls, wooden seats for waiting passengers, and with solar lighting facility.

(2) Bus Shelter

It comprises of RCC frame, which support the of the RCC Slab roof. The foundations/base for the RCC Frame to be constructed as per drawing and design. The floor shall be of 100mm thick Plain Cement Concrete (Grade M20/20) with the class F2 finish and cement interlocking tile.

On two sides of the bus shelter comprising width sides and the backside, aluminum frame panels fitted with 8mm thick unbreakable glass panel/walls shall be installed as shown in the drawing.

The seating bench base shall be made of 1st class brick masonry (1:4 c/s) and having cement plastered top. On top of the base a wooden seat/bench made of 50mm thick hardwood (Sakhuwa) strips laid and fitted intact without gaps with proper joinery. The size of seats shall be 500mm wide and back rest shall be of 400mm height. All fixtures shall be properly planed, polished and fitted at site as per drawing and instruction of the Engineer.

The bus stop area and the shelter shall be illuminated and have electric power points required for other purposes (like mobile charging). A PSC electric pole of 9m height shall be supplied with all accessories and erected at site as per drawings and specifications. This will be connected to a solar power system having a solar panel of capacity 100 Watt output and wirings and required fixtures shall be located at site as per drawing or instruction of the Engineer.

The digital information display board (in English and Nepali Language) shall be installed at the bus shelter.

The construction of bus shelter shall include supply, fabrication and installation of all components, fixtures at site all complete as indicated in the drawings. Testing of solar panel, lighting system is also to be included in this item.

(3) Measurement and Payment

The Bus-stop shelters will be measured in number for each Type. Payment for each unit and type shall be made after the completion and testing of unit and type with all its components.

1519 Traffic Signal

(1) Basic Requirements

All civil works, field equipment and facilities shall be installed in accordance with the requirements of the DOR or its designated representative (Engineer). The contractor shall submit details of the proposed equipment and facilities, installation methods, footing details, etc., and shall obtain approval of the Engineer before installation.

The contractor shall supply a FSD (Final System Design) for approval by the Engineer before any Notice to Proceed (NTP) to install traffic light at the intersection or pedestrian crossing (as the case may be) is issued. FSD shall be prepared in accordance with the best international practice for the installation of civil, electrical and telecommunication infrastructure which shall be approved by the Engineer.

(2) Traffic Controllers and Allied Equipment

Controllers and ancillary equipment provided shall at a minimum meet the requirements of the Electro-Magnetic Compatibility standards of the country of origin.

All controllers must be microprocessor based and compatible with the operation of an ITS and must be the type approved at least to the standards of the country or state of origin. The supplier shall submit type approval documentation stating clearly the conformity to environmental and destructive tests – wind, rain, dust, dampness, humidity, dry-heat and vibration.

All controllers shall be capable of signal display voltage dimming between 230V AC and 160V AC. Dimming shall be operated by the time-of-day schedule.

(3) Power Supply Requirements

Power Supply for the installation shall be arranged by the Contractor by means of a secured 24 hour local supply (recommended) as proposed by the Contractor during the FSD process and shall be metered where appropriate, single phase with filter protection against over-current, and shall incorporate earth leakage and short circuit protection. The Power Supply shall be terminated in a separate fuse-box unit, located in close proximity to the controller, or in an agreed position with the Engineer. Ducting shall be installed between the fuse unit and the controller as directed.

The supply compatibility of the controller and ancillary equipment shall be 230V AC (+/- 15 percent), 50 Hz (+/- 1 percent), 30 amp minimum. Actual power supply requirements shall be confirmed by the Contractor taking into account the number of heads, length of cable runs etc. It is the responsibility of the contractor to establish electrical power supply availability and conditions with the Electricity Supply Company.

The power requirement, range to connect to the LED signal heads under undimmed and dimmed mode shall be as specified in the relevant items in the BOQ or or as per the requirement of the equipment supplier.

A consumer earth terminal shall be supplied and located adjacent to the mains "cut out". The controller power supply should be able to absorb mains power interruptions of 75 milliseconds without any interference to the operation of the microelectronics or signal displays and this

applies equally to dimming operation.

A minimum of two 13-amp electricity sockets (General Purpose Outlets – GPOs), comprising RCD or equivalent shall be provided within the controller case and shall be of Universal 13 Amp design. These outlets shall not be used to support any permanent equipment, and are for the use of maintenance personnel only.

(4) Backup Power System Requirements

Uninterruptible Power Supply units that provide operational continuity in the event of loss of Mains AC power shall be required. The UPS and Batteries shall be rated to industrial temperature ranges and shall be designed to operate in hot and cold conditions dependent on the ambient temperature of the batteries. The intended backup system shall operate at 230VAC / 50Hz.

The unit shall be robust and sufficiently protected against lightning power surges and other spurious power surges on the mains inputs. Solar Panel shall be supplied in order to assist charging mechanisms.

The intersections in the East West Highway require a separate cabinet solution for small to medium intersections that cater up to 18 signal groups with a maximum load of 850VA. The UPS shall be housed in a separate cabinet to that of the Traffic signal controller and CCTV network but adjacent to them.

At this maximum load level, the UPS and Battery combination shall be required to provide approximately 12 hours of backup time in the event of loss of Mains AC.

The UPS charging unit shall be fitted with a front panel display so that maintenance technicians can monitor input voltages, output voltages and currents, and other historical data such as time of disconnection and time on UPS power. The display shall also provide information on expected time remaining on UPS at current consumption.

The UPS charging unit shall have a front panel interface that allows service personnel to view the status of all critical values such as input, output voltages and currents as well as time of loss of Mains AC.

The UPS shall provide an interface (clean contacts) to the traffic signal controller special inputs in order that the central traffic computer may receive warnings on mains power and battery health and levels.

The case or cabinet for the UPS shall be lockable and vandal proof and be of a similar minimum standard and specification as that of the traffic signal controller.

(5) Telecommunications Connections

Telecommunication circuits (if specified) shall be terminated within the controller case through a separate conduit. The termination point shall consist of a firmly anchored telecommunication box containing a line isolation unit for fixed lines, or encompassing a master termination box (telephone type socket) for dial-up PSTN connections (To be agreed in the FSD or advised by the Engineer during system expansion). The Engineer may specify a separate, termination and test, access panel on the controller cabinet.

Ducting from the controller case to the nearest telecommunication chamber or pole shall be provided, and remain separate from all other ducting.

The location of the telecommunication chamber (where applicable), shall be agreed on site

with the Engineer.

(6) Modes of Operation

The traffic signal controller shall be capable of operating in the following modes:

- i. Full Computer Control;
- ii. Linked and coordinated by means of synchronized clock (cable-less);
- iii. Vehicle Actuated (VA) or Isolated;
- iv. Hurry call for priority to particular movements (e.g., ambulance, fire brigade, other emergency vehicles, VVIP vehicles/ motorcade etc.);
- v. Manual intervention and option for setting different phase cycle for different time duration (minimum time duration 60 minutes), option for always green/red (as per requirement) traffic light;
- vi. Amber flashing on all approaches for linkage with pedestrian push-buttons and signals and coordinated controls; and
- vii. Fault Mode – either blacked out or hardware flashing yellow displays.

The priority mode (in future) shall be that of control by a central computer. Real time – second – by – second monitoring shall be the preferred option, but this ultimately depends on the type of communications available or approved by the Engineer. Real time monitoring may not be achievable in the absence of fixed telecommunication / fibre optic circuits. Until the stage of establishment of the Regional Traffic Management Centre (RTMC), the priority mode will be vehicle actuated or isolated mode by time of day. The controller shall however be capable of resorting to fully adaptive, real time detection and signal time assignment with computer control in the regional or central traffic management centre.

The contractor shall establish the availability of landlines or Fibre Optic Network (FON) or other proposed modes of communications where applicable.

In the event of a loss of communications or computer control or any fault, each controller should immediately revert to (CLF) cable less linking mode and failing that should then fall-back to vehicle actuated mode, or as programmed by the operators.

(7) Controller Facilities

The controller shall incorporate the following basic facilities:

- Capability to switch, operate, monitor type approved LED vehicles and pedestrian signal heads including (a) dimming of the LED displays; (b) monitor "last red" for all vehicle displays including arrow, Bus, Cycle displays with minimum 5W undimmed power for each aspect;
- Up to 32 vehicle movements to include 8 pedestrian movements;
- Up to 48 vehicle detector inputs monitored for s/c or o/c;
- Up to 16 physical pedestrian pushbutton inputs monitored for s/c or o/c;
- Pedestrian demand acknowledgement output – e.g., 'wait' indicator
- Time of day control of pedestrian audio / tactile facilities;
- Time of day and light sensor control of dimming facilities;
- Maximum Green timing control for each stage – 3 selectable sets per stage;
- Minimum Green selectable for each stage/phase movement;

- Vehicle Amber or Yellow adjustable and with s/w flashing control;
- Controllable clearance intervals for pedestrian movements;
- Selectable Flashing Red Man or Flashing Green Man clearances;
- All Red time adjustable between stage/phase changes;
- Inter-green time adjustable dependent on controller stage/phase movements;
- Stage extension timers associated with VA control – 3 per phase;
- Late start and Early Cut Off (ECO) timing facilities for phase movement control;
- Lamp failure monitoring facilities for each lamp of each phase;
- Full conflicting displays monitoring (green versus green or loss of reds);
- Hand Held Terminal (HHT) facilities for on-site maintenance;
- Integral self-tuning detectors and test functions (e.g., group flash, lamp loads);
- Detector fault monitoring (open circuit, short circuit and occupancy);
- Integral modem facilities for computer control;
- Up-loadable and downloadable timings and linking plans;
- Non-corruptible safety timings (usually held in EPROM);
- Input and output monitoring for detectors and pedestrian pushbuttons;
- Programmable general-purpose inputs and outputs;
- Stage/phase hurry call facilities – e.g., bus priority or emergency vehicle or VVIP vehicles;
- Stage/phase call/cancel facilities;
- CLF – 10 plans and 20 Time of Day / Week schedules;
- Manual selection of either Vehicular Activation (VA) or CLF modes for maintenance
- Comprehensive remote fault monitoring (Control Centre) for the following:
 - Controller on/off (by fault or power failure);
 - Controller in flashing mode;
 - Operational mode – CS - CLF – VA – Manual- Hurry call- Amber flashing
 - Dimming on/off;
 - Display conflict or loss of Reds;
 - Lamp failure;
 - Vehicle detector or pedestrian pushbutton failure;
 - Faulty general-purpose inputs or outputs

In addition, the controller should be able to remotely count traffic as configured – volume and occupancy – and to download such data as a basis for selectable plan changes. The exact features and operational design shall depend on the system approach to adjusting the control of timings in order to meet changes in traffic demands.

Controller programming facilities shall be configurable in every respect by a PC based programme that shall produce an EPROM (or some other non-volatile method) holding the controller basic operational dimensions and safety timings. Up-loadable and downloadable information for day-to-day controller traffic operations may be held in RAM or as directed in real time from the regional or central TMC computer (provision for future) and the controller (now).

All controller manual stage selection buttons (where specified) shall be clearly identifiable as defined in the controller specifications or as otherwise agreed with the Engineer.

(8) Computer Control and Monitoring

The competent Authority of GON shall set the standard for controller compatibility within the preferred ITS System Architecture. At that time and thereafter - all controllers shall be fitted with all necessary interface equipment for remote monitoring and on-line real-time monitoring capabilities.

All intersection traffic signals and pedestrian crossing installations shall be capable of supporting on line control and monitoring equipment as advised by the DOR.

The Adaptive Traffic Control (ATC) system shall be based on strategically placed detectors (or virtual imaging detectors) throughout the East West Highway that shall feedback data on saturation and volumes to the TMC (when established in future). Based on this data the central control computer (or the local controller - if specified in the programming) shall allocate priority by selective phase introduction, and/or set plan selection or phase movement times and cycle times for the system controllers in the network. Strategic detectors (real or virtual) may be included as Vehicular Actuation (VA) or Bus actuated in the future) detectors at any particular intersection or crossing.

In accordance with the capacity building process, it is envisaged that all intersections shall eventually be connected to a central computer, for part-time or full-time control and monitoring. This communication facility may consist of a standard two-wire telephone landline circuit that may consist of a dedicated point-to-point connection or FDN. It is not envisaged to utilise a PSTN dial-in and dial-out connection for traffic control. Interface modems in the controller should be integrated in the rack or on board the CPU.

Separately, and in future plans, a cellular network or Private Mobile Radio network based system may be incorporated for Fleet Management, Ticketing, Weather Information, VVIP movement and Bus Information and in this regard each bus or VVIP vehicle shall transmit a priority call to any intersection traffic signal controller. Traffic controllers shall be capable of receiving and relaying such radio signal inputs.

(9) Detection – Vehicles and Pedestrians

Vehicular Actuation (VA) detection and pedestrian push button Unit (PBU) detection shall be supported at all traffic signal installations.

Pedestrian crossings shall use detection as defined by the DOR at the time of bidding. This will consist of inductive loop detection or virtual imaging detection for the vehicle lanes. The DOR may stipulate Pedestrian presence detection or on-crossing detection at the time of bidding.

Intersection traffic signal equipment shall initially be installed with inductive loop or virtual imaging detection for the vehicle lanes. In accordance with the capacity building programme of the DOR, loops (inductive or otherwise) will have a tactical and strategic designation. In general, one loop per approach (whether inductive, actual or virtual) is deemed adequate by the DOR and its position shall be near the stop-line, or as directed by the Engineer. Vehicle or bus queue/flow loops may also be required to support the planned ITS control and monitoring facilities. Additional loop detectors if any proposed are as provided in the BOQ.

(10) Vehicle Actuated - Isolated Operation

Isolated controllers should support operation in VA mode and make best use of maximum green timings in order to achieve optimum operation. At least 3 sets of scheduled maximum

green times shall be provided. Unused max green time from a movement should be capable of transfer to any other movement. Also, if a movement is to be skipped out of a sequence its maximum green time should be available to the running movement, or transferable to any other movement.

(11) Facilities for Pedestrians / Cyclists and Disabled Road-Users

It is the policy of the DOR to provide facilities for visually and aurally impaired road-users and those with mobility disadvantages. All new traffic scheme installations in the national highways shall (as agreed in the specific and detailed design), be provided with suitable facilities for these road-users. At the appropriate time facilities for cyclists may also be stipulated for any specific scheme. In particular, the following points should be noted:

- Dropped kerbs and 'T' shaped tactile paving aprons may be specified in some cases and shall therefore be provided as agreed in the contract or with the Engineer.
- Tactile and/or audio-tactile signals shall be provided in pushbutton units and connected in accordance with the Final System Design (FSD) or as directed by the Engineer. Audible signals shall not be provided unless the all red phase for vehicles is present. Similarly, tactile signals can only be used if all vehicles in conflicting directions can be signalled to stop.
- If the signals displays are off or in flashing yellow mode, the tactile and audible facilities shall be inoperative.
- Fall-back flashing yellow must be provided from a separate hardware flasher within the controller.

Push Buttons shall be installed so that pedestrians are prompted to look towards the nearest approaching traffic stream whilst pressing the button. Additional push buttons may occasionally be required and provided if instructed by the Engineer. Push Button Units shall operate at ELV 50 Hz.

(12) Selected Vehicle Priority (SVP)

Selected vehicle priority technology is constantly evolving and becomes available in many options for many different vehicles and transport modes. No particular option is discounted by the DOR and each shall be considered on its merit at the time of the Invitation to Tender (ITT). The SVP shall be specified indicatively at the time of bidding. In general, all traffic systems and control equipment shall support:

For Buses:

- An inductive loop system (or virtual imaging system) usually used for selective signal control or hurry call
- Special bus transponders for remote monitoring and selective signal control
- Reception of Short Range Radio signal for controller and/or ATC instructions

For Priority Vehicles (Ambulance, Fire Truck, VVIP)

- Strategically placed inductive loops for selective signal control (or virtual loops)
- Special tag / transponders for remote monitoring and computer signal control

- Hurry Call for Emergency Vehicles (Ambulance or Fire Tender) - Usually 'hurry call' facilities based on a manual input (e.g. fire station emergency button), or selective loop positioned in order to call a special stage or phase movement, and to send a message to a central computer.

(13) LED Lanterns – General Requirements

Vehicle signal heads shall be of a sturdy moulded construction and fitted with backing boards, appropriate visors or hoods. The aspects shall be supplied with LED type technology for both vehicles and pedestrians and complete technical details shall be submitted at the time of bidding and must be finally agreed with the Engineer prior to installation. In general, the vehicle signal head should conform to the requirement detailed below.

Traffic signal display sequences shall be agreed during the FSD process. The contractor shall provide sequences for each intersection in a summarized tabular form for approval by the Engineer. Signal head and aspect configurations shall be shown on intersection detail shop drawings of intersections prepared by the contractor and the same submitted to the Engineer for approval.

The Colour displays shall be as follows:

- Green / Amber / Red - to vehicles (Flashing Amber as directed)
- Green Man / Flashing Red Man / Steady Red Man - to pedestrians

Single multi-colored aspects or animated aspect displays are not acceptable.

The fabrication and supply of all components for the traffic signal heads shall conform to relevant AS, BS standards and specification.

The electrical requirements of the LED vehicle signal head shall also be clearly stated by the contractor for the specific manufacturer, but in general should conform to or exceed relevant AS or BS including the capability to operate at the following voltages.

The Contractor shall furnish details for the proposed specific manufacturer to the Engineer for approval but in general the lanterns should conform to, or exceed relevant AS or BS within a temperature range of -25° to 70° C.

Signal head assembly and backing board shall be able to withstand wind speeds up to 160 kmph in any direction.

The minimum electrical requirements are as follows:

- 180V to 240V AC main supply for LV installations
- 42 V AC for ELV installations
- 12 V DC for solar installations
- Capability to operate on both 180V to 240V AC or 42 VAC with minor modification
- LV Maximum load Undimmed = 15 Watts
- LV Minimum Load Undimmed = 5 Watts (For ELV = 3W)
- Maximum Power use in shut down mode undimmed = 0.6 Watts
- Luminous intensity in the dimmed state = 50% to 75% of undimmed

The lantern bodies shall be of adequate strength and durability in order to withstand the conditions during installations and normal operations. Lanterns shall be dust-proof, weather-proof against corrosion and not suffer any significant deterioration or degradation from direct

sunlight.

All traffic signal heads, displays and associated hardware should have Type Approval from the concerned approving agency in the country of origin and should be compatible for operation and full function of the traffic signal controller proposed for this contract.

(14) LED Lanterns - General Specification

In general, signal lanterns should meet and agree with ISO 9001:2000 certification

Luminous intensity should comply or exceed EN12368. Other requirements include:

- No LED dots should be visible and there should be a uniform signal glow as with a single light source aspect
- A high Anti-Phantom Performance is required (Class 5)
- Aspects shall have a Low Power Consumption and Brilliant Light Output
- All products shall be traceable by Serial Number
- Aspect Masks shall allow for any Symbol Display
- The Life Cycle shall exceed 5 Years
- Degradation shall be reduced to a minimum by optimum heat balance
- Aspects shall exhibit Automatic Light Compensation in the case of individual LED failures
- LEDs shall be capable of Dimming Function Control by reduced voltage

The rear-side of the pedestrian signal head should have the manufacturer's name, model number, serial number engraved. In addition, the operating characteristics such as nominal operating voltage, power consumption, VA, load for the walking and standing person display, standard specification that the signal head conforms to, etc., should also be labelled on the backside.

(15) Requirement:

Requirement of accessories for 4-Way, 3-Way and Signalized Pedestrian Crossing are as follows:

i. Supplying, installing, testing, commissioning, remote monitoring and providing advice on operation and maintenance of traffic lights at 4 way intersections with the following items included, all complete:

- a) Beacon controller- 18 signal groups and 8 loop detectors with 1xCentral Management Unit (CMU), 3xLamp Control Unit (LCU), 8XLoop detectors, and 1xUSB Memory Stick for Personality No, Dimming No 5-position Manual Facility Switch No independent Flasher with complete set;
- b) Traffic Software License required for controller;
- c) Beacon BX0-86-30-18-00 Equipment Plate with Logic Rack for 18 signal groups and 6 loop detectors with 1xCMU, 3xLCU, 4 loop detectors and 1xUSB Memory Stick for Personality;
- d) Lamp Control Unit (LCU) with 18 signal groups;
- e) Central Management Unit (CMU) with built-in LED indicators, SD Memory Slot, Ethernet Port, USB and Serial Ports;
- f) Hand held terminal 4 for operators with 1 spare (total 5);
- g) Media XML communication interface for queue length data;
- h) Spare Stop Line Camera Detector for commissioning;

- i) Controller Flasher Module;
 - j) Police (Facility) with required positions;
 - k) GPS Clock and related hardware for Controller;
 - l) 4X Stop Line camera detectors;
 - m) Camera Interface Unit (CIU).
- ii. **Supplying, installing, testing, commissioning, remote monitoring and providing advice on operation and maintenance of traffic lights at 3 way intersections with the following items included all complete**
 - a) Beacon controller- 18 signal groups and 6 loop detectors with 1xCentral Management Unit (CMU), 3xLamp Control Unit (LCU), 6XLoop detectors, and 1xUSB Memory Stick for Personality No, Dimming No 5-position Manual Facility Switch No Independent Flasher with complete set;
 - b) Traffic Software License required for controller;
 - c) Beacon BX0-86-30-18-00 Equipment Plate with Logic Rack for 18 signal groups and 6 loop detectors with 1xCMU, 3xLCU, 4 loop detectors and 1xUSB Memory Stick for Personality;
 - d) Lamp Control Unit (LCU) with 6 signal groups;
 - e) Central Management Unit (CMU) with built-in LED indicators, SD Memory Slot, Ethernet Port, USB and Serial Ports;
 - f) Hand held terminal 4 for operators with 1 spare (total 5);
 - g) Media XML communication interface for queue length data;
 - h) Spare Stop Line Camera Detector for commissioning;
 - i) Controller Flasher Module;
 - j) Police (Facility) with required positions;
 - k) GPS Clock and related hardware for Controller;
 - l) 3X Stop Line camera detectors;
 - m) Camera Interface Unit (CIU).
- iii. **Supplying, installing, testing, commissioning, remote monitoring and providing advice on operation and maintenance of traffic lights at signalized pedestrian crossings with:**
 - a) Beacon controller- 6 signal groups and 4 loop detectors with 1xCentral Management Unit (CMU), 3xLamp Control Unit (LCU), 4XLoop detectors, and 1xUSB Memory Stick for Personality No, Dimming No 5-position Manual Facility Switch No Independent Flasher with complete set;
 - b) Traffic Software License required for each controller;
 - c) Beacon BX0-86-30-18-00 Equipment Plate with Logic Rack for 6 signal groups and 4 loop detectors with 1xCMU, 3xLCU, 4 loop detectors and 1xUSB Memory Stick for Personality;
 - d) Lamp Control Unit (LCU) with 18 signal groups;
 - e) Central Management Unit (CMU) with built-in LED indicators, SD Memory Slot, Ethernet Port, USB and Serial Ports;
 - f) Hand held terminal 4 for operators with 1 spare (total 5);
 - g) Media XML communication interface for queue length data;
 - h) Spare Stop Line Camera Detector for commissioning;
 - i) Controller Flasher Module;
 - j) Police (Facility) with required positions;

- k) GPS Clock and related hardware for Controller;
- l) 2X Stop Line camera detectors;
- m) Camera Interface Unit (CIU).

(16) Measurement and Payment

Supplying, installing, testing, commissioning and providing training on remote monitoring, operation and maintenance of the traffic signals/system shall be measured in number¹ of intersection and shall be paid as per the respective contract unit rate which shall be the full and final compensation to the Contractor as per Clause 112.

FOR REFERENCE ONLY

¹ Number of intersections shall be measured in such a way that "Supplying, installing, testing, commissioning and training on remote monitoring, operation and maintenance of traffic signal/system in the intersection under consideration shall be measured as one number"

Section 1600-Piling for Structure

Delete first and second sentence of Sub clause 1612 (1) and replace with the following:

All the piles shall be lined with 6mm thick permanent MS casing from bottom of pile cap to 0.5m below the maximum scour level.

Add the following sub section as 1612 (5) (a) Viii

1612 (5) (a) Viii: While carry out the pile boring to placing of concrete, necessary testing, construction of pile cap and sub structure the Contractor shall make necessary arrangement to protect the stability and protection of existing structures. The Contractor shall start the work after providing such arrangement to the satisfaction of the Engineer.

Insert the following above last paragraph of sub section as 1612 (5) (b)

The Contractor shall propose the requirement of any protection arrangement as mentioned in sub section 1612 (5) (a) Viii to the Engineer for his approval. Unless otherwise specifically instructed by the Engineer about type and design of the protection work, the Contractor shall arrange sheet pile with required retaining capacity so as to maintain the stability and safety of existing structure.

Replace last sentence of 1612 (6) (a) by:

Drilling/Boring works for pile is allowed only with rotary or oscillator type drilling equipment. Percussion hammer drilling/DTH Hammer drilling/vibratory type of drilling like water or air jetting for boring of piles shall not be allowed. Use of other methods of borehole stability is subject to approval by the engineer.

Add the following after first sentence of 1612 (6) (b):

Boring /Drilling of the piles is preferred in a staggered pattern.

Replace clause 1612 (7) by the following:

Stability of borehole shall be ensured by use of temporary casing of approved quality. Use of other methods of borehole stability is subject to approval by the engineer. As well as the Contractor shall ensure the stability of the existing structure during the construction of the new bridge.

Replace the last paragraph under 1614(1) with the following:

The Contractor shall carry out the loading test on test pile as specified in sub section 1614(2) and 1614 (3). Before constructing the pile works the Contractor shall construct a test pile to the location as specified by the Engineer and perform the above-mentioned loading test. If the test results are found to the satisfaction of the Engineer the pile shall be a part of permanent structure.

Add following Sub Clauses 1614 (5) after sub clause 1614(4) "Pile Integrity Test" as below.

(5) PDA Test –Foundation Piles

The Contractor shall carry out the following High Strain Dynamic Test (popularly known as Pile Dynamic Analyzer or PDA) on;

- a) Foundation piles on which load test will be carried out,

- b) One of working piles selected by the Engineer in each sub structure with pile foundation.

i. Specification

- a) The purpose of high strain dynamic testing shall be to obtain pile capacities for bridge foundation piles with a higher confidence level than obtainable with a static load test. This shall be achieved by correlating dynamic tests with static load tests on pilot piles.
- b) The equipment for dynamic testing shall be 'Pile Dynamic Analyzer'(PDA) or similar approved equipment conforming to the requirements of as finalized by the Engineer.
- c) Ram weight, height of fall, cushioning (wood + steel plate) to prevent damage to pile head shall all be in accordance with standard documented international practice.
- d) This work shall be carried out by a specialist sub-contractor who shall employ a professionally qualified engineer with a minimum of 5 years of experience in pile dynamic testing using PDA or similar equipment. He shall be in charge of testing and interpretation of results. He shall present himself at least by video contact for interview prior to being engaged.

ii. Number of Test Piles

Dynamic pile testing shall be carried out on one working pile for each substructure with pile foundation as selected by the Engineer. However, the Engineer may reconsider the total number of piles to be tested depending on the quality of results.

iii. Test Report

On completion of all field work, the specialist engineer shall prepare a final report covering all aspect of pile load-settlement behavior including ultimate tip resistance and ultimate shaft resistance. This final report shall incorporate results of the PDA monitoring, and results of all CAPWAP-Case Pile Wave Analysis Program computer analyses. The results of CAPWAP analysts shall be compared to the PDA results and correlations shall be drawn between the CAPWAP results and the PDA field monitoring results.

Add following text at the end of the first paragraph of clause 1616 (2) "Loading Test"

"Loading test shall be carried out on working pile of one in each bridge"

Rewrite the second paragraph under Section 1617 "Measurement" as below:

For cast-in-situ driven and bored concrete piles of specified cross-section, the measurement, for boring and providing & installation of 6mm thick permanent steel casing casing from bottom of the pile cap upto 0.5m below the maximum scour level and as specified in 1614 (1), shall be the length in metres of the accepted pile that remains in the finished structure complete in place. Reinforcement in cast-in-situ driven and bored concrete piles shall be measured for payment as per Section 2000

Rewrite the third paragraph under Section 1617 "Measurement" as below:

Boring, installing 6mm thick steel casing, reinforcement, concreting for the test pile shall be measured under relevant items in the BOQ separately. But the loading tests on test pile

(working pile) as mentioned under 1614 (2) shall be measured in number.

Please delete second last paragraph under Section 1617 "Measurement".

The Pile integrity test shall not be measured separately. It is deemed to be included in the relevant item in the BOQ.

High Strain Dynamic Test (popularly known as Pile Dynamic Analyzer) shall be measured in number.

Please add the following at the end of the Section 1617

The measurement of the protection work (sheet pile) done for the existing structures as per 1612(5a, viii) and 1612 (5b) shall be made in square meter (depth x length).

Please delete the contents under section 1618 "Payment" and replace with the following:

The payment for cast-in-situ driven and bored concrete piles of specified cross-section, for boring and providing & installation of 6 mm thick permanent steel casing as specified in 1614 (1) and those specified in Clause 112, shall be made at the contract unit rate

Reinforcement in cast-in-situ driven and bored piles shall be paid at the contract unit rate as specified in Section 2000. Concrete and reinforcement in pile cap shall be paid separately at the contract unit rate as specified in Section 2000.

Pile shoes when called for on the Drawing or by the Engineer shall not be paid for separately, but full compensation for all the work involved in supplying and fitting pile shoes shall be considered as included in the unit rate for pre cast concrete piles and no additional compensation shall be allowed.

Splicing of piles, when allowed, shall not be paid for separately but full compensation for all the work involved shall be considered as included in the unit rate from pre cast concrete piles.

Additional quantities of concrete, reinforcement and form work, caused by incorrect location of piles or additional piles necessary to replace defective piles shall be at the Contractor's expense.

The Payment of the protection work (sheet pile) done for the existing structures as per 1612 (5a, viii) and 1612 (5b) shall be made as per the respective BOQ item rate.

No separate payment shall be made for the Pile Integrity test.

High Strain Dynamic Test shall be paid at the contract unit as provisioned in Bill of Quantities which shall be full compensation for Pile Instrumentation, Accelerometer, Strain transducer, Pile Driver Analyzer, Impact Pile Driving Hammer, labour, transportation, professionals, recording and reporting including all incidentals necessary to complete the test.

Loading tests on Test piles (working pile) shall be paid at contract unit rate which shall be full and final compensation for the cost of all operations and incidental costs associated with testing operation thereof in addition to those specified in Clause 112.

Whatsoever the written above, the rate shall also include the cost of undertaking 'confirmatory sub-soil investigation' as per Clause 1619, boring equipment, standard penetration testing, split spoon sampling, boring, excavation, concreting, inspection and control, cutting off, welding, coupling and all related tools, rigs, cranes, jets, frames, leads, labour, barge mounted platform/island of adequate sizes and other incidental equipment and work necessary to complete the work.

Add new Clause "1619 Ground Conditions"

1619 Ground Conditions:

No responsibility is accepted by the Engineer or the Employer for any opinions or conclusions given in any factual or interpretative Site Investigation Reports. The Contractor shall report immediately to the Engineer any circumstances which indicates that in the Contractor's opinion the ground conditions differ substantially from those reported in or which could have been inferred from the site investigation reports, geotechnical design report, or from pilot pile test results or from trial boreholes SPT values and tests.

The Contractor shall drill one borehole at each pier and abutment to the design depth of the piles at that location. The bore log shall be provided to the Engineer within three days of the completion of each borehole for his assessment of the consistency of the sub surface conditions with those used for design. No separate payment will be made for such boreholes.

The pile lengths shown on the Drawings are design lengths. Final pile lengths will be determined in the field by the Contractor and approved by the Engineer after considering the pilot pile load test results. If the results vary significantly the Engineer may order confirmatory subsoil investigation.

(1) Confirmatory Sub Soil Investigation

(a) Boreholes

Confirmatory boring and sub soil investigation during construction shall be carried out by the Contractor,

(b) Boring

Boring shall be carried out in accordance with the provisions of AASHTO T-86 or ASTM D 420 and ASTM D 1452 as agreed with the Engineer. Field identification and logging of soil samples shall be made in accordance with the Unified Soil Classification System (USCS).

Before taking any undisturbed samples or making any in-situ test, the lining shall be carried down to the bottom of the borehole at the test depth. Augers of proper size shall be used in very soft to soft clays and silts to avoid suction, the use of shell shall only be restricted to moderately stiff to very stiff and hard clays and also in sandy strata below water table. The use of a chisel will be permitted only in boulder or rock formation or through local obstructions etc.

Uncased boreholes may be permitted only up to a depth where, the sides of the hole can stand unsupported. In case side fall or squeezing is noticed, steps shall be taken immediately to stabilize the sides of the borehole by casing pipes as directed by the Engineer. Use of bentonites slurry of 5% concentration may be permitted to stabilize the borehole.

No water shall be added while boring through cohesive soils and cohesion- less soils above the water table. While boring through cohesion- less soil below the water table, the water level in the casing shall always be maintained at or above the water table. The cuttings brought up by the auger, shell or the split-spoon or undisturbed sampler shall be carefully examined and the soil description duly recorded after performing field identification tests.

After completion of the boring at any borehole, a bore log shall be prepared in an approved standard template in consultation with the Engineer and submitted to the Engineer in triplicate. After observing the position of the water table after 24 hours, backfilling of the borehole shall

be carried out with approved materials and in a manner as directed by the Engineer.

(c) Standard Penetration Test (SPT)

SPT tests will be carried out in accordance with the procedure in AASHTO T-206 or ASTM D-1586 at 1.5 m interval or at every identifiable change of strata, whichever is earlier. The driving of split-spoon shall be recorded for every 150 mm of penetration until the total penetration is 450 mm.

Boring shall be terminated when a combined 100 blow count (from SPT) is recorded for 300 mm of penetration or less in the borehole. Other conditions for termination of SPT and subsequently, the borehole are as follows:

- i. 50 blows produce less than 150 mm advance
- ii. 10 successive blows produce no advance

When termination conditions are met, the borehole log shall show the number of recorded blows for the amount of penetration e.g. 70/100 (or 50/100) will indicate that 70 (or 50) blows resulted in a penetration of 100 mm.

N-values as observed in the field shall be reported in the bore logs without any correction for overburden and water table.

(d) Disturbed Samples

Disturbed samples shall be taken from borehole cuttings and split-spoon for visual classification tests at the site. The samples shall be taken at 1.5 m intervals or at every identifiable change of strata, whichever is met earlier to give a reliable record of the variations in the conditions of the soils. Disturbed samples shall be sent to the laboratory in air-tight plastic container with proper labelling for the purpose of record and laboratory testing.

(e) Undisturbed Samples

Undisturbed samples (75 mm diameter) shall be collected in good quality thin walled seamless Shelby Tubes conforming to the ASTM D-1587/AASHTO T-207 from cohesive soil strata. No SPT shall be conducted immediately before collection of an undisturbed sample.

Undisturbed samples shall be taken from the boreholes at following intervals or at every identifiable change of strata if met with earlier.

0.00 m to 15 m @ 1.5 m interval 15 m and above @ 3.0 m interval The size of the thin walled sampler should be such that a sample having a minimum size of 75 mm diameter and 450 mm length can be recovered. The sampler shall be pushed straight by jacking in soft to firm deposit and no hammering shall be allowed. Use of thick wall samplers may be permitted in case of deposits having very high consistency, subject to the approval of the Engineer. Recovery ratio shall be observed and reported in the boreholes, for every sample. The top and bottom of a sample must be indicated clearly on the sample tube to facilitate laboratory testing in proper orientation.

(f) Handling and Labeling of Samples

The following conditions of handling and protection of undisturbed samples shall be undertaken on undisturbed sample.

- a) Immediately after being taken from the borehole pit, the ends of the sample shall be cut and removed to a depth of about 25 mm (or more in the top to cover any obviously disturbed soil). Several layers of molten wax should then be applied to each end to give a plug about 25 mm thick. If the sample is very porous a layer of waxed paper should first be placed over the ends of the sample. Any space left between the end of the samples tube and the top of the wax should be tightly packed with saw dust or other suitable material, and a close fitting lid or screwed cap shall be placed on each end of the sample tube. The lids should, if necessary, be held in position by adhesive tape.
- b) A label bearing the number of the sample, borehole number, depth of sample, date etc., shall be placed inside the container just under the lid. It shall be placed at the top of the sample, In addition, the number of the sample shall be painted on the outside of the container, and the top or bottom of the sample shall be indicated.
- c) Undisturbed soil sample tubes shall be placed in a stout wooden box and packed with moist saw dust, paper, etc. to prevent damage during transit to the laboratory.

(g) Dispatch of Samples

Samples shall be dispatched to the laboratory as soon as possible after being obtained and shall not be allowed to accumulate on site. If it appears to the Engineer that there is a danger of samples deteriorating through further storage, the contractor shall dispatch such samples as soon as directed by the Engineer.

(h) Groundwater Table Measurement

Groundwater table shall be measured 24 hours after drilling and shall be recorded in the bore log.

(i) Laboratory Tests

Laboratory tests shall be carried out as per relevant AASHTO or ASTM specifications, the results of all tests shall be submitted in the template approved by the Engineer

(j) Reports and Records

On completion of each borehole, three copies of each bore log shall be submitted to the Engineer, together with one copy of the list of disturbed and undisturbed samples taken from the borehole.

The bore log shall show:

- i. Ground level at borehole referred to the reduced level;
- ii. Co-ordinates of the bore hole location;
- iii. A detailed description of each stratum;
- iv. The position, type and identification of each sample and SPT value;
- v. Location of samples in bore log;
- vi. Any other site test results available;
- vii. The levels at which each separate ground water level is first encountered and at which it comes to rest (standing water level).

The Engineer shall select the samples and type of test to be conducted.

On completion of all field and laboratory testing, three copies of all the results shall be submitted to the Engineer in hard and digital format.

(k) Measurement and Payment

There shall be no separate payment to the Contractor for the subsoil boring and testing. The cost for these investigations and related works is covered under payment under the relevant Clause of these Specifications.

FOR REFERENCE ONLY

Section 1900 – Bearings and Expansion Joints

1901 Expansion Joints

Add following Clauses after clause 1901(6) "Strip Seal Joint" and renumber 1901(7) and 1901(8) to 1901(9) and 1901(10)

(7) Compression Seal Expansion Joint

Compression seal joint consists of steel armoured nosing at two edges of the joint gap suitably anchored to the deck concrete and a preformed chloroprene elastomer/closed cell foam joint sealer compressed and fixed into the joint gap with special adhesive binder. The seal is supposed to remain in continual compression due to pressing of the seal wall against joint faces throughout the service life to ensure that the joint remains water tight and capable of repelling debris. Typical compression seal joint is shown in Fig.19.1

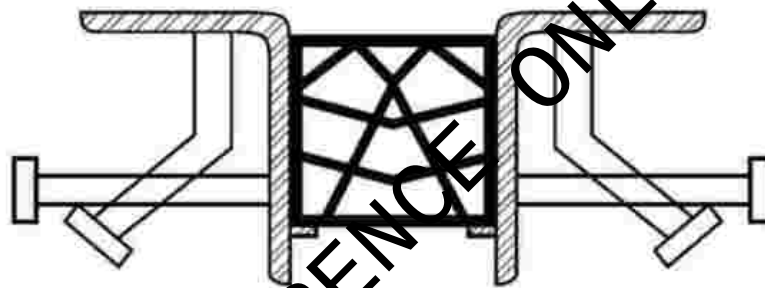


Fig. 19.1 Compression Seal Expansion Joint

Fabrication/ Pre-installation, handling and storage, installation and acceptance tests shall be same as sub clause 1901(6).

(8) Reinforced elastomeric Expansion Joints

This type of joint consists of reinforced elastomeric pads connected to a supporting steel structure which itself is cast into the concrete structure of the bridge. The joint accommodates movement by shear deformation of elastomer and opening and closing of grooves at upper and lower surfaces. The maximum movement is limited by the gap width. Typical reinforced elastomeric joint is shown in Fig19.2.

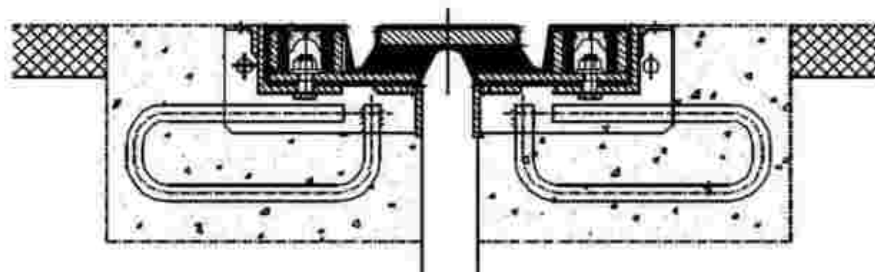


Fig19.2 Reinforced Elastomeric Expansion Joints

Fabrication/ Pre-installation, handling and storage, installation and acceptance tests shall be same as sub clause 1901(5).

Add following at the end of first paragraph of sub clause 1902 (4) "Elastomeric Bearing"

Proposed bridge are laminated type. For the laminated bearing the dimensions and properties shown on the drawings are tentative, based on IRC: 83-2018, Part II, Table B2. The actual design shall be carried out by the manufacturer on the basis of provided load and deformation data.

FOR REFERENCE ONLY

Section 2000 – Concrete for Structures

2004 The Design of Concrete Mixes

Add after Sub-Clause: 5(a)

The test cubes prepared during the trial mixes shall be designated preliminary test cubes and as such shall comply with Clause 2004 Sub-Clause 5(a) of the Standard Specifications.

The engineer shall require the contractor to make trial mixes and preliminary test cube at least 40 days before the start of concreting.

Add Sub clause (6) "Contractors Responsibility" after Sub clause (5) "Quality Control of Concrete Production":

(6) Contractors Responsibility

All necessary labour, materials, equipment, etc., for sampling, preparing test cubes, curing, crushing of cubes, etc. shall be provided by the contractor. The cube-crushing machine to be provided by the contractor, in accordance with this special provision, shall be approved by the engineer and shall be duly calibrated by an independent inspection agency approved by the engineer.

The machine shall be recalibrated at one (1) year interval or more frequently if instructed by the Engineer, all at the Contractor's expense.

Testing of other materials and concrete may be arranged by the Engineer in an approved independent laboratory at the cost of the Contractor in case the equipment is not operational or test facility does not exist at site.

As a confirmatory test, the Contractor shall carry out the third party lab test on his own cost upon the request of the Engineer.

2006 Transportation of Concrete

In the last paragraph delete from the end of first sentence "...shall not be longer than the initial setting time of the concrete" and substitute:

".. shall not be longer than 45 minutes. At the discretion of the Engineer, when the ambient air temperature is below 30 degrees Centigrade and conditions are suitable this period may be increased to 90 minutes but in no case shall it be longer than the initial setting time of the concrete."

2007 Placing of Concrete

(3) Placing Procedures

In the first sentence delete "...as nearly as possible in its final position." and substitute with:

"...as nearly as possible to and in no case more than 3 metres from its final position."

Add to the 8th Paragraph as a final sentence.

"In no case shall concrete be discharged from such devices at a height of more than 1.5 metres above its place of final disposition."

2011 Concreting in Hot Weather

(2) Concrete Placing in Hot Weather

Insert as Final Paragraph:

"Concrete shall not be placed when the ambient air temperature exceeds 40 Degrees Celsius unless the Contractor submits a proposal for special precautions and receives written approval from the Engineer."

2012 Construction Joint

Add after Clause 2012

The surface of the concrete against which fresh concrete is to be placed is to be maintained in a damp condition for 24 hours before placing the fresh concrete.

2014 Reinforcement

Add after Sub-Clause (4)

Prior to pouring the concrete all reinforcement placed in position shall be checked and approved by the Engineer.

FOR REFERENCE ONLY

Section 2100 – Pre-stressing

Insert new Clause 2119 “Lifting and Placing of Precast Girders” after 2118” payment” as follows:

2119 Lifting and Placing of Precast Girders

(1) Description

The Work shall consist of:

1. Lifting or launching of the precast post-tensioned girders from the precast yard;
2. Transportation if required;
3. Installation of the girders at the designated space on the substructure;
4. Securing the girders in place for further operations with necessary false work or bracings.

(2) Submittals

The Contractor shall submit the following to the Engineer, in accordance with this Specification, for his approval:

- a) A Girder Transportation Plan, if required, identifying the loading and transportation procedures, including the proposed route, schedule and traffic control procedures.
- b) A Girder Erection Plan comprised of a schedule and detailed procedure clearly illustrating the method and sequence by which the Contractor proposes to unload and erect the precast pre-stressed concrete girders.

The Girder Erection Plan shall include detailed notes and Shop Drawings, as necessary to describe the following:

- i. Access to undertake work, including earth berms, work bridges, and/or plat forms;
- ii. Type and capacity of equipment;
- iii. Sequence of operation, including position of cranes, trucks with girders, and traffic accommodation for all stages of unloading and erection;
- iv. Detailed crane position on the ground, particularly adjacent to substructure elements such as piers and abutments;
- v. Details of temporary supports, false work and bracings, including proposed methods to be used to ensure structure stability during further construction activities.

(3) Compliance

The Contractor shall strictly adhere to the following instructions:

During any operation of transportation or erection the girders shall be lifted by two nos of Crain, only by the lifting loops provided at both ends. In the absence of such loops the girders shall be lifted by holding at both ends, the position of grip or support being at the designated position of bearing centerline. Lifting the girder by any kind of grip or support towards the mid-span is strictly prohibited.

- a) The re-bars projecting outside the girder concrete surface, such as shear connector bars at the top or the dowel bar sat the positions of cross girders or diaphragms, or any other bar provided for the purpose of further construction shall

not be used for any operation of lifting, transportation or securing the girder in place. All such bars shall be kept in the shape shown in the drawings.

- b) Any kind of support, fulcrum or underpinning at any position towards the mid-span from the designated position of bearing centerline is strictly prohibited during storage, lifting, transportation or installation of the precast girders.

(4) Measurement and Payment

Unless specified otherwise in the contract, the item of lifting, transportation and installation of the girders shall be considered one job per girder and shall be measured and paid in number per girder. All the incidental costs including the submittals shall be considered included in the quoted rate.

FOR REFERENCE ONLY

Section: 2400 River Training and Protection Works

Add to the Sub clause 2402 (7) "Construction" paragraph (v) "Filling" following:

"Stones obtained from dismantling of existing stone masonry works and Gabion structures may be used by the Contractor for the permanent work if they comply with requirement of the Specification."

FOR REFERENCE ONLY

Section 2600 – Masonry for Structures

2603 Construction

(1) General

Add the words "levelled, compacted" after the word "cleaned" in the first sentence of fourth paragraph.

FOR REFERENCE ONLY

Section 2800 – Bio-Engineering Works

2802 Provision of Seeds

(2) Tree and Shrub Seed Collection

Delete Clause 2802 (2) (f) and substitute:

- (f) Seeds shall only be collected when fully ripe. Seeds collected early shall not be accepted. The Contractor shall be held liable if the germination rate of seeds is lower than the rates given for each species in manuals and information bulletins published by the Geo- Environmental Unit of the Department of Roads or the Ministry of Forests and Soil Conservation.

2803 Provision of Plant Cuttings

(2) Provision of Hardwood Cuttings

Delete Clause 2803 (2) (g) and substitute:

- (g) Hardwood cuttings are to be 20 to 40 mm in diameter and 300 to 500 mm long for palisades, vegetated stone-pitched walls and for pegging jute netting; 450 to 600 mm for brush layers; and a minimum of 1000 mm long for fascines. These sizes should not be exceeded unless specified or approved by the Engineer.

Delete Clause 2803 (2) (h) and substitute:

- (h) For live check dams, all cuttings are to be 2000 mm in length; the cuttings for cross pieces should be 20 to 50 mm in diameter and the truncheon cuttings for the vertical elements should be 30 to 80 mm in diameter: truncheon cuttings are made from the species listed in Clause (i) below. These sizes should not be exceeded unless specified or approved by the Engineer.

Delete Clause 2803 (2) (i) and substitute:

- (i) Once cuttings have been made, they shall be wrapped in wet hessian jute immediately. At all times, cuttings shall be kept moist and as cool as possible, and shall be wrapped in wet hessian between all operations such as taking from the parent plant, trimming and planting. Under any circumstances, all cuttings shall be planted the same day that they are made.

(1) Provision of Bamboo Cuttings

Delete Table 28.2: Types of bamboo cuttings and substitute:

Table 28.2: Types of Bamboo Cuttings

Local name	Botanical name	Best propagation	Details
Choya/tam a bans	<i>Dendrocalamus shamiltonii</i>	Rhizome cuttings / Single node culm	Rhizome cuttings: culm 2500-3000 mm length, leave all branches; rhizome 300-500 mm. Single node Culm cuttings: 1 node and

Local name	Botanical name	Best propagation	Details
			150mm of culm each side, straight and fine cut, main branch should be 200-300 mm long.
Dhanu bans	<i>Bambusabalcooa</i>	Rhizome cuttings / Single node culm	Rhizome cuttings: culm 2500-3000mm length, leave all branches; rhizome 300-500mm. Single node culm cuttings: 1 node and 150mm of culm each side, straight and fine cut, main branch should be 200-300 mm long.
Kalo bans	<i>Dendrocalamus hookeri</i>	Rhizome cuttings / Single node culm	Rhizome cuttings: culm 2500-3000 mm length, leave all branches; rhizome 300-500 mm. Single node culm cuttings: 1 node and 150mm of culm each side, straight and fine cut, main branch should be 200-300 mm long.
Mal bans	<i>Bambusanutans (subsp. cupulata)</i>	Rhizome cuttings	Rhizome cuttings: culm 2500-3000 mm length, leave all branches; rhizome 300-500 mm.
Nibha/gho pi/ lyas bans	<i>Ampelocalamus patellaris</i>	Rhizome cuttings	Rhizome cuttings: culm 2500-3000 mm length, leave all branches; rhizome 300-500 mm.
Padang bans	<i>Himalayacalamushookerianus</i>	Rhizome cuttings	Rhizome cuttings: culm 1500-2000 mm length, leave higher branches; rhizome 200-300 mm.
Tharu bans	<i>Bambusanutans (subsp. nutans)</i>	Rhizome cuttings	Rhizome cuttings: culm 2500-3000 mm length, leave all branches; rhizome 300-500 mm.
Titenigalo bans	<i>Drepanostachyum intermedium</i>	Rhizome cuttings	Rhizome cuttings: culm 1500-2000 mm length, leave higher branches; rhizome 200-300 mm..

2806 Final Slope Preparation for Bio-Engineering

(2) Final preparation of fill Slopes for Bio-Engineering

Add, between Clauses (b) and (c) the following:

If backfilling is required behind a retaining structure, the trimmed material shall be compacted at intervals as the operation proceeds. This will require halting the trimming. The debris shall be redistributed and compacted as backfill. Compaction shall be carried out in level layers approximately 100 – 150 mm thick, laid back into the slope at about 5°. In dry conditions, water shall be added while compacting the material.

2807 Site Planting and Sowing

(2) Direct Seed Sowing of Shrubs and Trees on Site

Delete 2807 (2) (a) and substitute:

- a. The Contractor shall be required to carry out the sowing of shrub and tree seeds along the green belt, median, road side or any other location specified by the Engineer in accordance with the Engineer's specific instructions (if any).

Delete 2807 (2) (g) and substitute:

- (g) In some cases, the Engineer will instruct that seed shall be broadcast on to the slope. In this case, seeding shall be started at the top of the site, working down slope as evenly as possible so that the whole site is lightly covered. This shall be instructed where the site is still active and only warrants minimum expenditure, or where the site is naturally rough, providing plenty of niches in which the seed can catch. Quantities of seed shall depend on the type of seed involved but are generally half that of the quantities used in the nursery. With utis (*Alnusnepalensis*) seed it should be at a rate of 1 gram me of seed per square metre.

Delete 2807 (2) (h) and substitute:

- (h) **Measurement and Payment:** Work shall be measured in square metres on the basis of the actual area of surface over which seeds have been sown. The payment shall be the full and the final compensation to the Contractor for making arrangements for traffic control, providing seeds, all labour, tools, equipment, safety harness and incidentals to complete the work as specified herein. If the seeds are supplied through a separate contract, costs for the supply of the same shall not be included herein. However, if the Contractor is responsible for the supply and storage of seeds no separate payment shall be made for these items.

(3) Site Planting of Grass Slips and Cuttings

Delete 2807 (3) (e) and substitute:

- (e) All grass slips, whether supplied to the Contractor from a nursery (if so provided in the Contract) or otherwise obtained by the Contractor, shall be prepared for planting by the Contractor as given below. The Contractor shall transport them from the source wrapped in hessian jute. At all times, plants shall be kept moist and as cool as possible, and should be wrapped in wet hessian between all operations such as extraction from the bed, pruning and planting. Under any circumstances, all plants shall be planted in the same day that they are lifted from the nursery or other source.

(4) Site Planting of Shrubs and Trees raised in Polythene Pots

Delete 2807 (4) (a) second sentence and substitute:

- (a) The Contractor shall be required to carry out the planting of seedlings along the green belt, median, road side or any other location specified by the Engineer in accordance with the Engineer's specific instructions (if any).

(6) Brush Layering, Palisades and Fascines

Delete 2807 (6) (d) and substitute:

- (d) If the instruction to the Contractor includes the provision of cuttings, then the

Engineer shall specify the species and expected sources, and the Contractor must then obtain the cuttings required. This shall be done in the manner described in Sub-clause 2803 (2), wherein the size of the cuttings shall be 20-40mm in diameter and of length 300-500mm for palisades, 450-600 mm for brush layering, and a minimum of 1000mm for fascines.

Delete 2807 (6) (e) and substitute:

- (e) Cuttings of the following species, if specified for truncheons, shall be a minimum of 2000 mm in length: chuletro (*Brassaiopsishainla*), dabdabe (*Garugapinnata*), kavro (*Ficuslacor*), phaledo (*Erythrina species*) and Gliricidiasepium.

Delete 2807 (6) (k) (iv) and substitute:

- (k) (iv) Cuttings shall then be laid along each trench, so that they lie horizontally along the trench. There shall normally be eight cuttings together, although where material is short a minimum of four cuttings is permissible at the Engineer's discretion. They shall be over lapped so that no two ends coincide. Under no circumstances shall buds be damaged. The cuttings shall then be tied using jute or coir (coconut fibre) string at 500 mm intervals to form a bundle, as the fascine is created, it then forms a continuous bundle right across the slope.

2810 Site Protection

Add Clause 2810 (5) as follows:

(5) Fabrication and Placement of Steel Tree Guards

The Contractor shall provide steel tree guards as shown on the Drawings in place of the bamboo tree guards as specified in the Clause 2810 (2). No bamboo tree guards shall be accepted.

The steel tree guards shall be placed in line with the provisions detailed in the Clause 2810 (3).

No separate payment shall be made for the fabrication and placement of steel tree guards. All the associated cost is deemed to be included in the relevant item of tree and/or shrub plantation.

2811 Site Aftercare and Maintenance

Delete Clause 2811 (12) and substitute:

(12) Measurement and Payment

"No separate payment will be made for site aftercare and maintenance and all the associated cost is deemed to be included in the relevant item rate".

Add new Clause 2813 "Site Planting of Bamboo" as follows:

2813 Site Planting of Bamboo

- (a) The planting of bamboo is intended to replace or restore something of the natural vegetation on the slope to be treated. The Contractor is required to carry out the planting of seedlings to the Engineer's specific instructions.
- (b) The spacing of plants will be determined according to individual conditions. However, it will normally be at two meters across a slope and five-meters up and

- down the slope.
- (c) Select a suitable culm of the parent clump and dig out the rhizome carefully. Cut off the clump about two meters above the ground level. Cut the rhizome where it branches from the main plant, taking great care not to damage buds and small roots.
 - (d) Wrap the root ball in damp Hessian and transport the cuttings to site for planting on the same day
 - (e) Dig a hole (at least five times the size of the cutting rhizomes) and plant the rhizome either upright or at right angles to the slope. Carefully backfill the hole and firm the soil as much as possible.
 - (f) The Contractor is required to supervise all field operations very closely. The planting of bamboo is a delicate business and should be approached in the same way as the plant in go horticultural seedlings. The Contractor should employ experienced agricultural or forestry labourers for this work.
 - (g) Measurement and Payment:

The measurement shall be made in number of plants planted, counted and accepted by the engineer at site. The quantities measured shall be paid at the unit rates shown in the Bill of Quantities.

Add new Clause 2814 "Live Check Dam Construction" as follows:

2814 Live Check Dam Construction

- (a) The cuttings should be at least 2000 mm long and 50-80 mm in diameter made from woody material that is 6 to 30 months old. The contractor is to collect the cuttings from local area and transport them from there wrapped in hessian jute. At all times, cuttings are to be kept moist and as cool as possible. Under any circumstances, all plants supplied must be planted the same day.
- (b) Cuttings of the following species, if specified, should be a minimum of 2000 mm in length: dabdabe (Garugapinnata), kavro (Ficuslacor), phaledo (Erythrinasp) and Gliricidiasepium.
- (c) Spacing between check dams depends on the steepness of the gully slope and the profile of the floor. Live check dams should normally be at intervals of between three and five metres. Within check dams, cuttings should be about 30 to 50 mm apart.
- (d) Live check dams should be constructed as given below, unless specified differently.
 - i. Make a hole deep and big enough to insert vertical hardwood cuttings of the largest size available. Use a crowbar if necessary to extend the hole.
 - ii. Insert the vertical cuttings by carefully pushing them into the hole and firming the soil around them. Try not to damage the bark. They should protrude about 300 mm above the ground surface.
 - iii. Place long hardwood cuttings on the uphill side of the verticals takes.
 - iv. Backfill around the check dam and compact the soil.
- (e) Measurement and Payment: The measurement shall be measured separately as per the accepted final product in linear metre. The quantities measured shall be

paid at the unit rates shown in the Bill of Quantities.

Add new Clause 2815 "Measurement and Payment" as follows:

2815 Measurement and Payment

All the bioengineering items shall be measured in the respective units of the items of works specified in the Bill of Quantities (BoQ).

The payment of all the bio-engineering work items shall be made in two installments. First installment of 50% of the unit rate quoted in the BoQ shall be made after the completion of the works as per the Specifications and satisfaction to the Engineer. The second installment 50% of the unit rate quoted in the BoQ shall be made at the end of Defect Liability/Notification Period after carrying out the aftercare and maintenance of the bioengineering works that deem to be covered within the quoted rate, and acceptable to the Engineer.

Add new Clause 2816 "Priority on Bioengineering Works" as follows:

2816 Priority on Bio-engineering Works

The bioengineering works are very important to stabilize the side slopes. The Contractor shall require prioritizing the bioengineering works and stabilizing the side slopes before carrying out the bituminous works at the locations as instructed by the Engineer. In case of the bituminous works are carried out by the Contractor without carrying out the bioengineering works, and hence the bituminous works are damaged due to the slope failure in the absence of the bioengineering works, it is the responsibility of the Contractor to repair the bituminous works at his own cost. In no case, the Works shall be considered as completed unless the Contractor completes the bioengineering works to the satisfaction of the Engineer.

FOR REFERENCE ONLY

Section 2900-Maintenance of Roads

Delete Clause 2910 "Performance Based Maintenance of Roads" and Substitute by following:

2910 Performance Based Maintenance of Roads

2911 Performance Based Maintenance

(1) Description

This Section Performance Based Maintenance of Roads describes the works and services to be undertaken during Phase 2: Performance Based Maintenance Works.

The major objective of this works is to satisfy the road user with good accessibility, comfort, travel speed and safety, minimized the total system cost and environmental impacts.

Major works of this project is Improvement of the Kakadbhitta-Laukahi Section (120.62 km) of the East-West Highway. The performance based maintenance works is the one of the component of the whole works. After completion of the Improvement works the supervision consultant with consent of the Client will issue the improvement works completion certificate and then after the PBMC component will start.

For fulfilment of the above mentioned objectives the scope of works and services of PBCs may cover routine and recurrent maintenance or one or several of the other works and services involved in road network management and operation, improvement works, monsoon services, and emergency works.

In traditional road maintenance contracts, the Contractor is responsible for the execution of works which are normally defined by the Engineer, and the Contractor is paid on the basis of unit prices for different work items and quantities of works executed. In Performance Based Maintenance contracts, the Contractor is responsible to identify, plan and carry out the Works and Services to achieve and maintain the Service Levels (Management Service Levels and Operational Service Levels) specified in this Section. He will not receive instructions by the Employer and/or Engineer of what to do when, where and how as in traditional maintenance contracts, except for Emergency Works or Day Works.

The role of the Engineer, on behalf of the Employer, is to enforce the contract by verifying compliance with the agreed Service Levels and with all applicable legislation and regulations.

The Contractor will receive a Monthly Lump Sum Fee for the Performance Based Maintenance Works and Services. Payment reductions will be applied if the Contractor fails to comply with the Service Levels in any given month. Emergency Works are paid on unit price basis.

(2) Required Services

Two groups of services are required:

- Management Services; and
- Operational Services.

The management services include providing the information and data the Employer requires to manage the road asset during the Maintenance Phase of the Contract and to facilitate either the next tendering process or handover to the Employer, such as:

- Information on how the Contractor assures the quality of his services, manages the health and safety of his staff, manages emergencies, and manages traffic at the worksite;
- Contractor's work programs and schedules;
- Regular work progress reports;
- Inventory and Road Register updates and other data sharing requirements;
- Maintenance history;
- Management of enquiries from third parties (public, police, etc.).

The operational services include the activities needed to maintain the satisfactory condition of the road assets, to assure their durability, as well as to satisfy the road users riding comfort requirement. These include, inter alia:

- Road and lane width
- Road roughness
- Scabbing
- Control of potholes and cracking
- Drainage
- Rutting
- Corrugation
- Visibility of road signs and markings
- Response times to rectify defects that compromise the safety of road users
- Vegetation control
- Littering control
- Edge break
- Depression
- Slickness/Bleeding
- Raveling
- Shoving
- Shoulder condition

(3) Contractor's Responsibilities

Besides the timely provision of management information to the Employer, the Contractor shall be responsible for defining, optimizing and carrying out in a timely manner the works which are needed to ensure the roads remain at or above the Operational Service Levels (It is minimum condition of road, bridge roadside and traffic asset that must be met by the contractor over the entire contract period, Clause 2914 of these Specifications) defined in the Contract. In doing this, the Contractor shall comply with local legislation, the Specifications, environmental and social regulations.

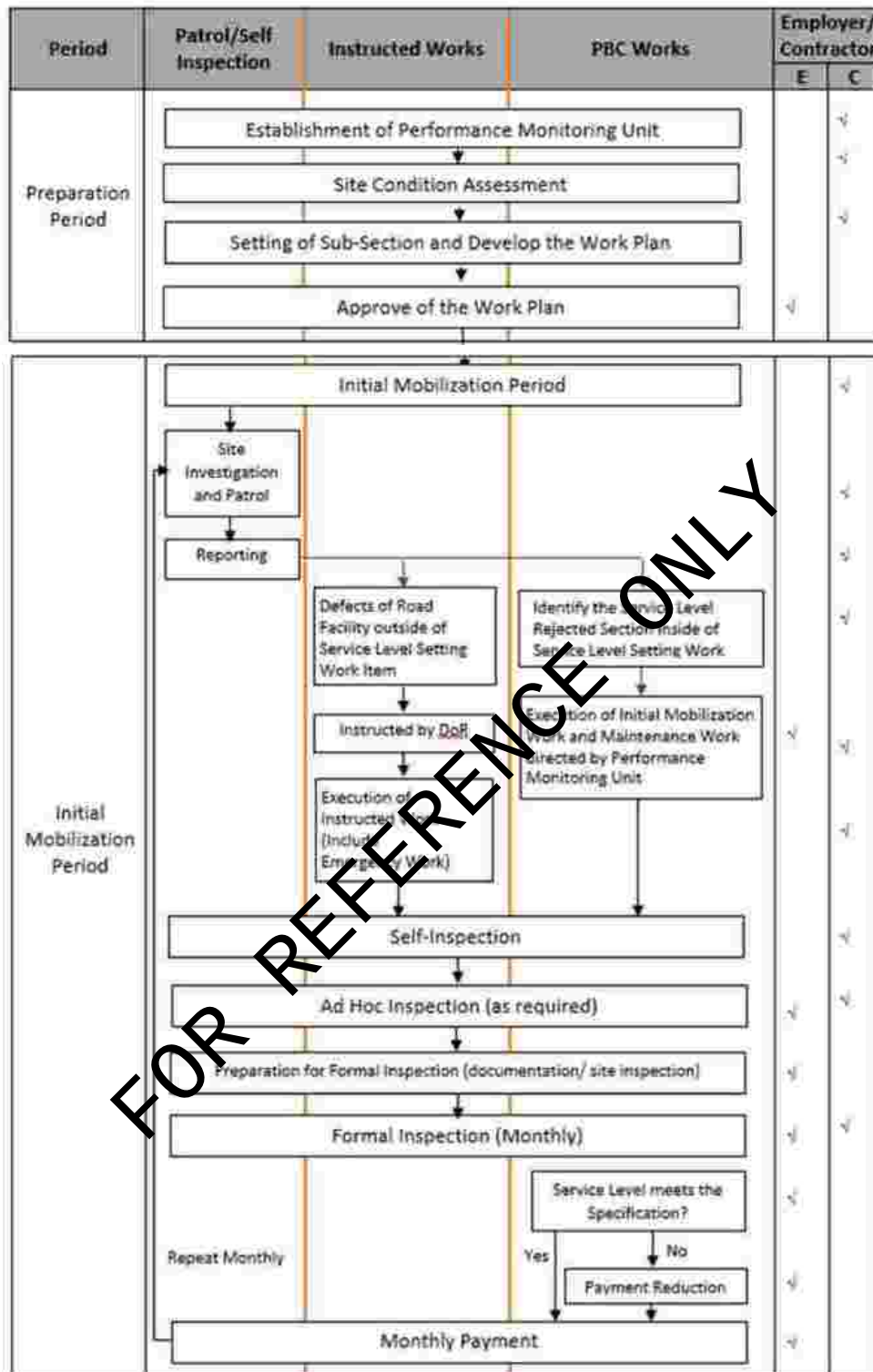
The Contractor shall set up a Performance Monitoring Unit to observe road conditions and plan the various works needed to ensure the roads meet the defined Operational Service Levels. The Performance Monitoring Unit will provide the Contractor with information on the Contractor's compliance with the Operational Service Levels, and data required to define and plan all works. Under the maintenance works and services, the Employer will not issue instructions to the Contractor regarding the types and volumes of works to be carried out but instead, the Contractor will decide what to do where, when, and how.

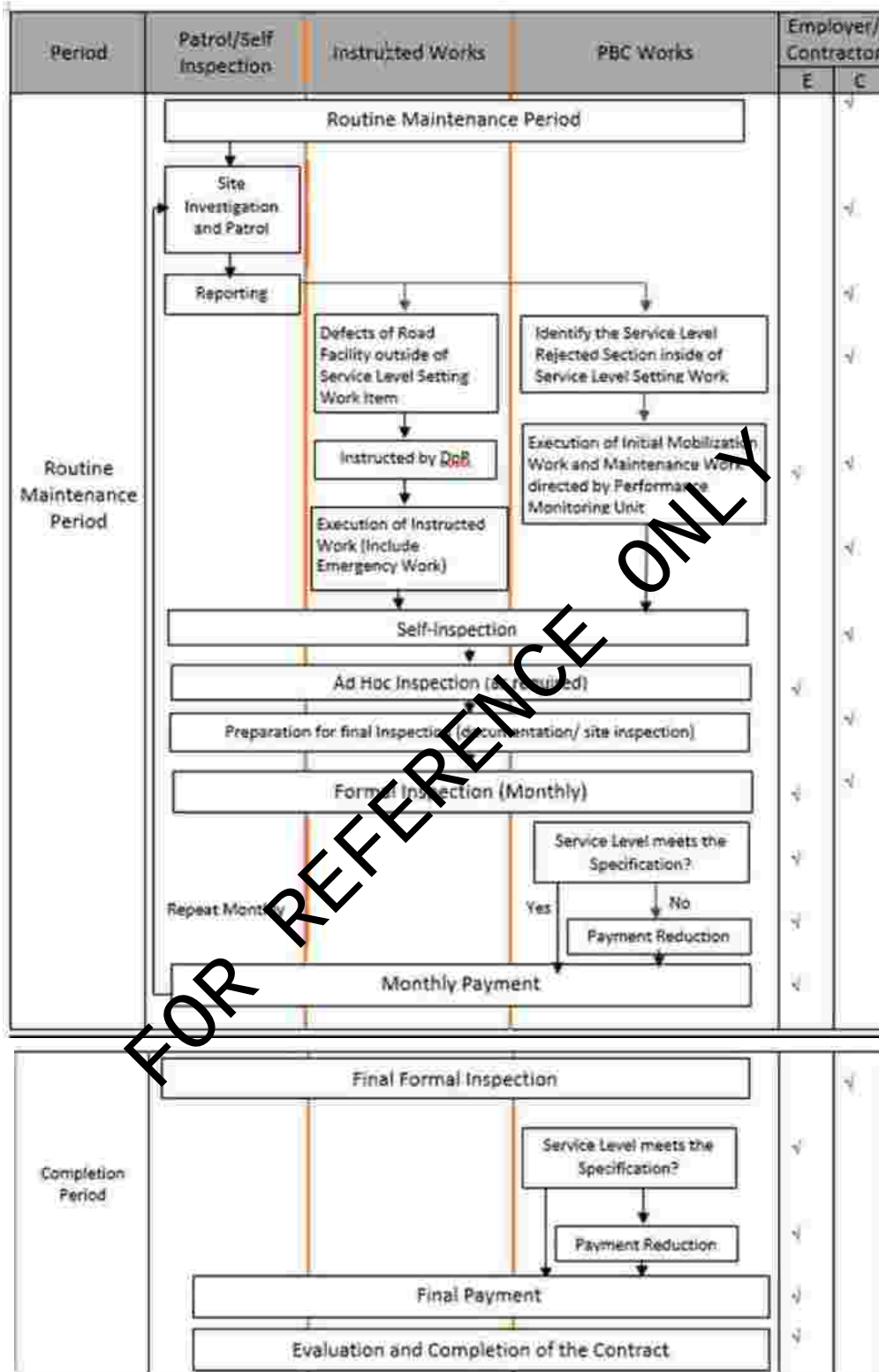
(4) Work Flow

A typical work flow for road maintenance under the PBC contract is shown in Figure 29.1. For performance based maintenance, the contract period is composed of the Initial Mobilization Period and the Routine Maintenance Period. During the Initial Mobilization Period, the Service Levels must be brought up to the required levels. Service Levels are evaluated during monthly formal inspections and the amount to be paid each month shall be determined considering the payment reduction for non-compliance with the Service Levels in the contract.

FOR REFERENCE ONLY

Figure: 29.1 A Typical Work Flow



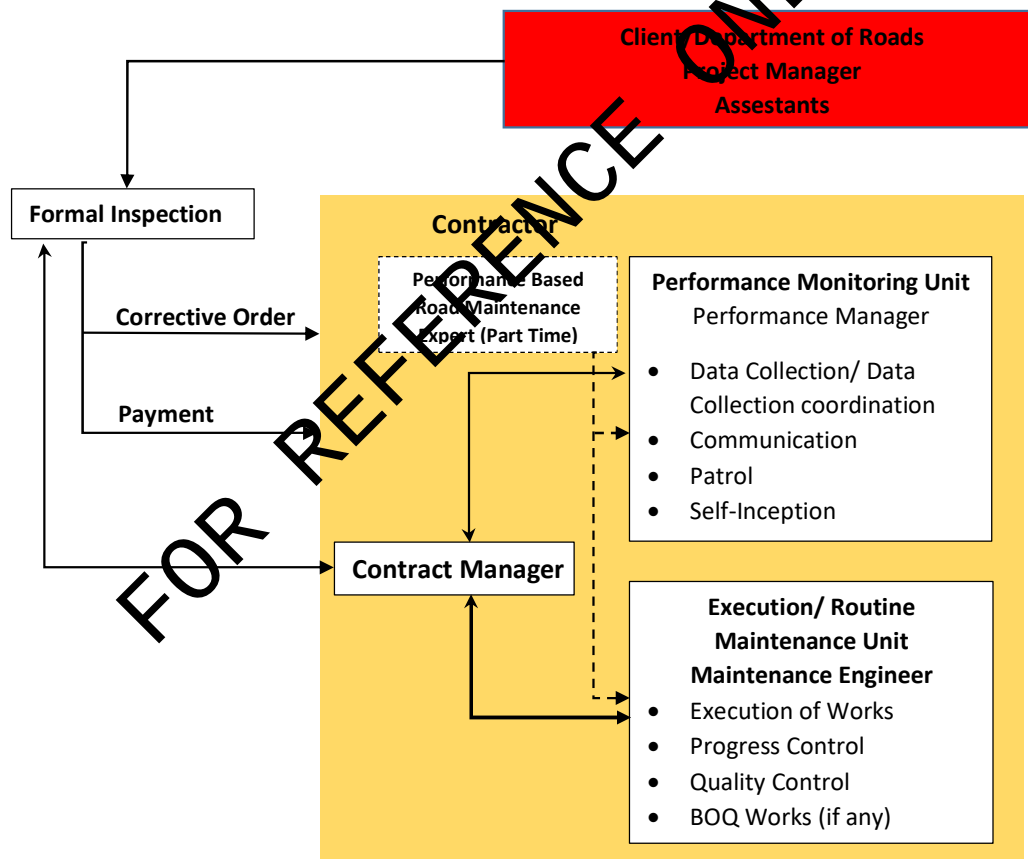


(5) Action by the Contractor

In PBC the maintenance work is not undertaken based on the instruction of the client. Instead, the Performance Monitoring Unit should be established within the organizational setup of the contractor to support the Contract Manager in gathering the information needed by the contractor to manage the works and services. The information gathered is used to prepare Monthly Statements and ensures that a complete database of the road condition, both on- and off-carriageway, is available at all times.

The contractor must establish the Performance Monitoring Unit after the award of the contract. The Performance Monitoring Unit is a team within the contractor's organization responsible for supervision of service levels while the Execution/ Routine Maintenance Unit is responsible for implementation of the work on site. The Performance Manager shall be the head the PMU.

Figure 29.2 Illustrates the recommended organizational structures of the contractor.



(a) Role of Performance Monitoring Unit

The contractor is obliged to establish within its organization a Performance Monitoring Unit PMU staffed with qualified personnel. The roles of the PMU are:

- I. Self-inspection to verify the degree of compliance with the required service levels and preparation of PBC inspection record;
- II. Patrol;
- III. Assessment of the road;
- IV. Generation and presentation of the information requested by the Road Manager for the documentation required for the monthly statement; and
- V. Formal Inspection together with Road Manager and Project Manager

Typical tasks of the Performance Monitoring Unit are shown in **Table 29.1**

Table 29.1 Tasks of the Performance Monitoring Unit

Stage	Task	Report
Plan	Site condition assessment Development of Work Execution Plan	Report for site condition assessment of the road
Do	Data Collection/ Reporting Communication with the client Communication with road users	Daily Work Record Daily Patrol Record Photo Record Incident Report
Check	Self-inspection Formal and Ad hoc inspection Development of Draft Monthly Statement	Defect Detection and Rectification List Self-Inspection Result Report Draft Payment Reduction Calculation Table Draft Monthly Statement
Action	Remedy action to Non-compliance	Remedial work report

(b) Role of the Contract Manager

The roles of the Road Manager include:

- I. Drafting of Work Program including monitoring system;
- II. Monthly formal inspection together with Project Manager;
- III. Preparation of monthly statement; and,
- IV. Coordinating the work of the PMU and the Execution/Maintenance Unit

(c) Role of the Execution/ Routine Maintenance Unit

The roles of the Execution/ Routine Maintenance Unit include:

- I. Execution of works;

- II. Quality control testing required for routine works and emergency works;
- III. Progress control; and,
- IV. Executing Instructed (BoQ) works (if any)

(6) Definitions

In addition to the terms defined in the Conditions of Contract, the following words and expressions shall have the meanings stated.

“Day” means calendar day

“Emergency Work” means the works that are defined under Clause 3306.

“End Date of Phase 2: Performance Based Maintenance Works” means the date on which the maintenance works were completed in accordance with the Contract as stated in the Taking- Over Certificate issued for Phase 2: Performance Based Maintenance Works.

“GPS” means Global Positioning System.

“Management Service Levels” means Service Levels associated with the Management Services.

“Maintenance Unit” means the Contractor crew dedicated to execute the maintenance works. This Unit shall also act as the initial response unit in case of any emergency.

“Maintenance Works” means all Works and Services required to comply with the Service Levels. This includes replacements of road assets, if necessary.

“MSL” means Management Service Levels

“Performance Monitoring Unit” means the Contractor's dedicated personnel tasked among other things to evaluate and report on the condition of the road as well as plan the necessary maintenance and rectification works.

“Monthly Lump Sum” means the monthly rate per Kilometer of road payable to the Contractor for completed Maintenance Works, subject to reductions as provided in the Contract.

“Operational Service Level” means the level of usability of the road and its various assets as established by the prescribed allowable non-conformances, beyond which the road is considered as non-complying and requiring rectification works to be executed.

“OSL” means Operational Service Level.

“Phase 1” means the period for which the upgrading works of the road is to be executed by the Contractor under Phase 1: Upgrading Works.

“Phase 2” means the period for which the performance based maintenance works and services to be executed by the Contractor under Phase 2: Performance Based Maintenance Works.

“PRP” means Payment Reduction Point.

“Payment Reduction Point Value” means the monetary value of one PRP.

“Rainy Season” means generally the time between June 15 and September 15.

“Road Assets” means all road related assets, including road furniture, within the right of way of the Kakarbhitta – Laukahi Road section of East – West Highway belonging to the Department of Roads.

“SL” means Service Level, a generic abbreviation for both OSL and MSL.

“Commencement Date of Phase 2” means the day immediately following the conclusion of the Defects Notification Period of the Phase 1: Upgrading Works.

“Works” means Works and Services

“Work Order” means an order issued by the Employer in response to the Contractor's proposal for the execution of works under Emergency Repair Works, which details the works required as well as the agreed time and cost.

2912 General

(1) Project Site

The project site is **Kakarbhitta – Laukahi Road** Section of East – West Highway.

Maintenance is to be provided for the road and all associated items for the full width of the road right of way and for any ancillary works outside the right of way such as drainage inlets and outlets, slope and structure protection works etc. The area to be maintained includes the first 10 m length beyond the Right of Way of the side/approach roads.

(2) Scope of Services

The performance based maintenance works specified under this sub section shall cover the whole length from 95+760 to 111+500 after completion of DNP of the Contracts within these chainages. The Works to be provided by the Contractor include all managerial, administrative and physical activities that the Contractor needs to carryout, to comply with the Service Levels specified herein, or with any other requirements of the Contract. In particular, they include physical activities associated with the following road-related assets and items:

- i. Paved areas of roads, parking areas, lay-bys, shoulders, approach roads footways and the like;
- ii. Unpaved shoulders, medians, greenery areas and verges;
- iii. Signs and signals, road markings and road safety furniture including bus and truck bays, bus stands, resting area;
- iv. Road lighting and associated facilities;
- v. Bridges, culverts, cross drainage, earth retaining structures and other structures;
- vi. Surface and sub-surface Drainage ditches, pipes, manholes and related items;
- vii. Slopes of cuttings and embankments;
- viii. Landscaped and bio-engineering areas; and
- ix. Other road assets, which have been constructed or installed during Phase1 and before that.

Management services include processes and procedures such as:

- i. Assure the quality of the services;
- ii. Manage the health and safety of the Contractor's personnel;

- iii. Protect the environment;
- iv. Manage emergencies;
- v. Manage traffic at work sites, and
- vi. Collect, manage and report on data specifically required by the Contract and in addition necessary for the effective management of the services
- vii. Daily inspection patrols.

(3) Performance Criteria and Service Levels

The required condition of road assets is achieved by satisfying performance criteria designed to limit the presence of defects such as potholes and cracking in the pavement. Performance criteria are defined by Service Levels, which are the specified threshold for each of the performance criteria; for example, it may be specified that there shall be no pothole in excess of 150 mm in diameter or 50 mm deep and no crack shall be wider than 5 mm. The defined Service Levels are the accepted minimum thresholds for the quality levels of the road assets for which the Contractor is responsible.

Service Levels are specified in two categories:

- a) Management Service Levels relating to the various management processes and procedures of the Contractor that deliver the Operational Service Levels, ensure good governance of the asset during the term of the Contract, provide information that the Employer concerning the delivery of the Works and facilitate the next tender round. They address matters such as:
 - (i) Information on how the Contractor assures the quality of his services, manages the health and safety of his staff, protects the environment, manages monsoon period and emergencies, and manages traffic at worksites;
 - (ii) Contractor's work schedule and programmes;
 - (iii) Regular progress reports;
 - (iv) Recording of network and inventory updates;
 - (v) Recording of maintenance history; and
 - (vi) Management of enquiries from third parties (public, police etc)
- b) Operational Service Levels that are measures of the condition of the assets to assure their durability, to provide road user services and to ensure safe operation and comfort, such as:
 - (i) Timely response to rectify defects that compromise the safety of road users;
 - (ii) Repair of potholes and cracking;
 - (iii) Repair of Rutting and other defects of the pavement;
 - (iv) Maintenance of drainage systems;
 - (v) Keeping road signs and markings clean, visible and in good condition;
 - (vi) Keep lighting equipment suitably visible and in good condition;

- (vii) Vegetation control, manage sight distance;
- (viii) Maintenance of structures; and
- (ix) Safety Inspection Patrol
- (x) Litter control within Right of Way along the alignment.

For each performance criterion, a Service Level (SL) is specified. Throughout the contract period, if the Contractor fails to comply with an SL, reductions will be made from amounts due to the Contractor. The fundamental concept associated with such reductions is the Payment Reduction Point (PRP). Each SL breach attracts PRPs, which are accumulated and combined with the value of the individual PRP to evaluate the total reduction applicable.

(4) Monitoring of Performance

Under the terms of the contract, the Contractor shall also be responsible for the continuous monitoring and control of road conditions and Service Levels for the road or road sections included in the contract. This shall be necessary not only to fulfill the contract requirements, but the activity shall also provide the Contractor with the information needed to be able (i) to know the degree of his own compliance with Service Level requirements, and (ii) to define and plan, in a timely fashion, all physical interventions required to ensure that service quality indicators never fall below the indicated thresholds. The Contractor shall not receive instructions from the Employer concerning the type and volume of road maintenance works to be carried out. Instead, all initiative rests with the Contractor who shall do whatever is necessary and efficient to achieve the quality levels required.

Some emergency works are to be foreseen. These are meant to remedy unexpected damage which occurs as a result of extraordinary natural phenomena, and which affect the normal use of the road network, or the safety and security of the users. For emergency works, the contract limits the responsibility of the Contractor, establishing that the Employer will approve execution of services and separate remuneration based on specific amounts proposed by the Contractor for each case, on the basis of volume of works estimated at each time and on unit prices included in the bid and in the contract.

2913 Management Services

Management Services are the various management processes and procedures of the Contractor that deliver the Operational Service Levels, ensure good stewardship of the road asset during the term of the Contract, provide information that the Employer requires concerning the delivery of the Services and facilitate the next tender round.

(1) Functions of Contractor's Key Personnel

During the Maintenance Phase of the Works, the Contractor's key personnel shall include but not be limited to the following key personnel whose duties are outlined below:

- **Contractor's representative / Contract Manager** shall act and represent the Contractor during the Phase 2 of the Contract. His duties and responsibilities include those discussed in the General Conditions of Contract.
- **Performance Manager** shall be responsible for the Performance Monitoring Unit and for the development and monitoring of the Program of Performance.
- **Maintenance Engineers** shall instruct and supervise the works undertaken on the site based on the requirements of the Contract.

- **Performance Based Road Maintenance Expert** (part time) to coach and train the staff of the contractor and subcontractors in the planning, execution and monitoring of the performance based maintenance works.

(2) Performance Monitoring Unit

The Contractor shall establish a Performance Monitoring Unit staffed by qualified personnel, who shall verify continuously the Contractor's degree of compliance with the required Operational Service Levels. The Performance Monitoring Unit shall also be responsible for undertaking the quality control testing required for all Works.

The Performance Monitoring Unit shall maintain, at all times, a detailed and complete knowledge of the condition of the road sections included in the Contract and shall provide the Contractor with all the information needed in order to efficiently manage and maintain the roads. The Performance Monitoring Unit shall carry out, together with the Employer, the formal and scheduled inspections of Operational Service Levels.

(3) Facilities for the Employer

The facilities provided to the Employer under the Construction Phase of the Contract such as offices, accommodations, laboratory, vehicles, supplies, consumables, telephone services, internet services, utilities and the like shall not be required.

(4) Communication System

The Contractor shall provide and maintain in operation for the duration of the Contract a communications system or systems that ensure that both written (letter, fax or E-mail) and oral (voice) communications can be established at all times:

- (i) between the Contract Manager and his senior field staff;
- (ii) between the Employer/Engineer and the Contract Manager;
- (iii) between the public telephone system and the Contract Manager;
- (iv) between the public telephone system and the Employer/Engineer;

The equipment to be provided and maintained includes the equipment located at the Employer's and/or Engineer's office.

The equipment may comprise cellular mobile phones, satellite phones, radio equipment, tele-facsimile equipment and computers with broad band internet access linked by local area network and/or similar. The Communications System shall provide for "24/365" (i.e 24 hours per day, every day of the year) communication with security and redundancy provisions that are fully fit for purpose.

(5) Site Regulations

The Contractor shall prepare Site Regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. Such Site regulations shall include, but shall not be limited to:

- a) Security;
- b) Gate control;
- c) Safety;
- d) Traffic control;
- e) Accident, monsoon and Emergency response;

- f) Dealing with third party enquiries and complaints;
- g) Sanitation;
- h) Medical care; and
- i) Fire prevention.

The Site Regulations shall comply with the relevant laws and regulations of Nepal.

(6) Specifications and Work Methods

The Maintenance Works shall be executed in accordance with the Specifications and the Special Provisions for Performance Based Maintenance Works and/or any applicable Standards stated in the Specifications.

In case of conflict between the Specifications and Work Procedures defined in Phase 1 and the Service Levels or specifications of Phase2, the Service Levels and Work Procedures of Phase2 shall take precedence. If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.

With the prior written approval of the Employer, the Contractor may introduce new materials and work methods as long as they provide a better quality of work.

Under no circumstances shall the Contractor be entitled to any additional payment or relief from payment reduction due to the inadequacy of the materials and work procedures that he has proposed and employed in the Works and Services, notwithstanding any consent by the Employer to their use.

(7) Program of Performance

The Contractor shall develop, implement and maintain a Program of Performance, which shall set out in detail the management processes, procedures and controls that he will employ to deliver the Services and Works. The Program of Performance shall comprise the following components:

a) Operational Plan

The Operational Plan shall describe how the Contractor will undertake the Works to achieve the Service Levels including but not limited to the following matters:

- (i) Organizational structure for management and delivery of the Services;
- (ii) Locations and coverage of depots and storage facilities;
- (iii) Numbers, classification and deployment of equipment and personnel;
- (iv) Provisions for procurement and storage of materials;
- (v) Procedures for Safety Inspections and Service Level Inspections;
- (vi) Procedures for Structural Inspections;
- (vii) Procedures for routine maintenance and repair works;
- (viii) Procedures for incident response and emergency works;
- (ix) Procedures for response to third party enquiries, reports and complaints;
- (x) Procedures for data collection, recording and storage.

b) Contractor's Quality Assurance Plan

The purpose of the Contractor's Quality Assurance Plan is to integrate the requirements of the Contract and the Contractor's quality assurance systems to deliver the Services.

The Quality Assurance Plan describes the methods and procedures, which the Contractor will apply for the execution of the Contract, including how the Contractor will:

- (i) Identify the quality requirements specific to the Contract;
- (ii) Plan and execute the Services and Works to satisfy those requirements;
- (iii) Inspect and/or test work and materials to ensure compliance with the quality requirements;
- (iv) Record and monitor the results as evidence of compliance;
- (v) Audit the Quality Assurance processes and procedures to ensure compliance; and
- (vi) Ensure that prompt action is taken to correct non-compliance.

The Quality Assurance Plan shall comply with the principles of ISO 9001:2008 or any revision thereof. It shall clearly describe the systems, procedures and methods that will be used to deliver and monitor compliance of the Services.

c) Health and Safety Management Plan

The purpose of the Health and Safety Management Plan is to foster a responsible attitude towards occupational health and safety and to comply with the provisions of the Law of Nepal.

Because of the nature of the Services, the Contractor may occasionally be exposed to hazardous situations, which could involve risk of various degrees of harm, to the Contractor's personnel and/or the public.

Situations will arise when it is not practical to eliminate or isolate significant hazards. In these situations, the Contractor must mitigate hazards by ensuring planned protection systems (e.g. equipment, clothing) are available and used. The Contractor's personnel and all sub-contractors must comply with the Health and Safety Management Plan, including all types of pandemic at all times.

The Health and Safety Management Plan shall, when implemented in accordance with the plan requirements:

- (i) Ensure the systematic identification of existing and new hazards on work site(s) and at depots, storage facilities, in offices or wherever activities are undertaken;
- (ii) Ensure the mitigation of significant hazards, where elimination and isolation are impractical;
- (iii) Ensure the provision and use of appropriate protective measures;
- (iv) Include emergency procedures for dealing with accidental spillage, pollution or imminent danger;
- (v) Ensure regular review and assessment of each hazard identified and monitor own staff and subcontractor's exposure to these hazards;
- (vi) Ensure reporting and recording of work site safety incidents so health and safety problems can be addressed quickly and regularly. It is a requirement of this

Contract that any such incident be advised promptly to the Engineer;

- (vii) Comply with all other health and safety aspects requirements of Nepalese law and regulations.

d) Environmental Management Plan

The purpose of the Environmental Management Plan is to foster a responsible attitude towards protection of the environment, occupational health and safety and shall comply with all applicable national, provincial and environmental laws and regulations of Nepal. The Environmental Management Plan shall comply with the principles of ISO 14001:2008 or any revision thereof.

Because of the nature of the Services, the Contractor's operations have the potential to cause adverse environmental impacts. Situations will arise when it is not practical to avoid such impacts. In these situations, the impacts must be mitigated by planned actions and protection measures, which must be employed.

The Contractor's shall execute the contract in accordance with the Environmental Management Plan (EMP) and approved Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) prepared for the Project at all times.

The Environmental Management Plan shall, when implemented be in accordance with the plan requirements:

- (i) Contractor shall establish an operational system for managing environment impacts.
- (ii) The means by which the environmental management systems will be supervised, monitored and audited to ensure compliance with the principles and objectives of the EMP at all times;
- (iii) Carry out all of the monitoring and mitigation measures set forth in the EMP and approved IEE prepared for the project.
- (iv) Records to be prepared and maintained by Environmental Management staff and communication procedures to be followed so that the Employer and others associated with the Works (e.g. sub-Contractors) are kept fully informed on matters relating to the EMP and approved IEE and applicable regulations throughout the Contract period;
- (v) Proposals to ensure that maintenance methods do not compromise the Contractor's commitment to the EMP and IEE and compliance with all relevant statutory regulations;
- (vi) An organizational structure showing the appointed environmental management staff and the responsibilities of environmental protection participants;
- (vii) The names, addresses, telephone and fax numbers of all participants;
- (viii) The criteria used for the appointment of the principal staff;
- (ix) The proposed interactions and communications procedures between the Contractor's personnel and the environmental protection staff, including proposals for the communications facilities to be provided. In particular, the establishment of a regular communications and reporting system;
- (x) The frequency, coverage and intent of environmental management meetings together with the rationale for attendance;

- (xi) Frequency, coverage and intent of regular environmental reports;
- (xii) Methods proposed for promoting awareness of environmental protection issues among all personnel directly or indirectly associated with the maintenance works;
- (xiii) Provisions for storage of liquid, toxic and dust creating materials;
- (xiv) Waste control and management;
- (xv) Materials handling;
- (xvi) Erosion prevention, including take care of planted grass, shrubs and trees;
- (xvii) Dust Control;
- (xviii) The powers vested in the environmental management staff that would enable them to take urgent, appropriate and direct action to prevent or correct environmental impacts;
- (xix) The means by which environmental management matters will be communicated to Sub- Contractors to ensure effective compliance by subcontractors.

Further details of the Environmental Management are described in **Appendix B** of Phase 2 and approved IEE for the project.

e) Risk Management Plan

The Purpose of the Risk Management Plan is to ensure that uncertain events that may have adverse impacts on the integrity and condition of the road assets or on the Operational Service Levels are identified, analyzed and placed under a proactive management regime. The Risk Management Plan shall, as a minimum, include:

- (i) Establishment of a risk register, in which all foreseeable adverse events are identified and assigned values of probability and consequence of occurrence;
- (ii) Analysis of risks in which the impact of potential combinations of events is considered across a range of scenarios;
- (iii) Identification of risk management strategies involving avoidance and mitigation of risks together with management strategies for residual risks;
- (iv) Assignment of responsibility for risks to the organizations or individuals best able to manage them;
- (v) A process for the regular review and updating of the risk register and the risk management plan.

f) Emergency Procedures and Contingency Plan

The Emergency Procedures and Contingency Plan shall establish the roles, practices and procedures to be followed during and following the occurrence of natural phenomena with imponderable consequences, such as strong storms, flooding and earthquakes. The Emergency Procedures and Contingency Plan shall be developed by the Contractor and agreed with the Engineer and any other stakeholders the Engineer may identify.

The purpose of the Emergency Procedures and Contingency Plan is to ensure the safety of the Contractor's personnel and road users in the case of emergency and/or road closure. It should include:

- (i) An effective communication and event recording system;
- (ii) The names, 24-hour contact telephone numbers and specific duties of the Contractor's personnel nominated to respond to an emergency event;

- (iii) The contact telephone numbers of other parties who need to be notified in cases of emergency events, e.g. police;
- (iv) Detailed response procedures for all potential emergency events;
- (v) Possible detour routes in the event of road closure.

g) Traffic Management Plan

The Traffic Management Plan establishes the practices for traffic management at work sites and shall comply with the relevant rules and regulations in Nepal. The Traffic Management Plan must be developed by the Contractor and agreed with the Engineer.

The objectives of the Traffic Management Plan are to:

- (i) Clearly define and document the responsibilities and chain of command for the development, implementation and management of traffic control measures and systems,
- (ii) Establish the minimum requirements for temporary traffic control,
- (iii) Establish the minimum geometric, cross section and surfacing standards for temporary works,
- (iv) Provide appropriate transitions and enable safe and efficient traffic flow into, through and out of work sites,
- (v) Protect the Contractor's personnel at all times.

Protect the Road and related assets and the Contractor's resources at all times, and Meet the operational requirements for the Road.

The Traffic Management Plan must include at least the following:

- (i) A documented process for preparation, review and approval of the Traffic Management Plan;
- (ii) A document tracking and control system to ensure that only the latest operative copy of the Traffic Management Plan is in circulation;
- (iii) 24-hour contact telephone numbers for Contractor, Engineer, Employer, emergency services and other stakeholders; and
- (iv) Layout diagrams, method statements, etc. for implementation of traffic control while undertaking each aspect of the Services (including site specific layout diagrams and method statements if the Services require traffic control measures not covered by standard codes of practice.

h) Road Management Database

Data about the conditions of the road assets being maintained under this Contract are required for current and future reference. The Contractor shall prepare and maintain a road management database of accuracy and completeness appropriate to the uses for which it is intended, which shall be kept current at all times. The Contractor shall supply all information necessary to prepare and maintain this data. The following information is to be collected and updated:

- Road and bridge inventory and treatment history
- Road condition and section rating

- Traffic and classification details
- Maintenance history

The Contractor shall undertake whatever actions may be necessary including detailed road condition surveys to obtain the above data and all information required to maintain the road management database.

The Contractor shall provide hard and electronic copies of the updated road management database and all relevant information to the Employer. Report and subsequent updates shall be submitted every three months thereafter together with the relevant monthly progress report.

8) Daily Inspections

The Contractor shall undertake Inspections of all lengths of road in both directions for which he is responsible on at least a daily basis to ensure the continuous safe operation of the roads and the compliance of all road related assets with the Operational Service Levels.

The procedures for Inspections shall be described in detail in the Contractor's Operational Plan. The Daily Inspection shall as a minimum record the following information:

- (i) Date and time of inspection at start and end of each of each day and the route covered;
- (ii) Weather;
- (iii) Route of inspection;
- (iv) Summary of general operating conditions;
- (v) Recording of all non-compliances with Operational Service Levels detected;
- (vi) Incidents, hazards and defects discovered and actions taken;
- (vii) Record of interactions with:
 - Police
 - Engineer's staff
 - Official bodies
 - Members of the public

9) Inspection of Structures

All bridges and all culverts with span or diameter in excess of two (2) metres together with all earth retaining structures with a height in excess of two (2) metres and other significant structures shall be visually inspected at least once in each calendar month to ensure that they are in a safe operating condition.

This inspection shall record:

- (i) Vehicular damage to structures;
- (ii) Scour of foundations in watercourses and erosion of protective structures such as revetments, gabions and the like;
- (iii) Settlement of foundations, movement or rotation of abutments, wing walls and earth retaining structures;
- (iv) Significant corrosion of steel reinforcement in reinforced concrete members causing spalling of concrete;

- (v) New or worsened deflection or cracking of reinforced concrete members;
- (vi) Corrosion of structural steelwork with significant loss of metal.
- (vii) Anything else that impairs the safe operating condition of the bridge.

Where defects appear to be worsening rapidly, the Contractor shall inform the Engineer without delay and shall take appropriate measures to ensure the safety of road users and employees.

Any non-compliance with the Operational Service Levels discovered during any inspection shall be recorded. The record of each defect shall include an accurate positional reference, description and dimensions of the defect and a photograph taken with a digital camera and bearing a date and time stamp. The record of each inspection shall be recorded. Upon completion of remedial works for each defect or group of defects, the record of works together with a further date and time stamped photograph shall be recorded as well and included in the Monthly Report.

10) Execution/ Routine Maintenance Unit

The Contractor shall provide on a daily basis a minimum of one Routine Maintenance Unit (RMU) comprising of personnel and equipment required to undertake the carrying out of the Routine Maintenance Works. The Contractor may increase the number of RMUs as he may deem necessary to meet the requirements of the Works.

Each RMU shall have the following minimum resources:

- 1 No. Foreman
- 1 No. Light/Heavy vehicle driver
- 1 No. double cabin pick-up with identification (contractor's name, Employees' name, road name, and emergency contact phone no.)
- 1 Set Operational flashing amber lights fitted to the RMU truck
- No. Maintenance workers
- No. Mobile phones
- 1 No. Jack
- 1 No. Compressor
- 1 No. Vibrating plate compactor
- 1 No. Chain saw
- 1 m3 Cold storable bituminous premix and 0.5 m3 of sand
- No. "Half Road Closed" Signs
- No. "Roadwork Ahead" Signs
- 12 No. 300 mm plastic 'high visibility' colored traffic cones
- 200 kg drum of bitumen
- 1 No. Bituminous spray pump
- 1 No. 200 litre drum of clean water
- No. Rakes
- 2 No. Long handle shovels

- 2 No. Long handle heavy duty brooms
- 2 No. Picks
- 8 No. Reflectorized safety jackets for the RMU crew

The RMU shall be available to work for a minimum of 8 daylight hours per day from Sunday to Friday inclusive. The starting and finishing times are to be agreed with the Employer.

The RMU shall also be the "Initial Emergency Response Unit" and shall have the following capabilities in case of an emergency:

- Haul a half cubic meter of sand (or other suitable granular material depending on the nature of the requirement)
- Provide an after-hours response with a minimum of a two-person crew
- Mobilize emergency kits such as temporary warning signs, flashing lights, barriers, safety clothing, shovels, brooms, etc.

The RMU shall carry at all times mobile phones to contact police, fire, ambulance, and hospital or medical center to obtain help in the event of accidents or any emergency encountered.

A listing of all emergency contact phone numbers shall be circulated by the Contractor to all relevant officers, including the Contractor's staff and the Employer within 14 days from the Commencement Date of Phase 2. It is the Contractor's duty to engage the regular length worker /supervisor of the DoR during the PBM Phase of the contract and pay them **the wages and perks (as per Standard Norms of the concerned Division Road Offices)**.

11) Reporting

a) Inception Report

Within 28 days after the Commencement Date of Phase 2, the Contractor shall submit an inception report to the Employer. The report shall include the following:

- Initial condition survey
- Video survey
- Roughness survey
- Initial road management database
- Detailed maintenance program for the first 3 months
- Information regarding environmental, safety and social issues and other information as may be necessary

The Contractor's initial condition survey of the roads, structures and other appurtenances shall be attended by the Engineer. The detailed results of the survey shall be recorded by the Contractor and submitted to the Engineer for confirmation.

The initial condition survey will establish a baseline of road conditions at the time of commencement of the Phase 2. The video survey shall be undertaken during daylight hours from the passenger's seat of a slow moving vehicle with the camera aligned towards the center of the road. Video shall also be taken of all bridges, major culverts and any other major structures to show the conditions of each structure from all angles. The Contractor shall complete and formally submit to the Engineer two copies of the video record on DVD.

The roughness data is required to establish the actual roughness condition of the road at

the time of commencement of the Phase 2. Roughness shall be measured using a method and equipment approved by the Engineer.

The environmental, safety and social surveys shall establish the issues existing prior to the commencement of Phase 2.

The Employer shall confirm the accuracy of the initial condition survey within 21 days of his receipt of the inception report. The Engineer's opinion on the condition of any road asset or any item shall be final.

Interim Payment Certificates will not be released until such time as the inception report is approved by the Employer.

b) Daily Report to be submitted to the Employer

The Contractor shall prepare and submit daily reports to the Engineer on all inspections, incidents, non-compliance with Operational Service Levels detected, remedial actions taken and other works executed by the Contractor. The format and the information to be supplied shall have to be approved by the Engineer.

The information provided in the daily reports shall be summarized by the Contractor and included in the relevant sections of his Monthly Reports.

c) Monthly Reports

The Monthly Report shall be submitted by the Contractor to the Engineer each month no later than the seventh calendar day of the following month; except for the reports under (ii) and (iii) below, which shall be submitted on the last working day of the respective month; shall comprise the following components:

- (i) Narrative Report, describing Services and Works undertaken during the period, problems and issues arising and measures taken to deal with them;
- (ii) Contractor's Monthly Operational Service Level Inspection Report;
- (iii) Monthly Evaluation Form for Compliance with Operational Service Levels;
- (iv) Memorandum of Non-Compliance with Operational Service Levels – based on the Monthly Formal Inspections;
- (v) Memorandum of Non-Compliance with Operational Service Levels – based on Informal Inspections;
- (vi) Report on all Maintenance Works and Services;
- (vii) Report on any Emergency Works or other Works instructed by the Engineer due to defects to be repaired under the Defects Notification Period liabilities;
- (viii) Report on the compliance with the Contractor's Quality Assurance Plan, Health and safety Management Plan, Environmental Management Plan, Risk Management Plan, Emergency Procedures and Contingency Plan, and Traffic Management Plan;
- (ix) Report on Testing undertaken in accordance with the Contractor's Quality Assurance Plan or as required by the Engineer. Tests shall be undertaken in accordance with the specifications and appropriate standards and the detailed test results shall be submitted to the Engineer in the respective month;
- (x) Structural Inspection Reports on inspections undertaken. First inspection reports shall be provided within two (2) calendar months of the Commencement Date of Phase2;

- (xi) Summary of Incident Reports shall be submitted for each month (or a nil return);
- (xii) Updated Monthly Work Program, detailing the location, timing and extent of all works the Contractor proposes to complete during the next month;
- (xiii) Any other information as the Engineer may require from time to time.

d) Incident Reports

Every occurrence of an Emergency that requires "Emergency Works" as defined in Section 2916 Emergency Works below shall be reported to the Engineer as described below:

- (i) Any road closer should be reported within one (1) hour of discovery and road closer report should be submitted after twenty-four (24) hours of road re-opened;
- (ii) Landslides, defined as movement of earth or rocks encroaching on any carriageway or shoulder or blocking any drainage system or watercourse; reported without delay and in any event within one (1) hour of discovery;
- (iii) Flooding, defined as large volumes of water occupying all or parts of the roadway, shoulders and adjoining areas; reported without delay and in any event within one (1) hour of discovery;
- (iv) Any other event where the Contractor proposes to request issue by the Employer of an Emergency Work Order; reported without delay and in any event within one (1) hour of discovery;
- (v) Road Accidents involving injury to people, significant vehicular damage and/or damage to the road surface, structures or road furniture; without delay and in any event within twenty-four (24) hours of discovery;
- (vi) Other Damage, including vandalism, theft, damage of highway furniture and structures; reported weekly.

Incident reports shall include:

- (i) The precise location, timing and extent of the incident, supported by maps/plans and date/time stamped digital photographs;
- (ii) A brief narrative description of the circumstances.
- (iii) Where applicable, the names of the people and/or organizations responsible for causing the damage. This information is required so that the Employer may seek recovery of the costs associated with repairing the damage.

Copies of incident reports shall be included in the monthly reports.

e) Handover Report

No later than two (2) months prior to the Date of Completion of the Contract the Contractor shall submit the Handover Report in draft to the Engineer. The purpose of the Handover Report is to provide a smooth transition to the next contract and ensure that the next Contractor is aware of any outstanding issues.

The Report shall:

- (a) Summarize any unresolved issues,
- (b) Include the most recent complete set of data on the Road and related assets

included in the Contract; and

(c) Provide the following details:

- i. The current and up-to-date Program of Performance including all sections and particularly the updated risk register;
- ii. A schedule of outstanding defects and liabilities;
- iii. Any unresolved issues, especially those that may impact on the next Contractor;
- iv. Details of any sensitive issues;
- v. Any on-going special monitoring/maintenance needs.

The final Handover report shall be submitted no later than 14 days prior to the Date of Completion of Phase 2.

12) Management Service Levels

Table 29.2 lists Management Service Levels (MSL), which relate to the overall management of the Works along with the corresponding Submission Dates and resulting PRPs for each MSL.

The Management Services cease on the Date of Completion of the Contract. If any requirements are unfulfilled at that time, the Employer and/or Engineer may procure their completion and recover the cost thereof from amounts due to the Contractor.

The Management Service Level Number (see MSL No column in Table 29.2) comprises a section reference to one of the sections above followed by a count within that section.

(i) **Table 29.2 – Required Submission Dates and Payment Reduction Points for Management Service Levels.**

Table 29.2 Required Submission Dates and Payment Reduction Points for Management Service Levels

Management Services	MSL No	Action	Submission Dates	Payment Reduction Point
Key Personnel	1	Key Personnel appointed, approved by the Employer and on the site	At the Commencement Date of Phase 2	10 pts. per day
Performance Monitoring Unit	2	Performance Monitoring Unit fully established	At the Commencement Date of Phase 2	10 pts. per day
Communications System	4 (1)	Details of Contractor's proposed Communications System submitted in draft	At the Commencement Date of Phase 2	4pts. per day
	4 (2)	Engineer either issues a notification of "no objection" to the proposal or notifies Contractor that the	Within 14 days after submission of the Draft	N/A

Management Services	MSL No	Action	Submission Dates	Payment Reduction Point
		Communications System is unsatisfactory, stating the specific areas of concern		
	4 (3)	Contractor submits revised details	Within a further 7 days of Engineer's notification	4pts. per day
	4 (4)	Communications System complete and fully operational	Within 60 days after the Commencement Date of Phase 2	4 pts. per day during which any significant element is inoperable for the entire day. (For the avoidance of doubt, a "significant element" is a communication medium, such as telephone or internet, for which there is no redundancy or equivalent alternate system in operation)
Site Regulations.	5 (1)	Draft Site Regulations submitted to the Employer, and copied to the Engineer, for approval, which shall not be unreasonably withheld.	At the Commencement Date of Phase 2	4 pts. per day
	5 (2)	Engineer either issues a notification of approval of the draft Site Regulations or notifies the Contractor that they are not approved, stating the specific reasons for rejection.	Within 14 days after submission of draft Site Regulations	N/A
	5 (3)	Contractor submits revised draft Site Regulations	Within a further 7 days of Engineer's notification	4 pts. per day
	5 (4)	Contractor implements Site Regulations and remedies breaches forthwith	N/A	2 pts. during the first week, 4pts. payment reduction points during the second week and 1pts. per day thereafter until the deficiency is remedied
Program of Performance	7 (1)	Contractor's Program of Performance submitted	At the Commencement	4 pts. per day

Management Services	MSL No	Action	Submission Dates	Payment Reduction Point
		in draft	Date of Phase 2	
	7 (2)	Engineer either issues a notification of "no objection" to the Plan or notifies the Contractor that his Program of Performance fails to comply with the Contract, stating the specific areas of "non-compliance"	Within 14 days after submission of Program of Performance	N/A
	7 (3)	Contractor submits a revised Program of Performance	Within a further 7 days of Engineer's notification	4 pts. per day
	7 (4)	Contractor implements Program of Performance	Continuous	5 Pts for each material breach of the Program of Performance per day during which the breach persists (For avoidance of doubt, a material breach is a neglect or disregard of any element of the Program of Performance notified in writing to the Contractor by the Engineer)
	7 (5)	Contractor updates Road Management Data Base	Every three months together with the relevant Monthly Report	1pts. per day
	7 (6)	Contractor updates Program of Performance annually or upon the occurrence of any material change to any of the constituent processes and procedures or upon the reasonable request of the Engineer and submits to Engineer	Within 14 days of each anniversary of the Commencement Date of Phase 2 or upon the occurrence of any material change to any of the constituent processes and procedures or upon the reasonable request of the Engineer	4pts. per day

Management Services	MSL No	Action	Submission Dates	Payment Reduction Point
Daily Safety Inspections	8	Contractor undertakes Safety Inspections on at least a daily basis to ensure the continuous safe operation of the roads	During each calendar day	5 pts for each instance of failure to undertake an inspection in whole or in part
Inspection of Structures	9 (1)	Contractor inspects all bridges and all culverts with span or diameter in excess of three (3) meters together with all earth retaining structures with a length in excess of 3 m and other significant structures at least once in each month to ensure that they are in a safe operating condition	As per Operational Plan	As per Program of Performance
Inception Report		Contractor records any non-compliance with the Operational Service Levels discovered during any inspection and submits report to Engineer	Within 24 hours of completion of inspection	2 per day
	9 (2)	Submission of Inception Report	28 days after the Commencement Date of Phase 2	2Pts per day
Daily Reports	11a	Submission of Daily Report	By the end of the following day	2Pts per day
Monthly Report	11b	Contractor submits the monthly Report to the Engineer	No later than the 7th calendar day of the following month (starting with the report on the first month after the Commencement Date of Phase 2)	3Pts per day
Incident reports	11c	(i) Landslides, defined as movement of earth or rocks encroaching on any carriageway or shoulder or blocking any drainage system or watercourse; reported without delay. (ii) Flooding, defined as large volumes of water	Within one hour of discovery	5Pts per hour

Management Services	MSL No	Action	Submission Dates	Payment Reduction Point
		occupying all or parts of the roadway, shoulders and adjoining areas; reported without delay. (iii) Any other event where the Contractor proposes to request issue by the Employer of an Emergency Work Order; reported without delay.		
	11d	(iv) Road Accidents involving injury to people, significant vehicular damage and/or damage to the road surface, structures or road furniture without delay.	Within twenty-four (24) hours of discovery.	2 per day
Hand Over Report	11e (1)	Contractor submits draft Handover Report to the Engineer.	No later than two months prior to the Date of Completion of the Contract	10 per day
	11e (2)	Engineer either accepts the report or notifies the Contractor of any inaccuracies or other inadequacy of the report.	Within 14 days after submission of the Handover Report	N/A
	11b (3)	Contractor submits final Handover Report, in which the comments of the Engineer are addressed and the report updated with any changes in the information contained therein.	One day prior to the Completion of the Contract	15 per day

2914 Operational Services

The operational services include the activities needed to maintain the satisfactory condition of the road assets, to assure their durability, as well as to satisfy the road users riding comfort requirement. This includes basically routine maintenance works but could include resurfacing, asphalt concrete overlays and replacement of road side assets such as road signs, crash barriers or other road related assets. These requirements are defined through Operational Service Levels, which the contractor needs to comply with during the entire Phase2.

There are 3 Categories of Operational Service Levels:

- a) **Operational Service Levels Category A:** They are the ones that are considered very important and need to be rectified within a short period of between 1 hour and 48 hours.
- b) **Operational Service Levels Category B:** They are considered less important. Although the Contractor is required to frequently control that these OSL are complied with, they will attract Payment Reduction Points only if they are not complied and detected during the Joint Monthly Inspection.
- c) **Operational Service Levels Category C:** They are controlled only once per year.

For each of the 3 Categories of Operational Service Levels the OLS number, the Item, the Operational Service Level, the Count Unit and the Payment Reduction Points are specified. For the Categories A and C, the Rectification Periods are specified as well.

The Count Unit defines the unit for the application of the Payment Reduction Points, which is either per item, per event, per 1 km of double lane roadway, per 100 m of shoulder, etc. The Count Unit of 1 km of double lane roadway means between two adjacent kilometer posts. The Count Unit per 100 m of double lane roadway refers to 1/10 of a kilometer, whereby the kilometer is divided into 10 sections of 100 m.

For each Item defined in the **Tables 29.3 to 29.4**, the Payment Reduction Points shall be applied when one or more Operational Service Levels are not complied with. Payment Reduction Points shall be applied for each Item only once, even if several OSL are not complied with for the same Item.

For any section of a four lane highway, "double lane roadway" means the two lanes on each side of the medium.

FOR REFERENCE ONLY

(1) Operational Service Levels Category A

Note: The detection and measurement of Operational Service Level shall be achieved by visual inspections using the appropriate measuring tools such as a ruler, tape measure, 3.5 m spirit level straight edge (unless indicated differently in the respective OSL), measuring wheel, odometer of a vehicle, reflectometer or equipment for compaction testing and for coring.

Table 29.3: Operational Service Level for Category A

OLS No.	Item	Operational Service Level	Count Unit	Payment Reductions Points	Rectification Period
A.1	Lane Closure	Maximum number of closed lanes at any given time: 1 lane Maximum length of closed lane: 300m Minimum distance between closed lane sections: 500 m Minimum advance notice: 24 hours	Per event	3pts.	12 hours
A.2	Potholes, including de-laminations on paved surfaces	Maximum diameter: 150 mm or equivalent surface area and /or Maximum depth: 30 mm. (Not more than 3 potholes in 1 km of double lane roadway. During the rainy season temporary patching of potholes is allowed. These potholes shall be patched permanently latest during the following dry season.)	Per item	3 pts.	48 hours
A.3	Slides up to 50 m ³	No slide of slope material on the road blocking any lane or shoulder Notes: Clearing of slides up to 50 m ³ shall be part of Maintenance Works. Clearing of slides over 50 m ³ shall be part of Emergency Works	Per event	4pts.	On roadway: 24 hours On shoulders: 48 hours
A.4	Oil spills on pavements	No oil spills more than 50 cm ³ shall be allowed	Per event	5pts.	6 hours
A.5	Other Obstructions on paved roadway and shoulder, unpaved shoulders and roadway (e.g.: rocks, tree branches, animal carcasses, abandoned Vehicles, etc.)	No obstruction posing a potential traffic or safety hazard shall be allowed. Maximum volume of obstruction that is not posing a traffic or safety hazard: 150 cm ³ Maximum quantity of debris that does not pose a traffic or safety hazard: 1 kg per 5 m ² pavement surface	Per 100 m of double lane highway	4 pts.	4 hours if hazardous 48 hours if not hazardous

OLS No.	Item	Operational Service Level	Count Unit	Payment Reductions Points	Rectification Period
A.6	Culverts, inlets, outlets, Drainage pipes	Not more than 25% of flow area or cross section is blocked during rainy season	Per structure	4pts.	24 hours
A.7	Ditches	Not more than 25% of flow area or cross section is blocked during rainy season	Per 50 m of ditch	4pts.	24 hours
A.8	Catch basis	Not more than 25% of sedimentation	Per structure	4pts.	24 hours
A.9	Regulatory and Warning signs	Missing sign Sign obscured by vegetation (sight distance of a driver of 100 m on the roadway)	Per sign	4pts.	24 hours
A.10	Temporary signs and safety devices for works	Missing sign or safety device Signs and safety devices not removed after termination of works	Per work place	4pts.	24 hours
A.11	Waterways	During rainy season: Free flow of water under bridge and up to 50 m upstream and downstream shall not be obstructed by more than 15% of the cross section of riverbed up to design clearance under bridge as per original design	Per bridge	4pts.	48 hours

(2) Operational Service Levels Category B

Note: Count unit of 1 km means between two adjacent kilometer posts. The detection and measurement of Operational Service shall be achieved by visual inspections using the appropriate measuring tools such as a ruler, tape measure, 3.5 m spirit level straight edge (unless indicated differently in the respective OSL), measuring wheel, odometer of a vehicle, reflectometer or equipment for compaction testing and for coring.

(ii) Table 29.4.1: Operational Service Levels for Bituminous/Asphalt Concrete Pavement

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.1.1	Cross fall of pavement of double lane roadway	Maximum tolerance: +0% and -0.5% for road sections repaired by Contractor	Per 100 m of double lane roadway	30 pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.1.2	Patches	Shape: Rectangular and parallel to road centerline. Circular patches less than 100 mm diameter are allowable; Maximum level tolerance with surrounding pavement: +/-10 mm including seals Materials: Equal or better than the surrounding pavement No unsealed cracks wider than 3 mm Temporary patching is allowed during rainy season, but permanent patching is required during the following dry season	Per patch	1 Pts
B.1.3	Linear Cracks	Maximum width of unsealed cracks: 5 mm of more than 10 m aggregated length. Sealant height tolerance: +/- 5 mm of adjacent pavement surface of more than 5 m aggregated length	Per 100 m of double lane roadway	2pts
B.1.4	Multiple cracks(alligator cracking)	Maximum cracked area of 20 m ² and maximum width of unsealed cracks: 8 mm. Sealant height tolerance: +/- 10 mm of adjacent pavement The "cracked area" is equivalent to the rectangular area fully enclosing the cracks, where the outermost crack is at least 100 mm inside the rectangle.	Per 1 km of double lane roadway	2 pts
B.1.5	Depression, Rutting, Corrugation	Maximum depth of 20 mm for an aggregated length of more than 50 m. Depth measured with a 1.2 m straight edge	Per 1 km of double lane roadway	2pts.
B.1.6	Heaves and Shoves	Maximum height: 25 mm measured with 1.2 m spirit level straight edge centered on the heave and adjusted parallel to the pavement surface	Per item	1 pts.
B.1.7	Surface defects	Ponding of water: Maximum depth of 20 mm at any point and surface area of more than 1 m ²	Per 100 m of double lane roadway	3 pts
B.1.8	Raveling	Less than an aggregated surface area of 15 m ² Raveling is defined as a loss of binder of more than 5 mm in depth or loss of surface material of more than 10 mm in depth.	Per 100 m of double lane roadway	3 pts
B.1.9	Edge damage	Maximum length from the edge of the paved roadway towards the centerline of the roadway of 150 mm and an aggregated length along the road edge of maximum of 2m	Per 1 km of double lane roadway	3pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
		Edge damage of pavement with sealed shoulders shall be treated like potholes, see items A.2 and B.1.2 above		
B.1.10	Edge drop off	Pavement edge shall not be lower than the adjacent paved shoulder and not higher than 20 mm at any point; Maximum height difference between pavement and adjacent paved road surfaces at junctions: +/- 30 mm for an aggregated length of 3 m Pavement edge shall not be lower than the adjacent unpaved shoulder and not higher than 50 mm for an aggregated length of 10 m Maximum height difference between pavement and adjacent unpaved paved road surfaces at junctions: +/- 20 mm for an aggregated length of 1 m	Per 1 km of double lane roadway	2Pts
B.1.11	Flushing, bleeding or Glazing	Within horizontal curves, approach to curves or intersections, and within an intersection: Maximum aggregated surface area 10 m ² In other road sections: Maximum aggregated surface area 100 m ²	Per 1 km of double lane roadway	4Pts
B.1.12	Surface dressing, overlays	Shape: Rectangular and parallel to the road center line Maximum level tolerance with surrounding pavement: - 0 mm and +15 mm Materials: Equal or better than the surrounding pavement Applications of surface dressings or overlays require the prior approval of the Engineer. Pavements have to be repaired and inspected by the Project Manager prior to applying surface dressings or overlays.	Per 1 km of double lane roadway	4Pts
B.1.13	Pavement Width	Road width after completing upgrading works to be maintained with a tolerance of + / - 50 mm For edge damage see B.1.11 above	Per 1 km of double lane roadway	3Pts

Table 29.4.2: Operational Service Levels for Unsealed Roads Crossing at

Intersections

Note: Unsealed roads crossing the main roadway at intersections shall comply with the following Operational Service Levels up to a distance of 10 meters (both ways) from the edge of the main roadway.

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.2.1	Surface defects	Maximum diameter: 250 mm or equivalent surface area and Maximum depth: 50 mm	Per item	1

(iii) **Table 29.4.3: Operational Service Levels for Sealed Shoulders**

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.3.1	Width	Maximum tolerance: +200 mm / -50 mm of design width	Per 1 km of shoulder	10 pts.
B.3.2	Cross fall	Maximum tolerance: +0% and -2% for shoulders repaired by Contractor	Per 1 km of shoulder	5 pts.
B.3.3	Potholes	Not more than 5 potholes smaller than 150 mm	Per 1 km of shoulder	2 pts.
B.3.4	Patches	Shape: Rectangular and parallel to road centerline. Circular patches less than 100 mm in diameter or equivalent surface area are allowable. Maximum level tolerance with surrounding shoulder: -10mm and +20 mm including seals Materials: Equal or better than the surrounding shoulder No unsealed cracks wider than 3 mm For repairs of the base of more than 5 m ² compaction data shall be supplied.	Per item	1 pts.
B.3.5	D5: Linear Cracks	Maximum width of unsealed cracks: 5 mm Maximum width of unsealed cracks: 3 mm for an aggregated length of 10 m Sealant height tolerance: +/- 10 mm of adjacent shoulder surface	Per 100 m of shoulder	2 pts.
B.3.6	Multiple Cracks (alligator cracking)	Maximum width of unsealed cracks of 3 mm for an aggregated surface area of more than 15m ² Sealant height tolerance: +/- 10 mm of adjacent shoulder The "cracked area" is equivalent to the rectangular area fully enclosing the cracks, where the outermost crack is at least 100 mm inside the rectangle.	Per 100 m of shoulder	2pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.3.7	Depression, Rutting, Corrugation	Maximum depth of an 25mm for an aggregated length of 10 m measurement of depth 1.2 m straight edge.	Per 100 m of Shoulder	1 pts
B.3.8	Heaves and Shoves	Maximum height: 25 mm measured with 1.2 m spirit level straight edge centered on the heave and adjusted parallel to the pavement surface	Per item	1 pts
B.3.9	Surface Drain Defects	Ponding of water: Maximum depth of 30 mm and maximum surface area of 2 m ²	Per 100 m of Shoulder	2 pts
B.3.10	Edge Damage	Maximum length from the edge of the paved shoulder towards the centerline of the road: 150 mm and an aggregated length along the road edge of 3 m	Per 100 m of Shoulder	2 pts
B.3.11	Edge Drop off	Shoulder shall not be higher than 60 mm for an aggregates length of 15 m than the adjacent surface on the outer edge	Per 100 m of Shoulder	1 pts
B.3.12	Vegetation	No vegetation growing on the sealed shoulders	Per 100 m of Shoulder	1 pts

Table 29.4.4: Operational Service Levels for Unsealed Shoulders

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.4.1	Width	Maximum tolerance: +200 mm / - 50mm of design width	Per 100 m of shoulder	2 pts
B.4.2	Cross fall	Maximum tolerance: +0% and -2% for shoulders repaired by Contractor	Per 100 m of shoulder	2 pts
B.4.3	Potholes	There shall be no pothole bigger than 350 mm in diameter or equivalent surface area and deeper than 30 mm There shall be not more than 10 potholes bigger than 200 mm in diameter and more than 30 mm deep in any continuous 1 km of shoulder	Per 1 km of shoulder	2 pts
B.4.4	Patches	Patches shall be of the same material as the surrounding road surface material, properly compacted and in level with the adjacent road surface within a tolerance of +/- 30 mm	Per 1 km of shoulder	1 pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.4.5	Ruts or corrugations	Maximum depth of 60 mm for an aggregated length of 50 m in any 1 km of shoulder Maximum depth measured with a 1.2 m straight edge	Per 1 km of shoulder	2 pts
B.4.6	Surface drain defects	There shall be no ponding of water more than 40mm deep with an area of more than 1 m ² within a distance of 1.5 m of the edge of the pavement	Per 100 m of shoulder	2 pts
B.4.7	Vegetation (e.g.: grass, weeds, plants)	Maximum height of 200 mm for an aggregated surface area of 100 m ²	Per 1 km of shoulder	2 pts

Table 29.4.5: Operational Service Levels for Drainage System, Slope Protection Structures

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.5.1	Slopes of drainage system	There shall be no negative slope.	Per 100 m of dual lane roadway	2 pts
B.5.2	Uncovered ditches and drains with or without lining	Maximum area of obstructed cross-section at any point: 15% during the non-rainy season; Maximum width of cracks in lined channels: 15 mm; Maximum diameter of holes: 40 mm; Maximum area of damaged lining: 10% per 5 m length	Per 50 m of ditches and drains	2 pts
B.5.3	Covered Drains	No major damage that may pose safety hazards to pedestrians or vehicles or allow water to leave the channel. Maximum area of obstructed drainage cross-section: 15% during the non-rainy season; Maximum damaged surface area of each cover: 10%; Maximum space between covers: 40 mm; Maximum area of obstructed cover openings: 20% (excluding covers sealed with asphalt or concrete); Maximum level tolerance with adjacent covers: +/- 20 mm; Maximum level tolerance with adjacent pavement: +15 mm and -20 mm.	Per 50 m of covered drains	2 pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.5.4	Culverts and headwalls	Culverts shall be structurally sound and firmly contained by surrounding soil or material with no major damage to allow water to seep through the wall of any culvert. Maximum area of obstructed culvert cross- section of 15% during the dry season; Headwalls shall be structurally sound and firmly contained by surrounding soil or material with no major damage	Per culvert or headwall	2 pts
B.5.5	Manholes, inlets, outlets, drainage pipes, and catch basins	Manholes, inlets, outlets, drainage pipes, and catch and sedimentation basins shall be structurally sound and firmly contained by surrounding soil or material with no major damage to allow water to seep through the structure Maximum sedimentation: 20% during the non-rainy season; Maximum area of obstructed cross section: 15% during the non-rainy season; Less than 30% of the cross-section shall be obstructed up to 2 m in front of any manhole, inlet and catch basin.	Per item	1 pts
B.5.6	Manhole cover, grates	Maximum level tolerance with surrounding surfaces: +/- 10 mm Less than 20% of the flow area is obstructed	Per item	1pts
B.5.7	Kerb sand gutters	Maximum surface damage: 10% of any 10 m length	Per 100 m length per item	1pts
	Debris racks	Debris racks shall be structurally sound and less than 30% obstructed		
B.5.8	Slopes and cuts	Slope protections and gabions in place and functional. Maximum cross sectional dimension of erosion gullies: 200 mm x 200 mm for more than 10m	Per 100 m of slope measured parallel to the centerline of the roadway	1pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.5.9	Retaining walls, cut-off walls and similar structures	Structurally sound and not more than 100 mm displaced from the original place and firmly contained by surrounding soil or material Maximum surface damage: 5% of any surface area of 1m ² ; Maximum width of cracks on concrete structures: 5 mm; Maximum width of cracks on non-concrete structures: 10 mm; Maximum numbers of blocked weep holes: 10% per structure.	Per item	1pts

Table 29.4.6: Operational Service Levels for Road Signs, Pavement Markings and other Safety Devices

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.6.1	Regulatory, Warning, Information Signs and Hazard markers	All signs as per Drawings are in place, Uniform intensity, clean, legible and structurally sound; Minimum visibility distance at day and night (with low beam headlights) 150 m or if in doubt more than 70% of the required original retro reflectivity; Maximum bending of sign face from original position: 20mm; Post must be in place, structurally intact and properly connected to the foundation with less than 5% of its surface corroded; Maximum inclination of posts from the vertical: 5%.	Per item	2pts
B.6.2	Road Markings	All markings as per Drawings are in place; Uniform color and intensity, legible and firmly attached to pavement; Minimum visibility distance at night: 150 m with low beam headlights; Maximum length of damaged or missing edge or centerline markings: 15 m; Maximum area of damaged or faded sign markings or markings of pedestrian crossings: 20%; Maximum misalignment: 30 mm	Per 100 m of double lane roadway	2pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.6.3	Raised pavement markers or reflective pavement studs	Maximum missing/damaged markers: 5; Maximum number missing/damaged markers in curves:1; Minimum visibility distance at night:150 m with low beam headlights; The reflective area of markers is higher than the pavement level.	Per 100 m of double lane roadway	2pts
B.6.4	Kilometer posts	Present, properly painted, clean, legible, and firmly founded on the ground; Maximum inclination from vertical:8 degrees.	Per item	1 pts
B.6.5	Drainage markers, bollards or similar structures	All structures as per drawings are in place; Properly painted, clean, 90% free of corrosion or damages Maximum inclination from vertical: 8 degrees	Per item	1 pts
B.6.6	Kerb stones, traffic islands	Maximum surface damage of any kerbstone:10% Kerb stones and traffic islands shall not pose potential hazard to pedestrians	Per 1 km of double lane roadway	1 pts
B.6.7	Concrete barriers	All structures as per drawings are in place, Properly painted, clean and structurally sound; Maximum misalignment: 100 mm; Maximum damages: 5% of the surface area of any km of barrier.	Per 1 km of double lane roadway	1 pts
B.6.8	Guard rails and safety or crash barriers of metal	Guard rails and safety or crash barriers are in place; Not more than 3 reflectors are missing or not functional Properly painted where required and free of severe corrosion; Structurally sound with all fixing bolts present and secure; Maximum misalignment: 100 mm of the original horizontal or vertical position.	Per item and per 50 m length	2pts
B.6.10	Highway lighting	Lightning pole must be present, functional and more than 95% free from damage and corrosion; Electrical installations must be electrically safe and functional	Per 1 km of double lane roadway	2pts

Table 29.4.7: Operational Service Levels for Vegetation and Litter Control

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.7.1	Vegetation (Grass, weeds, plants)	Vegetation height shall be between 50 mm and 600 mm within 50 cm of the outer edges of drainage ditches or the outer edge of the shoulders or embankments; For grass and weeds there shall be not more than 20 m² deviations from the above-mentioned heights in any continuous 100 m of double lane road section; Vegetation height shall be between 30 mm and 300 mm around: • Edge marker posts • Signposts • Bridge end and culvert markers • Guardrails • Sight rails • Lighting Columns • Bridge abutments; Vegetation height shall be less than 250 mm around or in: • Kilometer post • Drainage markers • Culvert ends • Culvert headwalls • Side drains • Culvert waterways • Surface water channels • Kerb and channel • Lined channels • All sealed surfaces • Bridge decks. Vegetation height shall be between 30 mm and 200 mm on: • Medians • Traffic islands • Verges AND There shall be not more than 30 m² deviations from the above-mentioned heights in any continuous 100 m of double lane road section. Vegetation shall not • Hinder the free flow of water.	Per 1 km of the centerline of the double lane roadway	3pts

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.7.2	Trees, limbs, Shrubs and creepers located within the right-of-way	There shall be not shrubs or trees encroaching into the Vegetation Free Zone from the side or top. The Vegetation Free Zone is the area up to 5 m above the roadway and shoulders, and 3 m above a zone of 2 m lateral clearance besides shoulders; Vegetation shall not obscure any road signs or markers or limit sight distance on the inside of curves by more than 50 m; There shall be no dead or leaning trees or other vegetation within the right-of-way; Approval of the Employer is required to remove trees with stem diameter more than 100mm. The Contractor shall take care planted vegetation during the construction of the road they shall not be dead.	Per 1 km of the centerline of the double lane roadway	2 pts
B.7.3	Litter	Maximum number of litter items greater than a fist size in any 1 km of double lane road: 50 pieces in the right of way outside built-up areas	Per 1 km of the centerline of the double lane roadway	15 pts
B.7.4	Structures made by third parties	No structures like billboards of third parties within the right of way unless authorized by the Employer.	Per 1 km of the centerline of the double lane roadway	

Table 29.4.8: Operational Service Levels for Bridges

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.8.1	Approach to bridges	Maximum level tolerance between bridge deck and approaches: +/- 25 mm measured from the end of deck up to 1.5m into the approaches	Per bridge	2 pts
B.8.2	Structures	Less than 10% of each the structural element shall show corrosion or missing paint The color of the paint shall be uniform and of the same intensity	Per bridge	3 pts
B.8.3	Expansion joints	More than 95% of each expansion joint shall be clean, without major damage, and shall not pose any hazard to	Per bridge	2 pts

		vehicle		

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OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
B.8.4	Drains	More than 80% of drains of each bridge shall be more than 80% open	Per bridge	3 pts
B.8.5	Railings	Less than 10% of the surfaces of the railings shall show corrosion or missing paint; Paint shall be of uniform color and of same intensity.	Per bridge	1pts
B.8.6	Scouring around bridge pile sand erosion retaining walls	Erosion around bridge abutments and piers and on retaining walls (gabions, pitch, concrete) shall be less than 5% of the respective surface areas; Cracks shall be less than 30 mm wide for pitch walls and less than 10 mm for concrete walls	Per bridge	2 pts
B.8.7	Waterways	Free flow of water under bridge and up to 50 m upstream and downstream shall not be obstructed by more than 15 % of the cross section of riverbed up to design clearance under bridge as per original design	Per bridge	3pts

(3) Operational Service Levels Category

a) Pavement Roughness

The indicator to be used to determine the road roughness will be the International Roughness Index (IRI), whose measure unit is expressed in meters per kilometer (m/km).

An equipment meeting the Class III: Response Type Road Roughness Measuring System (RTRMS) precision shall be used to measure the IRI. The measure of roughness shall be made in a continuous manner in the wheel-tracks of each lane of the carriageway. The equipment shall be calibrated/validated in accordance with the manufacturer's recommendations and from observation during previous use.

The IRI shall be measured at the end of Phase 1: Upgrading Works, at the beginning of Phase 2 and in 12 months' interval thereafter. The final measurement of IRI will be done 3 months before the end of Phase 2. The measurement shall be made in the presence of the Employer's and/or Engineer's Representative.

Table 29.5 Operational Service Level for Pavement Roughness Survey

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
C.1.1	Roughness of pavement of highway	Lane-wise average IRI of the entire contract road length less than 3 m/km	Entire Contract Road Length	1,000
C.1.2	Roughness of pavement of highway	Average IRI of any continuous one lane kilometer less than 4	1 km lane	100

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
		m/km		

b) Surface Distress Index Survey

Any unsatisfactory performance of a pavement short of failure is the surface distress. Surface distress comprises cracking, disintegration (potholes), deformation, texture deficiency; pavement edge defaults and maintenance work (patchwork). The above distress shall visually assessed and recorded using a cumulative index called a "Surface Distress Index (SDI)". The method shall be simplified, "drive and walk" and also shall be by video recording the road and watching throughout the length of the roads which have been adopted instead of assessing only certain portion of the road.

The SDI is a six level rating index from 0 to 5. The rating 0 indicates a perfect pavement that is without any defects and rating 5 indicates a maximum possible deterioration (Table 29.6.1 SDI Score). The distress elements are divided into two groups: major defects and minor defects. (Table 29.6.2 Definition of Minor and Major Defects for Bituminous Roads)

Table 29.6.1 SDI Score

Scores	Incidence of minor defects	Incidence of major defects
0	None	None
1	1 to 200 sq.m. per 1000 m.	1 Occurrence
2	<50% of the area	2 to 4 occurrence
3	= 50%	< 30% of area
4		= 30% or potholes and base exposed < 20% of the area
5		Potholes and exposed base = 20% of the area

Table 29.6.2 Definition of Minor and Major Defects for Bituminous Roads

S.N	Types	Sub Type Abbreviation	Sub Type Definition
Minor Defects			
i.	Cracking	CN	Narrow interconnected cracks (1-3 mm width)
		CL	Line cracks (longitudinal or transverse)
		CS	Sealed cracks
ii.	Maintenance Patches	M	Distinct localized patchwork has been applied
iii.	Texture	RA	Shallow ravelling or scabbing (<20 mm)
		S	Slickness (texture depth, 1 mm)
		B	Bleeding
iv.	Short Edge Break	ES	Short edge break (> 100 mm < 5 m length)
Major Defects			
i.	Cracking	CW	Wide interconnected cracks (>3 mm)
ii.	Texture	V	Scabbing (>20 mm depth)

S.N	Types	Sub Type Abbreviation	Sub Type Definition
iii.	Rutting	RL	Rut depth >15 mm
iv.	Pothole	P	Pothole (>30 mm depth, >150 mm dia/length)
v.	Exposed base	G	Exposed base or sub base or gravel
vi.	Edge Break	LE	Long edge break (>100 mm, >5 m Length)
vii.	Depression/humps	D	Corrugations of any type and extent

Scoring system of the various distress shall be as per HMIS established system, SDI is averaged over each road link or section under consideration and can only be used to provide an objective assessment of pavement condition.

The SDI shall be measured at the end of Phase 1: Upgrading Works, at the beginning of Phase 2 and in 12 months' interval thereafter. The final measurement of SDI will be done 3 months before the end of Phase 2. The measurement shall be made in the presence of the Employer's and/or Engineer's Representative.

Table: 29.6.3 Operational Service Level for Surface Distress Index

OLS No.	Item	Operational Service Level	Count Unit	Payment Reduction Points
C.2.1	Surface Distress Index of Highway	Lane-wise average SDI of the entire contract road length less than 1.5.	Entire Contract Road Length	500
C.2.2	Surface Distress Index of Highway	Average SDI of any continuous one lane kilometer less than 1.7.	1 km lane	50

c) Falling Weight Deflectometer (FWD) Survey

Falling weight deflectometer (FWD) is a non-destructive impulse-loading device in which a transient load is applied to the pavement and the deflected shape of the pavement surface is measured. It is used to evaluate structural condition of the pavement.

Falling Weight Deflectometer (FWD) is an impulse-loading device in which a transient load is applied to the pavement and the deflected shape of the pavement surface is measured. The working principle of a typical FWD is illustrated in Fig. 1. DO, D1, etc., mentioned in Fig. below are surface deflections measured at different radial distances. Impulse load is applied by means of a falling mass, which is allowed to drop vertically on a system of springs placed over a circular loading plate. The deflected shape of the pavement surface is measured using displacement sensors which are placed at different radial distances starting with the center of the load plate. The working principle of FWD: a mass of weights is dropped from a pre-determined height onto a series of springs/ buffers placed on top of a loading plate. The corresponding peak load and peak vertical surface deflections at different radial locations are measured and recorded.

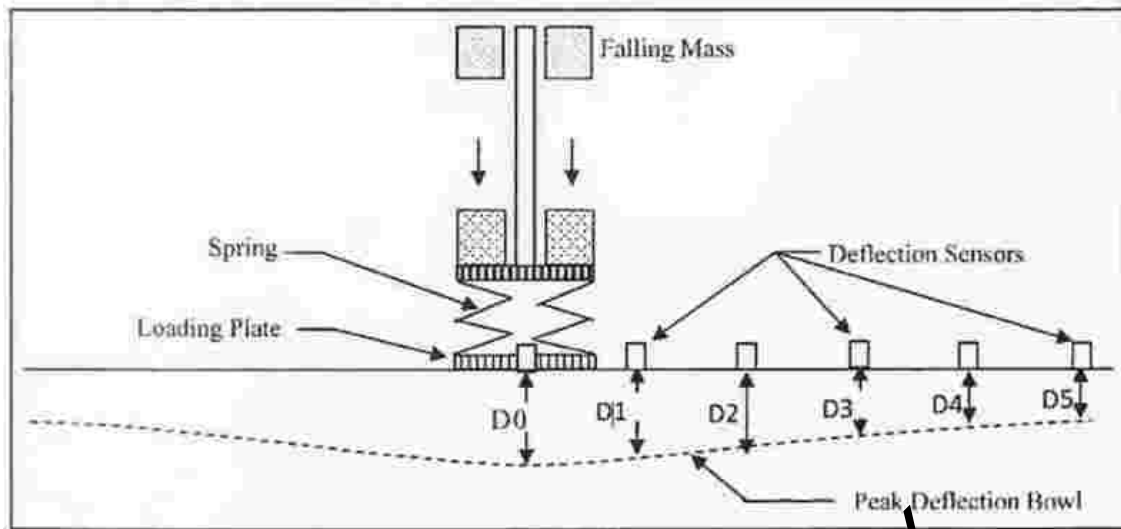


Figure:29.3 Working Principle of Falling Weight Deflectometer

The FWD shall be measured as per IRC:115-2014 "Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements using Falling Weight Deflectometer (FWD) Technique" at the end of Phase 1: Upgrading Works, at the beginning of Phase 2 and in 12 months' interval thereafter. The final measurement of FWD will be done 3 months before the end of Phase 2. The measurement shall be made in the presence of the Employer's and/or Engineer's Representative.

The resulting load-deflection data shall be interpreted through appropriate analytical techniques, to estimate the elastic moduli of the pavement layers. The computed moduli are, in turn, used for:

- (i) The strength evaluation of different layers of in-service pavements;
- (ii) The estimation of the remaining life of in-service pavement;
- (iii) Determination of strengthening requirement, if any; and
- (iv) Evaluation of different rehabilitation alternatives.

The technical report on FWD comprising measurements, interpretation, analysis and recommendations shall be submitted to the Engineer.

(4) Verification of Operational Service Levels

a) Service Level Inspections by the Contractor

Under the terms of the contract, the Contractor is required to inspect all roads and road assets that have to be maintained under this contract with sufficient frequency to ensure that they always comply with the Operational Service Levels (OSLs). The contractor shall therefore develop and implement a regime of inspections, sufficient to comply with this requirement, and shall document this inspection regime in his Operational Plan.

Any non-compliance with the OSLs discovered during any inspection shall be recorded. The record of each defect shall comprise:

- (i) Its location reference (GPS position);
- (ii) Attributes of the defect;

(iii) As appropriate, further textual notes;

(iv) A photograph taken with a digital camera and bearing a date and time stamp.
The same procedure applies to the repair of each defect.

The record of each inspection shall be recorded and shall be included in the Monthly Reports.

The contractor shall submit the Contractor's Monthly Operational Service Level Inspection Report and the Monthly Evaluation Form for Compliance with Operational Service Levels to the Engineer on the last working day of the respective month. The format of these tables shall be submitted by the Contractor for the Employer's approval within 15 days after the Commencement Date of Phase 2.

For all non-compliances with Operational Service Levels detected by the Contractor during a month and that are rectified during the same month, no payment reductions will be made with the exception of Operational Service Levels of the Category A. In this case Payment Reduction Points will be applied if the contractor does not rectify the non-compliance within the rectification period defined in Table 29.3.

The Contractor shall conduct night inspections at least every month at the end of the month to ensure that when driving at night the road is safe and signs are readily visible at night.

b) Inspections by the Engineer

The Engineer may carry out inspections at anytime and anywhere on the roads included in the contract in order to assure that:

- The Contractor is complying with the Operational Service Levels of the Category A,
- The Contractor has reported the compliance with the Operational Service Levels correctly, and
- The Works are executed in accordance with the Contract provisions.

c) Joint Monthly Inspections by the Engineer and the Contractor

Joint Monthly Inspections are carried out by the Contractor (through his Performance Monitoring Unit) under the supervision of the Engineer. The main purpose of the Joint Monthly Inspections is to enable the Employer to verify the information given by the Contractor in his Monthly Evaluation Form for Compliance with Operational Service Levels.

Starting on the first working day of each month the Contractor and the Engineer shall jointly inspect at least 50% of the road length to check the correctness of the Contractor's Monthly Operational Service Level Inspection Report of the previous month. The selection of road sections to be inspected shall be decided by the Engineer. Any additional non-compliance detected during the joint monthly inspection will be recorded. If the Engineer finds more than 20% additional number of non-compliances during this inspection than have been recorded by the Contractor in his Monthly Operational Service Level Inspection Report for the inspected road sections, the Payment Reduction Points for all non-compliances detected by the Engineer will be multiplied by a factor of four for the respective month.

In every 3 months, the Joint Monthly Inspection shall include an inspection by night.

As a result of the joint monthly inspection a Memorandum of Non-Compliance with Operational Service Levels shall be issued and signed by the Contractor and the Employer.

Based on the Memorandum of Non-Compliance with Operational Service Levels, the Employer will, within 21 days, review and correct as necessary the Contractor's monthly statement and issue the corresponding Interim Payment Certificate to the Contractor in accordance with the General Conditions of Contract.

2915 Payments

1) Basis of Payments

All works and services performed in Phase 2 are deemed to be covered and paid for by the Monthly Lump Sum per kilometer indicated in the Bill of Quantities. Only Day works and Emergency Works shall be paid on unit price bases as specified in the Bill of Quantities.

The works and services shall cover all costs associated with Contract obligations during Phase 2, which are not specifically provided for elsewhere, including (but without being limited to) the provision of insurances, security, implementing quality plan requirements, all social, environmental, safety and traffic management requirements, conducting various inspections, surveys, etc.

2) Payment Reductions

In accordance with these Specifications, payment reductions are applied in case of non-compliance with Operational Service Level requirements.

Where the Contractor fails to comply with Management Service Levels or Operational Service Level, the Employer shall deduct moneys from payments due under the Contract. Payment Reduction Points are specified for each non-compliance with Service Levels.

For the **Management Service** Levels Payment Reduction Points shall be applied when the Contractor does not comply with the Management Service Levels defined in Table 29.2 above.

For Operational Service Levels **Category A**, the Payment Reductions Points shall be applied when the Engineer detects the non-compliance and communicates the non-compliance to the Contractor. After receipt by the Contractor of the communication of the Engineer concerning the non-compliance, the time starts for the Contractor to rectify the respective non-compliance within the Rectification Period in Table 29.3. Payment Reduction Points shall be applied if the Contractor does not rectify the non-compliance within the Rectification Period. For each additional Rectification Period in which the Contractor does not rectify the non-compliance further Payment Reduction Points shall be applied until the non-compliance has been rectified. If the same non-compliance is not rectified within one month after the date of the first detection, the Employer may contract a third party to rectify the non-compliance at the cost of the Contractor. The same procedure shall be applied if the Contractor detects a non-compliance, except that no Payment Reduction Points shall be applied for the detection of the non-compliance.

For the Operational Service Levels **Category B**, the Payment Reduction Points shall be applied for any non-compliance of OSL detected by the Contractor at the end of the month or the Joint Monthly Inspection. If any non-compliance has not been rectified before the next Joint Monthly Inspection, the non-compliance will be counted. In addition, 1 Payment Reduction Point shall be applied for each calendar day the non-compliance is not rectified. If the same non-compliance is still not rectified until the following Joint Monthly Inspection, the Employer may contract a third party to rectify the non-compliance at the cost of the Contractor.

For the Operational Service Levels **Category C**, The Payment Reduction Points shall be

applied when the Contractor does not rectify the non-compliance within the Rectification Period. For any further period of one month, in which the non-compliance is not rectified, the Payment Reductions Points shall be applied again, until the non-compliance is rectified. If the same non-compliance is still not rectified within 6 months of the first detection, the Employer may contract a third party to rectify the non-compliance at the cost of the Contractor.

2916 Emergency Works

(1) Description of Emergency Works

The Contract includes Day works and Provisional Sum for Emergency Works to be executed during Phase 2 of the Contract. Emergency Works are designed to repair damage to the roads caused directly by natural or manmade phenomena with consequences occurring either in the area of the roads or elsewhere, but with a direct impact on the roads. Such phenomena may include: tropical depression, rainfall and winds of extraordinary intensity and/or duration, major landslides within or outside the right-of-way, floods with water levels above normal maximum flood levels, earthquake, major accidents or similar events causing considerable damage to the road.

Damage requiring repair by Emergency Works can be generally described as for example:

- (i) Complete destruction of a culvert or other similar structure,
- (ii) Road washouts or other damage equivalent to more than 50 m³ of material on a road section of 500 meters length,
- (iii) Submersion of road along more than 100 meters length provided that the submersion is, in the opinion of the Employer, not the result of deficiencies in the drainage system or of insufficient maintenance of drainage structures, among others.

Eligible damage does not include "normal" damage, such as trees falling on the road, minor erosion of the road and embankments and minor damage caused by traffic accidents, which shall be made good by the Contractor as part of the Works. Providing full support to the police and road users and arranging of signing and clean-up of the site or similar works as necessary are part of Works.

(2) Obligations of Contractor during Emergencies

During execution of Emergency Works the Contractor shall ensure that Operational Service Levels on the road are maintained. In particular, the Contractor shall ensure the normal use of the road including those sections affected by emergencies.

The Contractor shall provide the notice with description of the emergencies and expected date/time of reopening of the road, by the public media (FM Radio, Television or/and established multimedia display board) of the emergency with road closer, partial closer or any other obstacles for vehicular movement to the road user.

The Contractor shall take the measures necessary to reopen the road to traffic at the earliest possible time and maintain the road open during Emergency Works, without being entitled to any separate compensation for those measures. If necessary, the Contractor shall provide temporary detour roads as approved by the Employer.

(3) Minor Works

Minor works that are below the thresholds indicated in the following Table 29.5 shall be carried out by the Contractor as part of the normal PBM Works, and a Work Order is not required. The Contractor shall inform the Employer of the damage and the rectification works undertaken.

Table 29.5: Thresholds of Some Activities for the Normal PBM Works

Activity	Unit	Maximum quantity per event to be rectified under normal PBM Works
Slides of material	m ³	50
Asphalt concrete	m ³	7
Sub-base course	m ³	25
Base course	m ³	15
Concrete (of any type)	m ³	5
Stone masonry	m ³	10
Gabion masonry	m ³	15
Embankment	m ³	50

(4) Procedure for Requesting Emergency Works

When damage falling under Emergency Works results in a reduction of any of the Operational Service Levels specified in this Contract, the Contractor shall make a formal request to the Employer to allow him to carry out Emergency Works to rectify that damage.

In such a case, the Contractor shall:

- (i) Immediately inform the Employer of his intention to do so by telephone, SMS or other means,
- (ii) Document the circumstances of the event and the damage caused through photographs, video and other suitable means,
- (iii) Prepare a written request stating the type of works he intends to carry out, their exact location, the estimated quantities and costs, the time required to complete the works and any other information as the Contractor may deem necessary. The request for Emergency Works shall be made immediately after the Contractor becomes aware of the existence of the damage.

Within 48 hours after receipt of the request, the Employer shall evaluate the request based on a site visit, and issue a Work Order to carry out the Emergency Works. The Work Order shall specify the type of works, their estimated quantities, estimated valuation, and the time allowed for their execution.

(5) Operational Service Levels

The Emergency Works shall comply with the requirements of the Specifications and/or applicable Standards and be subject to the Employer's approval. There is no individual Operational Service Level requirement for these works.

The Emergency Works are intended to assist the Contractor in bringing the road up to the

required Operational Service Levels within the time frame allowed by the Employer in the corresponding Work Order.

Failure to bring the road to the required Operational Service Levels within the stated time frame shall result in deductions of the Monthly Payments to be decided by the Employer. The payment deductions shall not be higher than 15% of the amount for the Emergency Works.

The Contractor shall correct all non-conformances relating to Emergency Works as specified in the Work Order prior to the Time for Completion of Phase 2. If any section of the road does not meet the Operational Service Levels at the Time for Completion due to uncompleted Emergency Works, Liquidated Damages shall apply.

If the maximum amount of Liquidated Damages has been exhausted and the non-conformance on road has not been rectified, the cost of remaining rectifications shall be recovered from Retentions, Performance Security, any/or any other monies due or that may become due to the Contractor.

(6) Measurement and Payment

The quantities of completed Emergency Works shall be measured net on drawings or measured at Site, whichever is more appropriate as determined and approved by the Employer. Where required by the Employer, the Contractor shall verify both quantity and quality of the completed works.

Valuation of the completed Emergency Works shall be as established in the corresponding Work Order issued by the Employer for the particular work using appropriate BOQ Unit Rates and Prices or Day works Rates, if appropriate.

For the emergency works the budget is allocated in the Day works and/or the provisional sums, as appropriate for the payment of the works. The payment for emergency works shall be made at existing Bill of Quantities (BoQ) rates or at appropriate Day works rates for each corresponding BoQ pay items with the CPA (Change in Price Adjustment) Such payments shall not be subject to additional overhead as per because of the fact that the BoQ and Day works rates quoted by the Contractor are with his overhead.

The payment beyond the contract period to the ADB shall paid by the Government of Nepal budgetary provisions.

2917 Appendices for Phase 2

Appendix A: Additional Technical Specifications

(a) Patching of Potholes/Delaminating

(i) General

This covers the repair of the potholes, delaminating and the damaged bituminous surface. The area to be repaired shall be located by the Contractor and marked out in square or rectangular shape, 30 mm beyond the extent of the damaged area, and then it shall be excavated with suitable equipment. The edges shall be cut vertically down to the required depth where the lower layer is suitable without any loose material. If the existing road base is damaged, it shall be also excavated to a depth required and removed as directed by the Engineer. The surface of the excavated area shall be thoroughly cleaned with compressed air to remove all dust and loose particles. The patching then shall be carried out as detailed below. On completion, the patch shall have the tolerances of -0 mm+10 mm, under a straight edge laid across it.

(ii) Shallow Potholes and Delaminating

Shallow patching shall consist of repairs to the bituminous surface to a depth not exceeding 40 mm.

The area to be repaired shall be excavated and prepared as described in (i) above. The cleaned surface shall be primed with MC 30 cutback bitumen. The sides shall also be tacked / primed with cut back bitumen using brush. The excavated area shall, then, be filled with asphalt premix material. The premix shall have a net bitumen content of 5% to 6% by weight or as per design mix. It shall be compacted with approved mechanical tampers/vibratory roller. After compaction, the surface of the patched area shall be true to the lines and levels of the surrounding existing surface (no "skin patches" are allowable). All loose and/or surplus materials on the surface shall be removed.

Potholes of less than 80 mm in diameter or equivalent surface area do not need to be marked out in square or rectangular shape. They may be filled with asphalt premix after careful cleaning with compressed air to remove all dust and loose particles.

(iii) Deep Patching

Deep patching shall consist of repairs to the bituminous surface to a depth exceeding 40 mm.

The area to be repaired shall be excavated and prepared as described in (i) above. The excavation shall be filled with base course material with each layer not exceeding 75 mm in thickness and duly compacted up to the existing crust thickness less 40 mm. The surface of the compacted base after thoroughly cleaned with compressed air to remove all dust and loose particles shall be primed with MC 30 cutback bitumen and the sides shall also be tacked/primed with cut back bitumen using brush. The top 40 mm portion above the repaired pothole shall be filled with asphalt premix material. The premix shall have a net bitumen content of 5% to 6% by weight or as per design mix. It of the patched area shall be true to the lines and levels of the surrounding existing surface (no "skin patches" are allowable). All loose and/or surplus materials on the surface shall be removed.

(b) Bituminous Surface Edge Repair

Where loss of bituminous surfacing exists at the edge without damaging the base, edge repair shall be performed as described for shallow patching.

Where damage of the edge extends into the base/subbase, the edge repair shall generally be carried out as specified for deep patching. Excavation shall be to a minimum width of 750 mm covering not less than 200 mm of the carriageway and not less than 500 mm of the shoulder.

The excavated area shall be filled with base material to a level 40 mm or below the existing level of the road and compacted as mentioned in deep patching. The surface of compacted base and sides of the excavated area shall be primed/tacked with MC 30 cut back the area shall be filled with asphalt premix material and compacted as specified for the patching. The final surface shall match with the adjacent surface in line and levels.

(c) Repair of Failed Sections

The depth of all dig outs to repair failed sections shall be a minimum 400 mm and all excavated material shall be removed from the site. Where full depth excavation is required, the limit of excavation shall be 25 mm below the existing sub-grade level.

Work shall include the supply, placement and compaction of base course material and the construction of a surfacing layer of 40 mm asphalt premix material including prime/tack coat.

(d) Removal of Landslide Material

Material from major land slips or other debris or unsuitable material shall be removed and carted to a spoil site approved by the Employer. Work shall include clearing all debris and material from the site, loading, cartage to spoil and disposal.

Appendix B Environmental Management and Safety

(a) General

The Contractor shall be solely responsible for any remedial or mitigation measures required by the environment-related effects of any of his maintenance activities. The Contractor shall demonstrate compliance with all environmental stipulations for this project in his Environmental Management Plan (EMP). In case of an environmental problem, the Contractor shall immediately notify the Employer and seek advice on his proposed corrective action. Among the situations that may arise are complaints or legal actions by third parties on matters such as environmental damage to property and natural resources, ground subsidence, interruption of groundwater flow and surface or groundwater contamination.

The Contractor shall conform to the Environmental Management Plan, which was prepared by the Employer for this Contract. The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of project activities. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated.

The Contractor is encouraged to recruit local skilled and unskilled labour to increase direct benefits in the project area and to minimize potential environmental issues related to construction camps, disease transmission and cultural disputes. Specific requirements in this regard are noted below. In conformance with the Specifications of which this environmental specification is a part, the Employer may withhold payments and/or stop work in the event of serious or repeated violations of the conditions stipulated herein.

(b) Compliance with Environmental Laws and Regulations

The Contractor shall conform to the Government of Nepal's laws for the protection of the environment and other relevant legislation in force, or in the absence of these, with Asian Development Bank requirements.

The Contractor shall comply with all current environmental laws and regulations of the country, be they national or local, relating to (but not limited to) the following:

- Dust
- Noise
- Vibration
- Air pollution
- Water contamination
- Solid waste disposal
- Liquid waste disposal
- Occupational health and safety
- Sanitary conditions (water supply, sewerage, etc.).

(c) Avoidance of Nuisance

The Contractor shall be responsible for ensuring that no earth, rock or debris is deposited on public or private rights-of-way as a result of operations, including any deposits arising from the movement of plant or vehicles. The Contractor shall ensure that vehicles exiting the Site of the works do not carry excessive material on the tires.

All water and waste products arising from the site operation shall be collected and removed from the site via a suitably designed temporary drainage system. They shall be disposed of at a location and in a manner that will not cause pollution problems or other nuisance.

The Contractor shall construct, maintain, remove and reinstate as necessary, temporary drainage works and take all precautions needed to avoid damage by flooding and silt transport in the works. He shall also provide adequate precautions to ensure that no spoil or debris of any kind is allowed to be pushed, washed down or deposited on land adjacent to the site.

In the event that any spoil or debris from maintenance works is deposited on adjacent land or washed into the area, then all such materials shall be immediately removed and the affected land restored to its natural state by the Contractor, to the satisfaction of the Employer.

(d) Air Quality

The Contractor shall not install any furnaces, boilers or other similar plant or equipment using fuel that may produce air pollutants without prior written consent from the Employer.

The Contractor shall not burn debris or other materials on the Site.

The Contractor shall implement dust suppression measures that shall include:

- Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate and other similar materials, when dust is likely to be created and to dampen them during dry, windy weather.
- The Contractor shall require that all vehicles, while parked on the site have their engines turned off.
- The Contractor shall check all equipment and machinery on the site at least once

per week and make any necessary corrections or repairs to ensure compliance with safety and air pollution requirements.

- The Contractor shall ensure that vehicles are properly cleaned (bodies and tires free from sand and mud) prior to allowing them to leave the Site.
- The Contractor shall provide necessary cleaning facilities on site and ensure that no water or debris from such cleaning operations is deposited off-site.
- The Contractor shall ensure that trucks used for transporting materials to and from the site are covered with canvas tarpaulins or other type of cover acceptable to the Employer, properly secured to prevent debris and/or materials falling from, or being blown off the vehicle(s).

(e) Water Quality Management

The Contractor shall ensure that no tools or machinery are washed in any water source or areas that drain into a watercourse, canals or channel.

The Contractor shall ensure that all temporary maintenance facilities are located at least 50 m away from any water body.

The Contractor shall check weekly that all equipment is prevented from dripping oil and other lubricants and to ensure that all lubrication and repair operations are carried out only in approved maintenance areas.

(f) Noise and Vibration Control

The Contractor shall consider noise and vibration as an environmental constraint in planning and executing maintenance works.

(i) Noise Control:

The Contractor shall at his own expense, take all appropriate measures to ensure that work carried out by the Contractor, whether on or off the Site, will not cause any unnecessary or excessive noise that may disturb local residents.

Night time work will require the prior written approval of the Employer.

(ii) Vibration Control:

The Contractor shall take all necessary measures to ensure that machinery used in the Works will not cause any excessive vibration that may cause damages to any building or structure.

The Contractor shall be responsible for repairing any damage caused by vibrations generated from or by the use of any equipment, plant and machinery.

(g) Environmental Reports

The Contractor shall submit regular environmental reports to the Employer as a requirement of the EMP. A summary report shall be submitted as part of the Monthly Progress Report. Reports shall comprehensively address all relevant aspects of environmental management.

(h) Environmental Inspections

All project locations including maintenance work sites, plant and equipment areas, staff offices, camps and accommodations that are directly or indirectly associated with the Contract shall be regularly inspected for compliance with the requirements of the EMP and related statutory regulations.

(i) Safety

The contractor shall ensure the all safety provisions as par clause 111 of this Specifications.

FOR REFERENCE ONLY

Section 3000 – Sub-Surface Geotechnical Investigation

Delete Clause 3001 "Scope" and substitute:

3001 Scope

The Contractor shall carried out confirmatory sub surface exploration for cross checking of design of foundation. It shall be planned in such a way that the profiles of different types of soil and/or rock up to the desired depth for at least in the full length of the proposed bridge are recorded and other information such as physical/mechanical properties like grain size distribution, sensitivity, existence of deleterious materials, etc. in soil and/or ground water etc. are also determined.

Delete Clause 3002 "Field Investigation" and substitute:

3002 Field Investigation

The field investigation of subsurface shall be carried out in three phases, namely, Reconnaissance, Preliminary Explorations and Detailed Explorations.

(1) Reconnaissance

It shall include review of available bore log, topographic and geological information, data/report from previous investigations and site examination, and design drawings and calculations.

(2) Preliminary Explorations

Detail subsoil exploration shall be planned the information and data obtained after reconnaissance investigation, as per above clause 3002(1).

Preliminary exploration shall be carried out to determine the soil profile showing the boundaries between the different types of soil and between loose and dense parts in the same type of deposits. For this purpose, as a first step, a suitable type of sub-surface sounding (e.g. static or dynamic cone penetration test) shall be carried out. As many soundings as necessary shall be made until penetration data is complete to provide the general shape and the trend of boundaries of the various soil deposits. Confirmatory drill holes shall then be made at one or two locations where average condition prevails and near those points where the penetration diagrams indicate maximum deviations from the average.

(3) Detailed Confirmatory Explorations

The scope of the detailed confirmatory exploration shall include boring program based on data obtained after preliminary investigations. The bridge site, types of structure with span arrangement and the location & type of foundation are already decided during the detailed design phase. The Contractor shall drill one borehole at each pier and abutment to the design depth plus 20% of design depth or as directed by the Engineer of the piles at that location. The bore log shall be provided to the Engineer within three days of the completion of each borehole for his assessment of the consistency of the subsurface conditions with those used for design.

For bridge works, the investigations shall be comprehensive enough to enable the designer to estimate or determine the followings:

- (a) The engineering properties of the soil and/or rock,
- (b) The location and extent of soft layers under the hard founding strata,
- (c) The geological condition like type of rock, faults, fissures or subsidence due to mining, porosity etc.,
- (d) The ground water level,
- (e) Artesian conditions, if any,
- (f) The location, type and extent of different layers,
- (g) Quality of water in contact with the foundation,
- (h) Probable settlement and probable differential settlement of the foundations,
- (i) Likely sinking or driving effort,
- (j) Likely construction difficulties,
- (k) The depth and extent of scour,
- (l) Suitable depth of foundation, and
- (m) Bearing capacity of the foundation.

Delete Clause 3006 "Conclusion and Recommendations" and substitute:

3006 Conclusion and Recommendations

The confirmatory investigation shall conclude with the engineering analysis and design review of the proposed foundation of the related structure for approval of the Engineer. The recommendation shall be supported by all details of investigations, their engineering analysis and results, design calculations and drawings all complete.

Delete Clause 3007 "Measurement" and Clause 3008 "Payment" and substitute Clause 3007 "Measurement and Payment":

3007 Measurement and Payment

There shall be no separate payment to the Contractor for the confirmatory sub surface exploration and testing, their engineering analysis and results, design calculations and drawings. The cost for these investigations and related works is covered under payment under the relevant Clause of these Specifications.

Section 3100 – Miscellaneous Works

3102 Precast Member

Add at the end of sub-clause 3102(2) as follows:

Precast concrete member shall be laid with close joins with 1:2 cement sand mortar at the ends. The joints shall not exceed 10 mm in thickness and shall be neatly pointed with a pointing trowel. Guide lines and straight edges shall be used to ensure that the exposed faces and edgings are set to true lines and levels. Care shall be taken to protect all precast units against chipping or breakage during handling and laying. Broken or chipped Sections shall not be used and shall be replaced with undamaged units.

Add at the end of first sentence of sub-clause 3102(4) payment as follows:

Payment of precast member (Precast Drain, Culverts, Bridge Girders and Precast Kerb Stone elements) shall be made in two installments First installment of 75% of item rate shall be made upon the completion of pre-casting on the contractor's yard and receiving the satisfactory laboratory reports and the remaining second installments of 25% of item rate shall be made upon transportation and installation/laying of the precast elements and completion of 100% of the Works.

3105 Railings

(5) GI Pipe Railing with RCC Posts

(a) GI Pipe

Add at the end of the second paragraph as follows:

"The diameter of GI Pipe shall be as shown in the Drawings and/or as mentioned in the Bill of Quantities."

(b) RCC Posts

Add at the end of the second paragraph as follows:

"The size of the RCC poles shall be as shown in the Drawings."

Insert new Sub-clause (6) "GI Pipe Railing" as follows:

(6) GI Pipe for Railing

GI pipe shall comply with NS: 199/2046 (Heavy Duty). The diameter of GI Pipe shall be as shown in the Drawings and/or as mentioned in the Bill of Quantities.

All GI pipes shall be free from abrasions, rough or sharp edges, and shall not be kinked, twisted or bent. Any pipe which does not meet the requirements of the field Specifications shall be replaced at the Contractor's expense.

"The diameter of GI Pipe shall be as shown in the Drawings and/or as mentioned in the Bill of Quantities."

Renumber the Sub Clause (6) "Measurement" to Sub Clause (7) Measurement:

(9) Measurement

Delete the whole content of (7) "Measurement" and replace with the followings:

Measurement for GI Pipe Railing with RCC Posts

GI Pipe Railing with RCC Post shall be measured in linear meter for complete railing set including GI pipes and RCC posts installed and accepted. Railing shall include both horizontal and vertical members, posts including bolts, nuts, fittings, etc. as shown in the Drawings. It also includes the excavation for the foundation of the RCC post, preparation of the foundation and backfilling with the concrete of grade as shown in the Drawings to the satisfaction of the Engineer.

Measurement for GI Pipe for Railing in bridges

GI Pipe for Railing shall be measured in Mt. installed and accepted. The works shall also include complete fixing with the respective elements including bolts, nuts, fittings, etc. as shown in the Drawings to the satisfaction of the Engineer.

Measurement for MS for Railing

GI Pipe for Railing shall be measured in linear meter installed and accepted. The works shall also include complete fixing with the respective elements including bolts, nuts, fittings, etc. as shown in the Drawings to the satisfaction of the Engineer.

Renumber the Sub Clause (7) "Payment" to Sub Clause (8) "Payment".

3106 Approach Slabs

(1) General

At end of the first paragraph delete "...M20/40" and substitute with: "As per drawings"

(2) Measurement

Delete existing sentence and substitute

"Approach slabs shall be measured as per the respective items in Section 2000 - Concrete for Structures".

3107 Drainage Spouts

(5) Measurement

Delete the entire content and modify as follows:

The drainage spouts shall be measured in number for the complete set including the materials, fabrication, and placement and finishing and the pipes for drainage spouts as shown in the Drawings and to the satisfaction of the Engineer.

(6) Payment

Delete the entire content and modify as follows:

The drainage spouts shall be paid at the contract unit price as mentioned in the Bill of Quantities. Such cost shall include all the cost for the complete set including the materials, fabrication, and placement and finishing and the pipes for drainage spouts as shown in the Drawings and to the satisfaction of the Engineer.

3108 Utility Facilities

(3) Measurement

Delete the entire content and modify as follows:

The galvanized steel bracket under utility facilities shall be measured in number (no) for the complete set including procurement of materials, fabrication, installation and completion as shown in the Drawings and to the satisfaction of the Engineer.

(4) Payment

Delete the entire content and modify as follows:

The galvanized steel bracket under utility facilities shall be paid at the contract unit price as mentioned in the Bill of Quantities. The payment shall include all the cost for the complete set including procurement of materials, fabrication, installation and completion as shown in the Drawings and to the satisfaction of the Engineer.

Add new Clause 3111 "High Density Poly-Ethylene (HDPE) Pipe" after Clause 3110 "Filter Material" as follow:

3111 High Density Poly-Ethylene (HDPE) Pipe

The pipes to be used for sub-surface drain, grouting purpose etc. if specified in the Bill of Quantities shall be made of high density polyethylene and shall comply with series as specified by NS40/2040. Jointing of pipes shall be done by fine-cutting and heating following with equipment complying with the prescription of the HDPE pipe manufacturer. Pipes may be jointed with angles to fit the requirements of the terrain, but angles shall not exceed the maximum specified by the manufacturer. The joints shall be water tight and develop the same strength as unjointed HDPE material. The method of jointing shall be approved by the Engineer prior to starting the works.

For sub-surface drain purpose, pipes shall be provided with holes of minimum 5 mm diameter. The pipes shall be perforated by drilling minimum 50 holes per meter length on the upper half of the pipe in a staggered pattern uniformly distributed. The Engineer might adjust these specifications according to the site conditions.

The measurement and payment of HDPE pipe shall be made in meter (m) including jointing, fitting etc. all complete. The contract unit rate shall be the full and the final compensation to the Contractor as per Clause 112 to complete the works as per these Specifications.

Add new Clause 3112 "Galvanized Steel Base Plate" after Clause 3111 "High Density Poly-Ethylene (HDPE) Pipe" as follow:

3112 Galvanized Steel Base Plate

The galvanized steel base plate shall be used in fixing the pedestrian handrails and crash barriers railings in the bridges as shown in the drawings. Materials, fabrication, transportation, installation and painting for base plate shall conform to the requirements of Section 2200.

All complete steel base plate elements, bolts, nuts, hardware and other steel fittings shall be galvanised or painted with an approved paint as specified in the Contract. If galvanized, all elements of the base plate shall be free from abrasions, rough or sharp edges, and shall not be kinked, twisted or bent.

Galvanising shall be carried out as per Clause 2209. Damaged galvanised surfaces, edges of holes and ends of base plate cut after galvanising shall be cleaned and re-galvanised.

The galvanized steel base plate shall be measured and paid in Kilogram (kg) for the complete works as shown in the drawings and specified in these specifications.

Add new Clause 3113 "Water Management in Median" after Clause 3111 "Galvanized Steel Base Plate" as follow:

3113 Water Management in Median

(1) Scope

This clause shall cover the work related to the construction of rain water management structures in median of the road. The work consists a) Laying of Geo-membrane and b) Construction of sub-surface drain.

Sub-surface drains shall be of close-jointed perforated pipes, surrounded by granular material laid in a base of the median.

HDPE geo-membrane as important components of base liner system as per design, drawings for rainwater protection and leachate drainage to the leachate collection pipes (Drain Pipes).

(2) Material

The materials used for construction of sub-surface drains shall comply with following requirements:

(a) Filter Material

Filter materials used in drains shall comply with the requirements specified in Clause 3110.

(b) Geo-membrane

An essentially impermeable membrane (liner or barrier) used to control fluid movement.

Geo-membrane (textured both sides) shall be made of HDPE of at least 1.5 mm thickness, duly protected from ultra-violet exposure with 2.5 per cent carbon black, in black colour, supplied in roll form with a minimum of 5 m width.

The joints of these sheets shall be heat bonded or seamed for effective permeation cut off. While fixing on to a base of the median, they shall not be punctured or stapled to impair their use.

(a) Geotextile

The geotextile fabric shall be a woven or non-woven or knitted fabric consisting of long-chain polymeric filaments or yarns such as polypropylene, polyethylene or polyester or any combination thereof, formed into a stable network such that the filaments or yarns retain their relative position to each other.

(b) Drain Pipe

Perforated pipes for the drains shall be of HDPE 160 mm internal diameter. Holes for perforated pipes shall be on one half of the circumference only and conform to the spacing indicated on the drawings. Size of the holes shall not ordinarily be greater than half of D85 size of the material surrounding the pipe, subject to being minimum 3 mm and maximum 6 mm. D85 stands for the size of the sieve that allows 85 percent of the material to pass through it.

Jointing of pipes shall be done by fine-cutting and heating following with equipment complying with the prescription of the HDPE pipe manufacturer. The joints shall be watertight

and develop the same strength as unjointed HDPE material. The method of jointing shall be approved by the Engineer prior to starting the works. Drain pipes shall be provided with holes of minimum 5 mm diameter. The pipes shall be perforated by drilling minimum 50 holes per meter length on the upper half of the pipe in a staggered pattern uniformly distributed. The pipe shall be wrapped with the Geotextile. The Engineer might adjust these specifications according to the site conditions.

(c) Back Fill Material

Backfill material shall consist of sound, tough, hard, durable particles of free draining sand-gravel material or crushed stone and shall be free of organic material, clay balls or other deleterious matter. Any particular grading for the backfill material or requires these to be designed on inverted filter criteria for filtration and permeability to the approval of the Engineer, the backfill material shall conform to the grading requirement as set out in following table:

Table 31.1 Grading Requirement

S. No.	Sieve Designation	Passing percentage
1	11.20 mm	100
2	5.60 mm	91-100
3	2.80 mm	83-100
4	1.40 mm	59-96
5	710 micron	35-80
6	355 micron	14-48
7	180 micron	5-15
8	90 micron	0-15

(3) Construction

The detailed layout of the rain water management in median works shall be as instructed by the Engineer, based on the general layout given in the Drawing.

The work shall start with construction at outlet side and then go upgrade.

The line and level for laying of Geo-membrane and sub-surface drain shall be fixed.

Dumping and construction material from the construction shall be removed and base of median shall be compacted to the line and level.

Surface receiving the geo-membrane shall be free of loose material and sharp object. Adjacent rolls of the geo-membrane shall be overlapped to a minimum width 450 mm. The preceding roll shall overlap the following roll in the direction to the upgrade.

Laying of geotextile wrapped half perforated HDPE pipe of 160mm internal diameter above the geo-membrane shall be started at the outlet end and proceed towards the upper end, true to the lines and grades specified.

After the pipe installation has been completed and approved filter material shall be placed over the pipe to the required level in horizontal layers not exceeding 150 mm. The minimum thickness of material above the top of pipe shall be as per design and drawing.

For remaining depth the filling works shall be carried out as per clause 1205 of these specification.

The finished slope shall be reshaped to facilitate proper surface drainage towards drains/culvert /bridges.

(4) Tests and Standard of Acceptance

Copies of the manufacturer's certificates for geotextile/geo-membrane and drain pipe to be used shall be furnished by the Contractor. In addition, the Engineer may ask for testing in independent laboratories. All test results shall meet the specified requirements.

Minimum one set of test for gradation analysis and compaction of filter material shall be checked as per Table 5.2. And/or every change in source of material. The results shall meet specified requirements

(5) Measurement

Laying of Geo-membrane shall be measured in sq.m. Overlapping of geotextile/geo-membrane shall not be measured for payment.

Laying of Geotextile wrapped HDPE pipe including geotextile and filter material shall be measured in linear meter.

(6) Payment

Laying of Geo-membrane shall be paid at the respective contract unit rates.

Laying of Geotextile wrapped HDPE pipe including geotextile and filter material shall be paid at the respective contract unit rates.

The contract unit rates shall be the full and the final compensation to the Contractor as per Clause 112 to complete the works as per these Specifications.

3114 Canopy Bridges for Primates

(1) Objectives

Major objective of the Canopy Bridge is to assess if it supports habitat connectivity of arboreal animal fragmented by linear Infrastructure development such as roads and to minimize the effects of linear barriers. As many wild animal casualties including arboreal animal are recorded along the highway traversing through dense and critical habitat area, the bridge aims to minimize roadkill and maintain canopy connectivity in long run.

(2) Scope

This clause cover the furnishing of material and construction of Canopy Bridge which is a system used for primate conservation.

(3) Material

Steel Pole: The steel tubing used in pole fabrication shall be of steel of any approved process possessing a minimum tensile strength of 42 Kg/sq. mm and a chemical composition of not more than 0.06% Sulphur and not more than 0.06% phosphorous.

The tubing diameter and tubing wall thickness shown in Table 1 for 9m height pole.

IS Designation	410 SP-31
Overall Height	9 m
Planting depth. m Sections: Length, m	1.5
Top (h1)	2
Middle (h2)	2
Bottom (h3)	5
Outside Diameter, mm	
Top (h1)	114.3
Middle (h2)	139.7
Bottom (h3)	165.1
Thickness, mm	
Top (h1)	3.65
Middle (h2)	4.5
Bottom (h3)	4.5
Approximate weight, Kg	147
Crippling load, kgf	367
Application of load from top of pole, m	0.2

The poles shall be galvanized with minimum coating of weight not less than 460-gm/-sq. m internally and externally.

Each pole shall be provided with a steel top plate 8 mm minimum thickness welded to the end of the section. The top plate shall not project beyond the perimeter of the top section. Each pole shall also be provided with a welded base plate welded to the bottom of the pole.

Pole Must be supplied Along with standard Cross Arms and Bracings Angles, Pole Clamps, GALVANISED STEEL BOLTS, NUTS AND MISCELLANEOUS FASTENING COMPONENTS for installation of wire rope fabricated from hot-rolled channels, angles and steel members. The steel channels and angles for transformer platform shall be fabricated in accordance with Indian Standards IS: 226-1975 and IS-808-1964 or any revision thereof or other equivalent national or international standard provided that the resulting steel stock is of equal quality and strength. The minimum tensile strength of the steel shall be 4200 kg/cm². Existing Transformer shall be reused.

Wire Rope: The wire rope shall be ordinary type having a 32 mm dia for main cable and 26 mm dia for diagonal cable. Wire rope must be supply along with required quantity of thimbles, bulldog grips bolts, nuts and miscellaneous fastening components for hoisting of cables and anchoring of it.

Cement Concrete: The cement concrete shall be M20 (for anchoring the cables on the ground and in foundation of steel pole. The cement concrete shall comply requirements as per Clause 2000: Concrete for Structure of Standard Specifications for Road and Bridge Works 2073 (Second amendment 2078).

(4) Construction

Construction methodology shall be as per following:

Erection of Steel Pole:

- i. Preparation of foundation for steel pole, foundation shall be 0.50x0.50x1.5m (LxBxD).
- ii. Steel Pole shall be erected vertically and set to plumb on the foundation hole with no lateral inclination.
- iii. The foundation hole shall be filled by the placing of cement concrete, M20. Compaction, curing and protection of concrete shall be carried out as per Clause 2000: Concrete for Structure of Standard Specifications for Road and Bridge Works 2073 (Second amendment 2078).
- iv. After hardening of the concrete ie after 28 days the contractor shall fasten the steel poles and conduct preparation works for hoisting of cable.

Anchorage Block:

- i. The contractor shall design the anchorage block for anchoring the cable and get approval from the Engineer before construction works shall be commence.
- ii. The contractor shall construct the anchorage works as per approved design, drawing and instruction of Engineer.
- iii. The contractor shall prepare the foundation.
- iv. Anchorage element shall be erected as per drawing and design on the foundation.
- v. Placing of cement concrete, M20 shall be carried out. Compaction, curing and protection of concrete shall be carried out as per Clause 2000: Concrete for Structure of Standard Specifications for Road and Bridge Works 2073 (Second amendment 2078).
- i. After hardening of the concrete ie after 28 days the contractor shall start hoisting of cable works.
- ii. The contractor shall hoist main cable and then fastening of diagonal cables shall completed. All node points shall be fastened by using thimbles, bulldog grips and bolt and nuts as required.
- iii. The contractor shall maintained the sag of the cable which should not be greater than:

$$S = WL^2/8T$$

Where:

S-Permissible sag

W-Weight per unit of the cable

L-Span Length

T-Tension in the cable

(5) Measurement and Payment

Construction of Canopy Bridge as specified in the Drawing and as directed by the Engineer shall be measured in number of Canopy Bridge all complete. The Canopy Bridge shall be paid at the contract unit rate which shall be full and the final compensation to the Contractor as per Clause 112 and for all costs required to complete the work as per these Specifications.

3115 Funnel Fencing

(1) Scope

This Section covers the erection of new funnel fences along the boundaries of the road or/and

other required locations for restriction of the movement of the wild animal from unauthorized locations. Fencing is often used to direct (funnel) wildlife to a specific area, such as road and highway crossings. Funnel fencing is used to prevent wildlife crossing at high risk points and guide them to safer crossings (e.g., underpasses, overpasses, bridges, culverts) or to open areas with adequate visibility to allow motorists to avoid collisions.

(2) Materials

Posts, Stays, Standards and Droppers: Posts, stays, standards and droppers shall be of the type and size indicated on the Drawing. Concrete posts shall comply with the requirements of IS: 4996.

Bolts for Stay: Bolts shall be galvanized steel bolts of the required length and diameter. The diameter shall not be less than 12 mm. All the necessary bolts, together with nuts and washers, shall be supplied with each post.

Wire:

(a) Barbed Wire:

Barbed wire shall comply with the requirements of NS: 168 and shall be of mild steel grade, double strand, unidirectional twist wire, each strand 2.50 mm diameter for use at any height above ground. The wire shall be either lightly galvanized or fully galvanized, as specified in the Bill of Quantities.

(b) Smooth Wire (Barbless):

Smooth wire (Barbless) shall comply with the requirements of NS: 163 and shall be of the type specified below: Straining wire shall be 4 mm diameter, lightly galvanized wire. Fencing wire shall be high tensile grade, 2.24 mm diameter wire, either lightly or heavily galvanized, as specified in the Bill of Quantities. Tying wire shall be 2.50 mm diameter, mild steel, lightly galvanized wire for tying fencing wire to standards and droppers, and 1.6 mm diameter, mild steel, lightly galvanized wire for tying netting and mesh wire to fencing wire.

Manufacturing Tolerances for Wire: Nowhere the actual diameter of the wire shall be less than the specified diameter by more than the following tolerances:

Specified diameter	Tolerances
Up to 1.5 mm	± 0.03 mm
Above 1.5 mm up to 2.5 mm	± 0.04 mm
Above 2.5 mm	± 0.05 mm

(3) Installation of Post and Standard

Straining posts shall be erected at all ends, corners and bends in the line of fences and at all junctions with other fences. Straining posts not be spaced further apart than shown on the Drawing. The height of posts above ground shall be such that the correct clearance between the lowest wire and the ground can be obtained.

Posts shall be accurately set in holes and where shown on the Drawing be provided with concrete bases to the dimensions shown on the Drawing.

Holes shall be dug to the full specified depth of the posts.

Corner, end and straining posts shall be braced by means of stay or anchors, as shown on the Drawing or as directed by the Engineer.

Standards shall be firmly planted into the ground at the spacing shown on the Drawing or as directed by the Engineer. The spacing of standards between any two straining posts shall be uniform and not greater than that shown on the Drawing. In hard material standards shall be either driven or set in holes drilled into the hard material. The size of drilled holes shall be such that a tight fit is obtained. Care shall be exercised when driving standards in order to prevent buckling or damaging them.

All posts and standards shall be accurately aligned and set to plumb. After posts and standards have been firmly set in accordance with the foregoing requirements, the fence wire shall be attached thereto at the spacing shown on the Drawing.

(4) Installation of Wire

The funnel fence is composed of 4 strands of wire. Top and bottom wire shall be barbless and middle 2 strands shall be barbed wire.

All fencing wire shall be wired to the sides of standards or posts in order to prevent the wires from being displaced and becoming loose. The wire shall be carefully stretched and hung without sag in true alignment. It shall not be stretched so tightly that it breaks or the end, corner, straining or gate posts are pulled up.

Each strand of fencing wire shall be securely fastened in the correct position to each standard with soft galvanized binding wire. The binding wire for each horizontal fence wire shall pass through a hole in the standard to prevent slipping of the fence wire in a vertical direction, while the ends of the wire shall be wrapped at least four times around the fencing wire to prevent it from moving in a vertical direction.

At end, corner, and straining posts the fencing wire shall be securely wrapped twice around the posts and secured against slipping by tying the end tightly around the wire by means of at least six snug, tight twists.

Splices in the fencing wire shall be permitted if made in the following manner using a splice tool. The end of each wire at the splice shall be carried at least 75 mm past the splice tool and wrapped snugly around the other wire for not less than six complete turns, the two separate wire ends being turned in opposite directions. After the splice tool is removed the space left by it in the splice wire shall be closed by pulling the wire ends together. The unused ends of wire shall be cut close so as to leave a neat splice.

Droppers shall be tied to each fence wire with soft binding wire in the required position as specified for standards, to prevent slipping in a vertical direction. The spacing of droppers between any two straining posts shall be uniform. Anchoring to structures shall be done as shown on the Drawing.

The completed fences shall be plumb, true to line with all posts, standards and stays firmly set. The height of the lower fencing wire above the ground at posts and standards shall not vary by more than 50 mm from their prescribed relative vertical positions.

(5) Measurement and Payment

The funnel fencing shall be measured in linear meters inclusive of all excavations, installation of posts and standards, barbed/barbless wires and other requirements necessary to complete

the work as per this Specification.

The fencing, measured as stated above, shall be paid at the contract unit rate which shall be the full and the final compensation.

3116 Median Fencing

(1) Scope

This Section covers the construction of median fencing as per the approved contract drawing. The location of the fencing and the sequence of the construction shall be as directed by the Engineer. The vertical members, their spacing, foundation excavation and concreting shall be to the required line and level and specified size shown in the drawing and as per the relevant section in this specification. Similarly the horizontal members and the jointing requirement shall be as directed by the Engineer. The finished surface shall be painted with the 1 coat primer and 2 coats of enamel painting to the satisfaction of the Engineer.

(2) Measurement and Payment

The finished median fencing as a whole as mentioned above and as shown in the drawing shall be measured in Running meter.

The fencing, measured as stated above, shall be paid at the contract unit rate which shall be the full and the final compensation as specified in section 112.

3117 Relocation/Re-erection of Electricity System

Scope of the Work:

The work under this sub section shall be executed under the supervision of the Nepal Electricity Authority (NEA) and the work under the scope of the BOQ shall comply the requirement in the Specification followed by the NEA and this can be available in Nepal Electricity Authority, Main Office, Ratnapark, Kathmandu, Nepal.

The Contractor shall execute the works as mentioned in the various items in the BOQ to the Satisfaction of the Nepal Electricity Authority and the Engineer. For the supervision and shutdown charges included in the BOQ, the Contractor shall deposit the required fees with the Nepal Electricity Authority (NEA) in accordance with its applicable procedures and requirements.

The contractor should deliver the material to the place designated by the NEA and should be responsible for proper storage of materials until installation. The Contractor shall be responsible for any loss or damage of materials.

All Materials must comply the Technical Specifications Standard of NEA and **as required in Appendix 11**. The Factory Acceptance Test of all major items must be conducted at the manufacturer's site in the presence of NEA Representatives before supply and installation. All Labour Works must comply the Construction Standard of NEA. All dismantled materials of existing lines must be returned to NEA in an acceptable condition. A detailed Single Line Diagram of existing lines along with the existing material details must be prepared through joint site visit by Contractor, Road Project Office & concerned DC office and verify the poles/lines to be shifted or new constructed. Supply of materials & labour works shall then be carried out as required.

If the scope of the work is required to be changed as per the relevant Agency's, ie. NEA's, requirement the quantity provided under various items in the BOQ may required to be deleted

or increased. Based on the Agency's requirement the Contractor shall allow the Agency to carry out some activities together with their own activities.

Upon the request of the relevant Agency the Contractor may require to carry out some activities beyond the scope under this BOQ for which the Contractor will receive the payment separately from the Agency but while doing so the Contractor shall get written approval from the Engineer.

For items related to electricity relocation that are not covered under this specification, the detailed specifications shall be obtained from the NEA, and the works/supplies shall be executed accordingly."

The Equivalence: It formally notes that the term "**Contractor**" used during contract execution is synonymous with the "**Bidder**" from the procurement/tendering phase once the contract award is finalized.

"Prior to procurement of any electrical goods under this Contract, the Contractor shall submit to the Engineer the Guaranteed Technical Particulars (GTP) / Technical Data Sheet completed by the intended manufacturer, along with the manufacturer's ISO 9001:2015 certificate and any other documentation required by NEA's Technical Specifications. No procurement shall commence until written approval of the manufacturer and the submitted GTP has been obtained from NEA. The Contractor shall allow sufficient time in their programme for this approval process and no claim for delay or extension of time shall be entertained on account of the time taken for NEA's review and approval."

Measurement and Payment:

The works under various items in the BOQ shall be measured in the unit provided under the respective items and payment will be made in two installments. First installment 80% of the unit rate quoted in the Bill of Quantities (BOQ) shall be released upon delivery of the materials (including electric poles, transformers, wires, and other appurtenances) to the site, provided they meet the required specifications and obtain NEA approval. Second Installment (20%) of the quoted unit rate shall be paid upon successful completion of the works and approval by the NEA. While carrying out the scope of works under the BOQ supervision shall be made by NEA. The supervision charge and shutdown charge (if required) shall be paid from the as stated in relevant BoQ items.

Temporary works such as temporary shifting of poles during relocation shall be incidental the works and the rates shall be deemed to be included in the rates quoted by the Contractor and not paid separately.

If there is any change in the scope in the work specified above the additional work measurement and payment shall be made based on the agreement between the Employer and the Contractor upon recommendation of the Engineer.

3118 Stone Soling

(1) Scope

This Section covers the stone soling works under floors, foundations, drains and subgrade stabilization.

(2) Materials

The stones to be used shall be durable and angular in shape. If boulders are used, they shall

be broken into angular pieces. The stones shall be sound, hard, free from iron bands, spots, sand holes, flaws, shakes, cracks or other defects. The stone shall not absorb water more than 5 per cent. The specific gravity of the stone shall not be less than 2.50.

Except otherwise described in the contract, the length of any stone shall not exceed two times its height. The breadth of the stone on the bed shall not be more than 150 mm.

(3) Construction

The bed on which stone soling is to be laid should be cleared of all loose materials, leveled, watered and compacted before laying stone soling. Over the prepared surface, the stone should be set as closely as possible and well packed and firmly set. The stones should be of full height and should be laid so as to have their bases of the largest area resting on the sub-grade or surface. Soling should be laid in one layer of 150mm depth or specified thickness of soling with a tolerance of ± 25 mm, but not more than 200mm. After packing the stones properly in position, the interstices between them should be carefully filled with quarry spoils or stone chips of larger size possible to obtain a hard, compact surface. Spreading of loose spoils or stone chips is prohibited. The entire surface should be examined for any protrusions and the same should be knocked off by a hammer and all interstices should be filled with quarry spoils or stone chips. Excess quarry spoils or stone chips if any over the surfaces should be removed. The surfaces should then be watered and consolidated with mechanical or sufficiently heavy wooden tampers and log-rammers.

(4) Tests and Standard of Acceptance

The stones shall be tested for Specification gravity and water absorption. At least 3 tests for stone shall be conducted for every source.

(5) Measurement

Stone Soling shall be measured in cubic metres..

(6) Payment

The stone soling shall be paid at the respective contract unit prices which shall be the full and the final compensation to the Contractor as per Clause 112.

3119 Ducting Works for Telecommunication System

The works under this section shall be executed in accordance with the specifications of Nepal Doorsanchar Company Limited (Nepal Telecom) as detailed in Appendix 12.

Appendices:

- Appendix1:** List of Standards
- Appendix2:** Notes on Construction and Finishing of Office and Accommodation Building
- Appendix3:** Office and Furniture / Equipment for the Employer
- Appendix4:** Accommodation and Furniture / Equipment for the Employer
- Appendix5:** Vehicles for the Employer
- Appendix6:** Survey Instruments required at site
- Appendix7:** Site Laboratory
- Appendix8:** Laboratory Equipment
- Appendix9:** Project Signboard
- Appendix10:** Design Subgrade CBR
- Appendix11:** Specification of Relocation of Electricity system
- Appendix12:** Specification for Ducting of NEPAL DOORSANCHAR COMPANY LIMITED

FOR REFERENCE ONLY

Appendix 1: List of Standards

The Contractor shall provide for the use of the Engineer, in accordance with the Specifications, copies of the latest editions of the following Standards, Publications and Codes of Practice; or copies of manuals containing details of these Standards: -

- TRL ORN 3:** A guide to surface dressing in topical and sub-tropical countries
- TRLORN18:** A guide to the pavement evaluation and maintenance of bitumen – surfaced roads in tropical and sub-tropical countries
- TRLORN31:** A guide to the structural design of bitumen – surfaced roads in tropical and sub- tropical countries.
- TRLRR104:** Preparation of cut-back bitumen.

NEPAL STANDARDS (NS)

NS163-2045(1988) Method of Test for adhesion of galvanizing of Gabion Wire

NS169-2045(1988) Requirements for mild steel wire (for Gabions)

INDIAN STANDARDS (IS)

- IS: 73– 1992 Paving Bitumen Specification
- IS: 217-1988 Cutback Bitumen- Specification
- IS: 1124-1974 Method of Test for water absorption, apparent specific gravity and porosity of natural building stones
- IS: 1597–1992 Code of Practice for construction of stonemasonry
- Part 1 Rubble stone masonry Part 2 Ashlar masonry
- IS: 2116–1980 Sand for masonry mortars
- IS: 2250-1981 Method of Test for cement mortar
- IS: 2386-1963 Method of Test for Aggregates
- Parts 1-6
- IS: 2720 Method of Test for Soils

Parts 1-5, 7, 8, 10, 14, 16, 22, 28, 29, 37 & 40

BRITISH STANDARDS (BS)

BS: 812-1975	Testing Aggregates Part 1: Methods for determination of particle size and shape. Part 2: Methods for determination of physical properties
BS: 1377	Methods of test for soil for civil engineering purposes
BS: 1881	Methods of testing concrete Parts 5,101-122,124,125,127,129,201-207 & 209

AMERICAN PUBLICATIONS & STANDARDS (ASTM/AASHTO).

AASHTO	Part I: Standard Specification for Materials Part II: Method of Sampling and Testing

All standards provided shall remain the property of the Contractor on completion of the contract.

OTHER PUBLICATIONS

In addition, the Contractor is to be familiar with and be able to provide, in part or in full or photocopies where possible, to the Engineer on a temporary basis the latest editions of the following Standards.

And/or Publications, which are mentioned in the most relevant Sections of the Standard Specifications for Road and Bridge Works, when so requested.

NEPAL STANDARDS (NS)

NS: 1 –2035(1978)	Specification for Burnt Clay Bricks
NS: 40-2040(1983)	Specification for High Density Polythene Pipes
NS: 80-2042(1985)	Specification for Reinforced Concrete Pipes
NS: 84-2042(1985)	Specification for Reinforcing Steel
NS: 112-2042(1985)	Specification for Enamel and Non-reflectorised Paint
NS: 163-2045(1988)	Specification for Smooth Wire
NS: 168-2045(1988)	Specification for Barbed Wire
NS: 190-2045(1988)	Specification for Primer Paint
NS: 191-2045(1988)	Specification for Reinforcing Steel
NS: 199-2046(1989)	Specification for Galvanised Iron (GI)Pipe
NS: 408-2054(1997)	Specification for Road Marking Paint

Other relevant NS documents as required by these Specifications.

INDIAN PUBLICATIONS & STANDARDS

IS: 277-1992	Galvanised Steel Sheets (Plain and Corrugated)
IS: 432-1982	Mild steel and medium tensile steel bars and hard-drawn steel wire for concrete rein for cement

IS456-2000	Code of Practice for plain and reinforced concrete
IS: 1079	Steel plate
IS: 1161	Steel tubes
IS: 1566-1985	Steel mesh fabric (for concrete reinforcement)
IS: 1786-1985	High strength deformed steel bars and wires for concrete reinforcement
IS: 2062-1999	Steel for general structural purpose
IS: 2062-1986	Method of Test for galvanized hardware
IS: 2386	Method of Test for Aggregates
Parts 7 & 8	
IS2629-1985	Hot-Dip Galvanising of Iron and Steel
IS: 4031	Method of Test for Cement
Parts 2, 3, 5& 6	
IS: 5758:1992	Pre-cast concrete kerbs, channels, edgings and quadrants

Indian Roads Congress (IRC)

Specifications for Road and Bridge Works (Fourth Revision) 2001

IRC:89 Stone for Pitching/ Revetment on Slopes (Clause 5.5.5.1) Other relevant IS and IRC documents as required by these Specifications

BRITISH PUBLICATIONS & STANDARDS

BS: 12	Specification for Portland cement Requirements for composition, strength, physical and chemical properties of four strength classes.
BS: 63	Specification for Single-Sized aggregate for general purposes.
BS: 812	Testing Aggregates Methods for determination of soluble Chloride Content. Part 117 BS: 1707 Specification for hot binder distributors for road surface dressings
BS: 3049	Pedestrian guard rails (metal)
BS: 3148	Methods of test for water for making concrete (including note on the suitability of water)
BS: 5075	Specification for concrete admixtures/work ability agents
BS: 6044	Road Paint
BS: 6088	Reflecting beads (Ballotini)
BS: 6906	Method of Testing Geotextiles Part 1 - Determination of tensile properties using wide width strips Part 3 - Determination of water flow normal to the plane of

geotextile under a constant head.

Part 4 - Determination of puncture resistance (CBR puncture test) Part 6 - Determination of resistance to perforation (Cone drop test)

BS: 7263 Part 1:1990

Pre-cast concrete kerbs, channels, edgings and quadrants

Other relevant BS documents as required by these Specifications.

AMERICAN PUBLICATIONS & STANDARDS (Including ASTM/AASHTO)

ASTM: D5	Bitumen Penetration of bitumen/(asphalt)
ASTM:D6/D1754	Loss on heating of bitumen/ (asphalt)
ASTM:D36	Softening point of bitumen/ (asphalt)
ASTM:D92	Flash and fire points of bitumen/(asphalt)
ASTM:D113	Ductility of bitumen/(asphalt)
ASTM: D2026	Standard specification for cutback asphalt (Slow curing type)
ASTM: D2027	Standard specification for cutback asphalt (Medium curing type)
ASTM: D2028	Standard specification for cutback asphalt (Rapid curing type)
ASTM: D4694	Standard specification for Pavement Falling Weight Deflectometer (FWD)
ASTM:E950	Standard specification for Road roughness

Other relevant ASTM documents as required by these Specifications.

Asphalt Institute

Manual Series No.2 (MS-2)- Asphalt concrete hot mix manual
Manual Series No.4 (MS-4) - The Asphalt Handbook
Manual Series No.14 (MS-14) - Asphalt cold mix manual

Other relevant Asphalt Institute documents as required by these Specifications.

Appendix 2: Notes on Construction and Finishing of Office

Not Applicable

Appendix 3: Office and Furniture

Not Applicable

FOR REFERENCE ONLY

Appendix 4: Accomodation and Furniture

Not Applicable

FOR REFERENCE ONLY

Appendix 5: Vehicle for the Employer

The type of vehicles the Contractor is required to provide for the exclusive use of the Employer and his staff shall be in accordance with the Specification and Bill of Quantities and shall be as shown below:

Vehicle Type 1

New, or nearly new (not more than one year old), five door Station Wagon (including one rear door) with a diesel engine of at least 2.2($\pm$ 10%)liter capacity, 110 BHP, 28 kgm torque, four wheel drive, a minimum ground clearance (unladen) of 180 mm, Air Conditioner, cloth seats, seat belts, locking fuel cap, spare wheel, power window, central locking, tool kit, tow rope, jump leads, fire extinguisher and first aid kit.

Vehicle Type 2

New, or nearly new (not more than one year old), "Double Cab" Pick-Up with a diesel engine of at least 2.2($\pm$ 10%) litre capacity, 110 BHP, 28 kgm torque, four wheel drive, a minimum ground clearance (unladen) of 180 mm, Air Conditioner, cloth seats, seat belts, locking fuel cap, spare wheel, power window, central locking, tool kit, tow rope, jump leads, fire extinguisher and first aid kit.

"**Nearly new**" means less than one (1) year old and with less than 30,000 km travelled and in general good condition.

All vehicles shall be of current manufacture and shall be registered in the name of the Contractor and shall have a guarantee/warranty for a minimum period of one year. It is assumed that the average running distance is 5,000 km per month for vehicles Type - 1 and Type - 2.

Vehicles will revert to the Contractor when no longer required by the Employer.

Vehicle Type 3

New motorcycle with minimum 150 cc and 4 –stroke engine, with accessories like helmet with visor, leg guard, gloves, jacket, utility box raincoat and boot.

All motorcycles shall be of current manufacture and shall be registered in the name of the Contractor

and shall have a guarantee/warranty for a minimum period of one year. It is assumed that the average running distance is 3,000 km per month for motorcycles.

Motorcycles will revert to the Contractor when no longer required by the Employer.

Appendix 6: Survey Instrument Required at Site

The Contractor shall provide and maintain the following survey instruments and equipment until Contract Completion or as instructed by the Engineer. The items shall be new or nearly new and subject to the approval of the Engineer.

At Contract Completion the survey instruments and equipment shall become the property of the Contractor.

The survey instruments shall for the use of the Engineer's Representative until Contract Completion.

The Contractor shall supply immediately replacement for damaged/lost items and be responsible for insurance against theft.

Survey Equipment Required at Site

S. No	Description	Quantity
1	Total Station with Standard Accessories and Aluminum Tripod prism less	1 Set
2	3 mtr. 3 Section Aluminum Ranging Rod	4 Set
3	Digital Theodolite	1 Set
3	Measurement Tool Kit (with GPS, Laser Distance Meter, Digital Verner Caliper, 5 m steel tape, Protector, Set squares, Scale etc.)	3 Set
5	Auto Level with Tripod	3 Set
6	5 mtr 5 Section Levelling Staff	6 Set
7	Clip on Bubble	3 Set
8	50 mtr Nylon Coated Steel Tape	3 Set
9	50 mtr Fiberglass Tape	3 Set
10	30 mtr Fiberglass Tape	3 Set
11	5 mtr Steel Tape	5 Set
12	Field Books/ Note Books	As required
13	Other miscellaneous accessories	As required

The above equipment are minimum numbers required. Depending upon the actual requirements at site, the Contractor shall arrange for other and/or additional survey equipment as instructed by the Engineer.

Appendix 7: Site Laboratory

1. Scope

The Contractor shall provide and maintain an adequately equipped site laboratory complete with all manpower, utility services, apparatus, furniture and fittings to undertake the required testing to assure the quality of the materials and the works.

Site Laboratory shall be fully equipped with a complete set of equipment as indicated in **Appendix – 8**. The Contractor is responsible for the cost of undertaking all testing necessary for Quality Assurance purposes. Tests which cannot be carried out in Site Laboratory shall be undertaken by an outside laboratory acceptable to the Engineer. The Contractor shall be responsible for providing the vehicles required carrying out day to day (regular) process control testing and collecting the samples to be tested in Site Laboratory at his own cost.

The Site Laboratory shall be located within 500 m of the site and the laboratory building may be located at the rented building or newly constructed on rented land or constructed on land on lease whatsoever shall be available up to the end of the project.

The working table with shelves for storing the equipment, heavy duty working table, and other racks shall be provided by the Contractor at the laboratory as per the instruction of the Engineer. The Contractor shall supply desktop computer and A-4 size printer at laboratory for sole use of the laboratory. First aid kit box, fire extinguisher and other safety appliances shall also be provided at the laboratory by the Contractor.

In order to operate the site laboratory the Contractor shall deploy at least the following:

- Generator 20 KVA minimum
- Pickup truck
- Quality Control Engineer – 1No.
- Senior Laboratory Technician-1No.
- Laboratory technician – 2No.
- Laboratory helpers – 6 Nos (minimum but shall supply additional numbers as required)
- Office boy – 1No.
- Security guards (day and night)

2. Description

The Site laboratory shall be newly constructed or rented and furnished to be a laboratory and provided with amenities including water supply, electric supply etc. as indicated below:

- The laboratory shall be provided with 240 volt, 50 HZ electricity. Lighting and sufficient electrical outlets shall be provided to the satisfaction and approval of the Engineer.
- A continuous supply of water with a minimum of two sinks with faucets shall be provided.
- The floor of the building shall be concrete suitably sealed and adequate to support operating test equipment without vibration and undue noise.
- A minimum of 10 metres of work benches, 900 mm high by 750 mm wide, shall be provided. The work benches shall have tops covered with approved plastic laminate or equivalent shall contain adjustable shelves and drawers and shall be constructed of

concrete / 19 mm plywood. A minimum of 6 metres of cupboards shall be constructed approximately 600 mm above the workbenches. These cupboards shall have a minimum of two 450 mm high shelves approximately 300 mm deep. All cupboards shall be provided with doors.

- A minimum of four exhaust fans, three ceiling fans with regulators and three opening windows with blinds.
- The laboratory shall be provided with double entrance doors wide enough to unload materials from site vehicles into the laboratory. A minimum clear opening of 2 metres shall be provided.

The laboratory shall be operated strictly under the supervision of the Consultant's Material Engineer. The manpower supplied by the contractor for the operation of the site laboratory shall work to the satisfaction of the Consultant's Material Engineer and they will use the facilities detailed above together with the Consultant's Material Engineer. The Contractor shall provide additional office space/accommodation for his other staff in addition to the designated laboratory to the Engineer. The Contractor's other staff shall strictly be prohibited in using the laboratory space for their office/accommodation.

Prior to the construction of the laboratory, the Contractor shall obtain written approval from the Engineer for the proposed construction and arrangement of the laboratory.

Office for Material Engineer

Each room shall be fitted with two 40 watt fluorescent light fittings, ceiling fans with regulators. The laboratories shall have at least five 5A and two 15A electric outlets. The Material Engineer's office shall have minimum required furniture and equipment for the operation of the day to day office works.

The Contractor shall provide the facility for communications between the Consultant's staff and the Contractor's staff.

The Contractor shall supply and keep replenished all consumable items.

FOR REFERENCE ONLY

Appendix 8: Laboratory Equipment

The following items of laboratory equipment shall be provided in the laboratory, as a minimum, however, this does not relieve the Contractor of his responsibility to equip the laboratory with all equipment needed to perform the full range of tests required by the Specifications:

S.No.	Particulars	Quantity
	General	
1	Oven 18" x 18" x 18" Aluminum Chamber	1
2	Platform balance 300 kg	1
3	Electronic Balance Model CH30R11 Capacity 30 kg x 5 gm preferably OHAUS or equivalent	1
4	Electronic Balance Model CT6000 Capacity 6010 gm x 0.5 gm preferably OHAUS or equivalent	1
5	Electronic Balance Model NDB110 Capacity 2100 gm x 0.1 gm preferably OHAUS or equivalent	1
6	Water bath serological 2 rack solar	1
7	Mercury Thermometer 250°C	2
8	Dial Thermometer 400°C	2
9	Mercury Thermometer 50°C	2
	Glassware: containers and small tools including;	
10	Wet and Dry Thermometer	1
11	Spatulas 200 mm	2
12	GI Wire Zinc coating and diameter test	1
	GI Tray	
13	300 mm x 300 mm x 75 mm	6
	400 mm x 400 mm x 75 mm	6
	600 mm x 600 mm x 75 mm	6
14	Aluminum Moisture Container 75 mm x 50 mm	50
15	Rubber Mallet	1
16	Aggregate Steel Scoop (690 mm x 300 mm x 100 mm)	1
17	Aluminum Scoop (125 mm x 200mm x 75 mm)	1
18	Gauging Trowel	2
19	S.S Bowl 2 Lit	2
	Volumetric Flasks	
20	1000 ml	2
	500 ml	2
	250 ml	2
	Measuring Cylinders	
21	1000 ml	2
	500 ml	2
	250 ml	2

S.No.	Particulars	Quantity
	Beakers	
22	1000 ml	2
	500 ml	2
	250 ml	3
23	Evaporating Disc 100 mm	3
24	Vernier Caliper 150 mm	1
25	Steel Ruler 300 mm	1
26	Pairs of heat resistant Asbestos hand gloves	2
27	Set of sampling tools all materials	1
28	Set of crowbar, pick, spade and 5 kg hammer, GI Tray	2
29	Gunny bags and plastic bags	50
30	GI Sieve 450 mm dia Size; 75, 69, 63,50, 37.5, 31.5, 25, 20, 14, 16, 12.5, 9.5, 6.3, 4.75, Lid and pan set of 16 pcs	1
31	Brass Sieve 200 mm dia Size; 4, 2.8, 2.36, 2, 1.18mm, 600, 425, 300, 150,170, 75 mic,90 mic ,Lid and pan set of 14 pcs	1
32	Dynamic Cone Penetrometer equipment complete with 2 extra cones and 2 extension rods (set)	1
33	Water Testing kit (set)	1
34	Organic Content testing kit (set)	1
	Soil and Aggregate	
35	Sample Splitters (Riffle boxes) 50 mm	1
36	Liquid limit device with grooving tools and counter	1
37	Glass Plate 400mm x 600 mm x 6 mm	2
38	Specific Gravity Bottle 100 ml	1
39	Compaction Mould 100 mm, 150 mm and Rammer 2.5 kg and 4 kg	1
40	Sand Pouring Apparatus 200 mm (sand replacement test)	2
41	Sand Pouring Apparatus 100 mm (sand replacement test)	1
42	Core Cutter Apparatus	1
43	Aggregate Impact Value Test Apparatus	1 set
44	Los Angeles Abrasion Test Apparatus	1
45	Flakiness Test Apparatus	1
46	Elongation Test Gauge	1
47	Standard Measure 30 lit, 15 lit and 3 lit	1
48	Tamping Rod	1
49	Aggregate Crushing Value Test Mold	1
50	Set equipment for specific gravity determination of both coarse and fine graded soils, including ancillary glass ware including pycnometers, and Guy Lussure type density bottles of Capacity 100 ml.	1 set
	CBR Apparatus	1

S.No.	Particulars	Quantity
51	CBR Load Frame	1
	Dial Gauge (0.01 - 0.25 mm)	5
	Annular Weight 2.5 kg	3
	Central Hole Weight 2.5 kg	3
	CBR Mould 150 mm	9
	Perforated Plate Brass	9
	Space Disc	9
	Penetration Piston	1
	Tripod	9
	Rammer 2.6 kg	3
	Rammer 4.89 kg	3
52	Unconfined Compression Test Apparatus (5 Tonne Capacity plus 5 kN, 10 kN and 20 kN Proving Rings)	1
	Bitumen and Bituminous Mixes	
53	Penetrometer with standard needle automatic	1
54	Viscometer	1
55	Standard spray trays	12
56	Centrifuge Type hand operated bitumen extractor 500 ml	1
57	3 m straight edge	1
58	Camber board and spirit level	2
59	Marshall Stability test Apparatus, complete	1 Set
60	Softening point test (Ring and Ball)	1 Set
61	Flash point Apparatus	1 Set
62	Ductility test Apparatus	1 Set
	Cement and Cement Concrete / Mortar	
63	Vicat Apparatus	1
64	Slump Test Apparatus	1
65	Concrete Cube Mould 150 mm	18
66	Mortar Cube Mould 75 mm	42
67	Compression Strength Testing Machine 200 tonne capacity	1
68	Compression Strength Testing Machine 50 tonne capacity	1
69	Sand equivalent test set, complete with graduate plastic cylinder, manual or mechanical shaker and stock solution	1
70	Curing tank for test cubes (2 m x 2 m x 0.75 m) with controlled heating facilities	1
71	Light weight hammer test	1

The site laboratory equipment and furniture shall become the property of the Contractor when no longer required by the Engineer unless stated to the contrary elsewhere in the contract.

Appendix 9: Project Signboard

The Contractor shall provide and erect at the beginning and end of each section of Project road a signboard approx. 2.50 m wide by 1.80 m high with the wording in Nepali or English.

Final details to be agreed with the Engineer (see drawing).

The board is to be made of galvanised steel; the lettering and border are to be in black on yellow background. The lower edge of the board shall be at approx. 1.20 m above adjacent ground and shall be mounted on suitable posts with struts on concrete foundations. The paint to be used shall be sunshine resistant paint.

The Contractor will be responsible for the repair and maintenance of the signboards up to the completion of all construction works.

The Engineer will direct the location and placing of the signboards.

FOR REFERENCE ONLY

GOVERNMENT OF NEPAL MINISTRY OF INFRASTRUCTURE DEVELOPMENT DEPARTMENT OF ROADS PROJECT DIRECTORATE (ADB), Bishalnagar, Kathmandu	
ASIAN DEVELOPMENT BANK ADB	
KAKARBHITTA-LAUKAHI ROAD SECTION OF EAST-WEST HIGHWAY	
CONTRACT NO.	:SHEP/OCB/KL/06
CHAINAGE	: Km 95+760 to Km 11+500
CONTRACTOR	:XXXXXXXXXXXXXXXXXXXXXXX :XXXXXXXXXXXXXXXXXXXXXXX
CONSULTANTS	:XXXXXXXXXXXXXXXXXXXXXXX :XXXXXXXXXXXXXXXXXXXXXXX

Appendix 10: Design Subgrade CBR

Design Subgrade CBR for Carriageway

S.No.	Chainage		CBR	
			Ave. Designed	Adopted
	From	to		
51	95+000	96+000	14.657	12
52	96+000	97+000	11.699	11
53	97+000	98+000	5.859 14	5 14
54	98+000	99+000	11.773	11
55	99+000	100+000	14.344	12
56	100+000	104+000	8.261	8
57	104+000	105+000	13.472	12
58	105+000	106+000	18.649	15
59	106+000	107+000	9.330	9

S.No.	Chainage		CBR	
			Ave. Designed	Adopted
	From	to		
60	107+000	108+000	8.514	8
61	108+000	111+000	7.196	7
62	111+000	114+000	5.967	6
63	114+000	115+000	9.642	9
64	115+000	116+000	6.700	6
65	116+000	117+000	13.097	12
66	117+000	118+000	5.193 14	5 ↓ 14
67	118+000	119+000	3.602 10.50	3 ↓ 10
68	119+000	120+620	12.367	12

Design Subgrade CBR for Service Road

S.No.	Chainage		CBR	
			Ave. Designed	Adopted
	From	to		
33	95+000	96+000	14.657	12
34	96+000	97+000	11.699	11
35	97+000	98+000	5.859	5
36	98+000	99+000	11.773	11
37	99+000	100+000	14.344	12
38	100+000	100+175	8.261	8
39	106+880	107+000	9.330	9
40	107+000	108+000	8.514	8
41	108+000	110+995	7.196	7

Appendix 11: Specification of Relocation of Electricity system

FOR REFERENCE ONLY

Technical Specifications

Steel Telescopic Pole

1. Scope

- 1.1 This Specification covers the design, fabrication, testing, supply, and delivery of fully galvanized steel telescopic poles commonly used in overhead electric lines and equipment of Nepal Electricity Authority conforming to the applicable standards.
- 1.2 It is not the intent to specify completely herein all the details of the design and construction. However, the offered shall confirm in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The offered goods shall be suitable for use within Nepal and the climatic conditions are:

- a) Annual Average Ambient Temperature 25°C
- b) Maximum ambient temperature 55°C
- c) Minimum ambient temperature -5°C
- d) Relative humidity 10 to 100%
- e) Average rainfall per annum 2,000 mm
- f) Maximum height above the sea level 2,000 m
- g) Maximum wind pressure / wind speed 150 kg/m² / 50 m/sec
- h) Average number of thunder storms 50
- i) Average number of rainy days per annum 100

- 2.2. The poles shall also be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth.

3. Applicable Standard

- 3.1. The equipment specified here shall conform to the latest edition of the following Standards:

1.	EN 10025	Hot rolled products of structural steels
2.	BS EN 10296	Welded circular steel tubes for mechanical and general engineering purposes.
3.	EN ISO 1460	Metallic coatings - Hot dip galvanized coatings on ferrous materials
4.	EN ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods
5.	IS 2062	Hot Rolled Medium and High Tensile Structural Steel
6.	IS 2029	Recommended Practice for Hot - Dip Galvanizing of Iron and Steel



- 3.2. This list is not to be considered exhaustive and reference to a particular standard or recommendation in this specification does not relieve the supplier of the necessity of providing the goods complying with other relevant standards or recommendations.
- 3.3. The manufacturer of the offered poles shall have been accredited with valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in its scope. The bidder shall furnish a copy of the ISO 9001:2015 certificate with the bid.
- 3.4. The manufacturer shall have in-house facility to manufacture and for testing of the poles as per the applicable standards and this specification.

4. General Requirements

- 4.1. The telescopic pole sections and fittings shall be manufactured from hot rolled structural steel as per BS EN 10025 or equivalent standards to meet the required yield strength and tensile strength of the steel.
- 4.2. The pole shall be erected by friction joint without involvement of through bolt, site welding or any type of additional device of joint at the time of erection.
- 4.3. The poles shall be telescopic, uniformly tapered circular or octagonal cross-section.
- 4.4. The poles shall be fabricated in sections out of welded tubes of suitable lengths as specified.
- 4.5. The diameters of the top and the bottom end of the completely assembled pole shall be as specified.
- 4.6. The sections of the steel poles shall be designed such that the butt end of the top section fits on the top end of the second section, the butt end of the second section fits on the top end of the third section and so on. The various sections shall be fitted together by pressed friction joints.
- 4.7. The completely assembled telescopic pole shall have the design loads as specified.
- 4.8. A separate pole cap and base plate shall be provided which fits the top section and the bottom section of the pole respectively.
- 4.9. Each steel telescopic pole shall be provided with a pole cap and base plate of suitable type and size. The diameters of the base plate and pole cap shall be same as that of pole and shall also be galvanized. The minimum thickness of pole cap and base plate shall be 3 mm and 6 mm respectively. The size of pole cap shall be designed so that it just holds tightly on the top of the topmost segment of each pole and the collar height shall be minimum 60 mm. The base plate shall fit tightly on the bottommost segment of the pole. The size of base plate shall not be less than 500x500 mm with collar of height 40 mm. The pole cap and/or base plate can be designed to hold tightly by at least three numbers of 8 mm diameter screws.
- 4.10. All sections of the pole including the top cap and base plate shall be hot dip galvanized both internally and externally in accordance with ISO 1460 or IS 2629 or equivalent standard. The galvanization shall be done after the fabrication and welding. The minimum thickness of the zinc coating shall not be less than 500 g/m² (equivalent to 70 microns) of zinc for all surfaces of steel including the base plate and the pole cap.
- 4.11. The Footstep holders shall be fabricated and shop-welded before galvanization on the segments so that after assembly of the required type of pole, these should be located



alternatively on the opposite sides of the poles at a vertical distance of 0.6 m to 0.7 m from each other. The footstep holders shall be provided only on the pole segments that lie above 2.0 m above the ground level and 1.0 m below the Cross-arm level. The footstep holders shall be suitable to hold on two man-weights (about 150 kg).

5. Specific Requirements

- 5.1. The data and the drawings related to the poles and fittings provided in this specification are only conceptual.
- 5.2. The supplier shall carry out detailed design and submit for approval. Only after approval of the detail design and drawings, the manufacturer can manufacture the poles.
- 5.3. The manufacturer shall manufacture a sample pole as per the approved detail design. The manufacturer shall test the sample pole in the presence of NEA representative and submit the report to NEA seeking approval for mass production. The mass production shall begin only after the approval of NEA.
- 5.4. After the approval of design calculation, the weight of the poles shall not be less than 2.5% of the guaranteed weights for acceptance. Greater than the above tolerance value shall not be accepted. If the actual weight of the pole is less than the guaranteed weight, then a proportional deduction on the contract cost will be made by the purchaser as per the reduction of the weight of the pole. But no increase in cost will be given to the supplier for any increase in the weight of the pole.
- 5.5. The following tolerances shall be maintained:
 - a. Tolerance on diameter: $\pm 2\%$ from technical data sheet
 - b. Tolerance on finished poles after assembly: the telescopic poles shall not exceed ± 75 mm of their stated length in the technical data sheet.
 - c. Tolerance on weight: $\pm 2.5\%$
 - d. Tolerance on thickness: $\pm 5\%$
 - e. Straightness: the finished and assembled poles shall not be out of straightness by more than 1/100 of the height.
 - f. If the offerer has negative tolerances on thickness and weight but within the acceptable limit, then the poles are accepted for delivery and the cost of sample of the reduced weight shall be deducted from the payment.

5.6. Design Criteria of Telescopic Pole

SN	Pole Attribute	Requirements
1	Overall length of assembled pole	13 m
2	Depth of planting	2.1 m
3	Application of load from the top	600 mm
4	Max. Load Applicable on pole	3434 N
5	Design Working Transverse Load	350 kgf



SN	Pole Attribute	Requirements
6	Design Working Vertical Load	350 kgf
7	Wind Load	417 N
8	Factor of Safety	2.0
9	Thickness of tubing	2.5 mm (minimum)
10	Tensile Strength of Steel Material	430 N/mm ² (minimum)
11	Yield Strength of Steel Material	300 N/mm ² (minimum)

5.7. Pole Details of Circular Section Telescopic Pole

SN	Pole Attribute	Requirements
1	Pole Type	Steel Telescopic Circular
2	Total Number of Sections	Six
3	Top Diameter	151 mm
4	Bottom Diameter	454 mm
5	Length of Each Section	2.5m

5.8. Manufacture of Circular Section Telescopic Pole

- 5.8.1. It shall be the responsibility of the Bidder to determine the thickness of the tubing adequate to sustain the load and test requirements. The Bidder shall determine the thickness of the tubing to develop the required pole strength in accordance with the Bidder's method of fabrication. However, the thickness of the tubing shall not be less than 2.5 mm.
- 5.8.2. Each segment of the 13 m pole has been denoted by the designation B2, B3, B4, B5, B6 and B7. A combination of several pieces of these segments will form a pole. Each piece of segment shall be measured 2.5 m in length and tapered in such a way that each adjacent numbered pieces fit into the other for assembling the required type of pole i.e., B27. Assembling segments B2, B3, B4, B5, B6 and B7 shall form Pole B27.
- 5.8.3. All welding of the poles shall be carried out at the manufacturers' plant.
- 5.8.4. Welds parallel to the longitudinal axis of the poles shall be fillet welds. Each section of the pole shall have only one longitudinal weld. However, the bottom section B6 & B7 sections of 13 m long poles can have maximum one additional longitudinal weld. No circumferential joints/welds of the tubes are permitted. All welds shall be capable of withstanding, without failure or cracking, the stresses in a pole when subjected to its ultimate design loads.
- 5.8.5. All seam welds on joint mating surfaces shall be ground flush. All high spots in the galvanizing on the mating surface shall be ground and if the galvanizing is damaged in the process, it shall be repaired.



5.8.6. The minimum overlap between the following segments shall be as follows:

B2-B3	B3-B4	B4-B5	B5-B6	B6-B7
300 mm	350 mm	400 mm	450 mm	500 mm

5.9. Pole Details of Octagonal Section Telescopic Pole

SN	Pole Attribute	Requirements
1	Pole Type	Steel Telescopic Octagonal
2	Total Number of Sections	Four to Six
3	Top Diameter	Maximum 151 mm
4	Bottom Diameter	Maximum 454 mm
5	Weight of Each Section	Maximum 80 kg
6	Overlapping Length	Minimum of 1.5 times of bottom diameter of upper section

5.10. Manufacture of Octagonal Section Telescopic Pole

5.10.1. The pole shaft shall have octagonal cross section and shall be continuously tapered with single longitudinal welding. There shall not be any circumferential welding. The welding of pole shaft shall be done by Submerged Arc Welding (SAW) process.

5.10.2. It shall be the responsibility of the Bidder to determine the thickness of the tubing adequate to sustain the load and test requirements. The Bidder shall determine the thickness of the tubing to develop the required pole strength in accordance with the Bidder method of fabrication. However, the thickness of the tubing shall not be less than 2.5 mm.

6. Marking of Pole

- 6.1. Each pole shall be clearly marked with the following engraving on the finished pole at a position approximately 3.5 m. from the butt end:
 - (a) "PROPERTY OF NEA"
 - (b) Name or Trademark of the Manufacturer
- 6.2. Each pole shall be clearly marked with the following with indelible permanent paint of color on the finished pole at a position below the above engraving:
 - (a) Contract Identification "DCSD-XX-XX-XX"
 - (b) Length of pole in meters
 - (c) Date (year and month) of manufacture
 - (d) Design working load.
- 6.3. If the manufacturer proposes to engrave the markings as per #1 and #2 above, it is acceptable to the Purchaser.
- 6.4. Each finished pole shall be marked with an indelible permanent horizontal line of red color throughout the circumference at a point 1/6th of the pole height from the butt



end of the assembled pole with five arrows pointing towards butt end to denote the planting depth.

- 6.5. The mating depth of the relevant sections of pole shall also be marked with an indelible permanent horizontal line of red color throughout the circumference.

7. Tests

7.1. Factory Acceptance Test

- 7.1.1. The following test(s) shall be performed on the finished pole and shall be witnessed by the Purchaser's representative.

- Checking of dimensions and the weight of each type of individual part of segment.
- Assembly test and checking of the dimension and the weight of the assembled pole.
- Drop test from a height of 2 meters.
- Deflection test and permanent set test by applying 1.2 times the maximum permissible load.
- Break test of the pole equals or exceeds 2 times design working load.
- Testing of the thickness of the Zinc coating.
- Tensile test.

- 7.1.2. The acceptance test shall be carried out at the manufacturer's laboratory provided that the testing facility is available. The supplier shall clearly state as to what testing facilities are available at the works of the manufacturer and whether the facilities are adequate to carry out all the tests or not. If any facility is not available at the manufacturer's premises, they shall be provided by the supplier to the purchaser's representative for witnessing the acceptance tests in an independent test laboratory at the cost of the Supplier/Manufacturer.

- 7.1.3. The number of poles selected for factory acceptance test shall be a representative sample as below.

Lot Size	No. of Poles for Dimension Check	No. of Poles for Assembly and other test
Up to 500	5	1
501 to 1000	8	2
1001 to 2000	13	3
2001 to 3000	18	4
More than 3000	20	5

- 7.1.4. **Drop Test:** The assembled pole shall be dropped vertically from a height of about 2.5 m or one sixth of the total pole height. The Drop Test may not result with any break in the welding of any of the pole segments. Any break observed in any of the pole segment may cause to reject the consignment at the Engineer's direction.

- 7.1.5. **Permanent Set Test:** The assembled pole selected shall be rigidly supported for a distance from its base equivalent to its scheduled buried depth. It will then be gradually loaded up to a load equal to the maximum permissible load. The



load shall be applied at right angles at the point of load application located 30 cm from the top of the pole for poles of length less than 5 m and 60 cm from top of the pole for poles of length longer than 9 m. The load shall be gradually and uniformly applied in increments of 10% of the design-working load up to 120% of the design-working load. At each increment of load, deflection of the pole tip shall be measured. The 120% loading shall be maintained for 5 minutes. The load shall be gradually reduced to zero and the amount of permanent deflection of the pole tip shall be recorded.

The pole shall be considered acceptable if the permanent deflection of the tip of the pole does not exceed 4 mm per meter of pole length. The permanent deflection is the deflection of tip of the pole on removal of load equal to 120% of design working load of pole after 5 minutes of the application of that load. The failure load of the pole tested equals or exceeds 200% of the design working load.

7.1.6. Other tests shall be carried out as per the related standards or the practices.

7.1.7. Should any of the poles first selected fail to pass any of the tests specified above, two further poles shall be selected for testing from the same batch i.e., same pole length, manufactured on the same day in respect of each failure. Should one or both these additional poles fails, the test material represented by the test samples shall be deemed as not complying with the requirement of the specification and the whole lot shall be rejected.

7.2. After receipt of poles at the designated stores, the purchaser shall carry out dimensional and weight verification and any other required tests on supplied poles. Acceptance Test report shall be issued after carrying out the required tests and verification on two percent (2%) of randomly selected delivered poles in presence of representative of the supplier. The delivered poles shall be subject for compliance with the technical specification to the Inspector's satisfaction.

7.3. Although the samples selected and tested by inspector from the supplier's work have passed the specified tests and been accepted, NEA reserves the right to test, the materials after receipt at the destination by arranging the testing in any of the NEA approved laboratories. However, in the event of the samples failing in the test or the materials otherwise found defective, the supplier shall replace such materials at the destination concerned on receipt of intimation from NEA.

8. Quality Assurance

8.1. The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.

8.2. The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit Manufacture Quality Plan (MQP) along with the offer.

8.3. The bidder/manufacturer shall provide detailed design calculations, fabrication drawings and GTP along with the bid.



9. Guaranteed Technical Particulars (Technical Data Sheet)

SN.	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Country of Origin			
3	Governing Standards for material			
4	Governing Standards for tubing manufacturing			
5	Governing Standard for Galvanization			
6	Grade and source of material			
7	Overall Length	m		
8	No. of Sections	Nos.		
9	Sections starting from the top			
	Section: 1			
	Length	m		
	Thickness	mm		
	Top diameter (outer)	mm		
	Bottom diameter (outer)	mm		
	Weight	Kg		
	Section: 2			
	Length	m		
	Thickness	mm		
	Top diameter (outer)	mm		
	Bottom diameter (outer)	mm		
	Weight	Kg		
	Section: 3			
	Length	m		
	Thickness	mm		
	Top diameter (outer)	mm		
	Bottom diameter (outer)	mm		
	Weight	Kg		
	Section: 4			
	Length	m		
	Thickness	mm		
	Top diameter (outer)	mm		



SN.	Description	Unit	NEA Requirements	
	Bottom diameter (outer)	mm		
	Weight	Kg		
	Section: 5			
	Length	m		
	Thickness	mm		
	Top diameter (outer)	mm		
	Bottom diameter (outer)	mm		
	Weight	Kg		
	Section: 6			
	Length	m		
	Thickness	mm		
	Top diameter (outer)	mm		
	Bottom diameter (outer)	mm		
	Weight	Kg		
10	Weight of Top Cap and Base Plate	Kg		
11	Weight of the complete pole after galvanization including top cap and base plate	Kg		
12	Guaranteed minimum transverse failure load	Kgf		
13	Guaranteed maximum permanent deflection	mm		

10. Non-Compliance Schedule (Table)

10.1. If there is any non-compliance with the technical specifications, the bidder shall provide a list of non-compliances with the specific specification clause, documenting the effects that such non-compliance is likely to have on the equipment's life and operating characteristics.

S.N.	Clause	Details of non-compliance with justifications



SEA, Kotha Provincial Office
Rani, Birtmagar

Technical Specifications of ACSR Wolf Conductor

1. Scope

The specification covers technical requirements of design, manufacture, fabrication, testing, packing, supply and delivery of commonly used Aluminum Conductor Galvanized Steel Reinforced (ACSR) conductor used on overhead power/distribution line construction.

2. Climatic Conditions

The ACSR Conductor shall be suitable for continuous satisfactory operations under the following climatic conditions:

a. Annual Average Ambient Temperature	25°C
b. Maximum ambient temperature	45°C
c. Minimum ambient temperature	-15°C
d. Maximum temperature attainable by an object exposed to sun	55°C
e. Maximum relative humidity	100%
f. Average rainfall per annum	2,000 mm
g. Maximum height above the sea level	3,000 m
h. Maximum wind pressure/wind speed	150kg/m ² /50 m/sec
i. Average number of thunderstorms	50
j. Average number of rainy days per annum	100

3. System Particulars

The ACSR Conductor shall work satisfactorily in the system with the following particulars:

a. Nominal System Voltage	33/11/0.4/0.23kV
b. System Frequency	50Hz with 5% tolerance
c. Number of phases	3/1

4. Applicable Standards

All conductors should be of Aluminum Conductors Galvanized Steel



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Reinforced (ACSR) construction. The conductors shall be manufactured and fabricated in strict conformity to **IS 398-Part II**.

5. General Requirements

The steel strands of ACSR conductor shall be performed so that they remain inert and do not move relative to each other when the conductor is out. The outermost layer of all conductors shall be stranded with right hand lay.

The correct tension must be maintained on the stranding machine when spinning the cable to avoid the possibility of bird caging during stringing. Any condition not complying may be rejected at the discretion of the Engineer.

The purity of the aluminum shall be the highest commercially available and not less than 99.5%. The contractor shall submit the certificates of analysis giving the percentage and the nature of any impurities in the metal from which the wires are made.

Precaution shall be taken during the manufacturing, storage and erection of steel core aluminum conductors to prevent the possibility of contamination by copper or other materials, which may adversely affect the aluminum. The manufacture of steel core aluminum shall be carried out in a portion of factory specially set aside for such purposes. Machinery previously used in the manufacture of copper or copper-bearing conductors shall not be for the manufacture of these aluminum or steel wires. The size and the composition of the entire conductor shall be as stated in general specification.

The conductors shall be supplied on drums of approved construction. Each drum shall be marked with the manufacturer's name, direction of rolling, the length, size stranding, net weight, gross weight, approximate measurement and production date of the conductor and manufacturing batch number incised. The minimum non jointed length of the ACSR conductor shall be at least as follows:

a. ACSR "WOLF" Conductor 500 m per drum



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However, the purchaser may ask the supplier to supply conductor of 1km length per coil and coiled without drum if required. The supplier shall quote the individual weight of the conductor and weight of the Steel reel on which it is rolled.

No two joints shall occur in the aluminum wires closer than 15 meters. No joints shall be permitted in steel wire unless the core consists of seven steel wires. In the latter case, joints in individual wires are permitted, but not with such adjacent joints shall be less than 15meters.

The wires used in manufacturing of stranded conductors shall satisfy all requirements of relevant standard before stranding.

The lay ratio (ratio of the aerial length of a complete turn of the helix formed by an individual wire in a stranded conductor to the external diameter of the helix) of the different layers shall be within following limits:

No. of Wires		Lay ratio for steel core		Lay ratio for outside layer	
Aluminum	Steel	Max.	Min.	Max.	Min.
30	7	28		10	14

In all construction, the successive layers shall have opposite directions of lay and the outer most layers being right handed. The wires in each layer shall be evenly and closely stranded.

The values of the tensile modulus of elasticity and co-efficient of linear expansion for ACS shall be as given below:

No. of wires	Tensile Modulus of Elasticity (GN/m ²)	Co-efficient of linear expansion/°C
ACS	80	17.8x10 ⁻⁶

6. Minimum Technical Requirements



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The minimum technical requirements of ACSR Conductor are tabulated below:

SN.	Description	Requirements
1	Code Word	WOLF
2	Nominal Aluminum Area(mm ²)	150
3	Sectional Aluminum Area(mm ²)	158.1
4	Total Sectional Area(mm ²)	194.90
5	Stranding and Diameter:	
5.1	Aluminum (Nos./mm)	30/2.59
5.2	Steel (Nos./mm)	7/2.59
6	Approximate Weight of conductor(kg/km)	726
7	Approximate Diameter(mm)	18.13
8	Breaking Load(kN)	67.34
9	Maximum Resistance at 20°C(Ω/km)	0.12

The minimum technical requirements of Aluminum Wires used in the construction of Aluminum Conductors Galvanized Steel Reinforce (ACSR) Conductor are tabulated below:

SN.	Description	Requirements
1	Nominal Diameter(mm)	2.59
2	Minimum Diameter(mm)	2.56
3	Maximum Diameter(mm)	2.62
4	Sectional Area of nominal Diameter(mm ²)	5.269
5	Weight of individual wire(kg/km)	14.24
6	Maximum Resistance at 20°C(Ω/km)	5.490
7	Minimum Breaking Load before stranding(kN)	0.89
8	Minimum Breaking Load after stranding(kN)	0.85

The minimum technical requirements of Steel Wires used in the construction of Aluminum Conductors Galvanized Steel Reinforce (ACSR) Conductor are tabulated below:



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SN	Description	Requirements
1	Nominal Diameter(mm)	2.59
2	Minimum Diameter(mm)	2.54
3	Maximum Diameter(mm)	2.64
4	Sectional Area of Nominal Diameter(mm ²)	5.269
5	Weight(kg/km)	41.09
6	Minimum Breaking Load before stranding (kN)	6.92
7	Minimum Breaking Load after stranding (kN)	6.57

7. Tests

Selection of Test Samples

Selection of Test Samples shall be done as per the relevant standards.

Type Tests

- The Type Tests shall have been carried out within last five years from the date of bid submission in accordance with the relevant standards and copy of the report shall be submitted along with the bid. The type test shall have been carried out from an internationally recognized ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF.
- If the type test report is not conducted OR it does not fulfill all the mentioned criteria OR the type test conducted is before five years from the last date of Bid submission the bidder shall declare that *"After the mass production of the 1st lot, the type test as per the relevant standards will be conducted in the particular rating at the bidder's cost in an ILAC/IAF accredited laboratory in the presence of Purchaser's representatives. If the conductor does not succeed the test, the lot shall be rejected"*.

The followings tests in addition to those mentioned in the relevant standards shall have been carried out as the Type Test.



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- i. Surface Condition Test if applicable
- ii. Test for ultimate breaking load on stranded conductor
- iii. Stress-strain test
- iv. Measurement of diameter of individual aluminum and steel wires
- v. Measurement of lay ratio
- vi. Breaking load of individual wires
- vii. Ductility test
- viii. Wrapping test
- ix. Resistance test
- x. Galvanizing test

Routine Test

- a. The routine tests shall be carried out in accordance with relevant standards.
- b. The following tests shall be carried out by the manufacturer to check the essential requirements:
 - i. Measurement of diameter of individual aluminum and steel wires
 - ii. Measurement of lay ratio
 - iii. Breaking load of individual wires
 - iv. Ductility test
 - v. Wrapping test
 - vi. Resistance test
 - vii. Galvanizing test
- c. The Manufacturer shall provide routine tests reports to the Representative of the Purchaser before Acceptance Tests.

Acceptance Tests

- The Acceptance Test shall be carried out in a lab of manufacturer in the presence of the Purchaser's representatives.
- b. In addition to the tests mentioned in the routine test, the followings tests



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shall be carried out as the Acceptance Test:

- i. Measurement of diameter of Conductor
- ii. Breaking Load of Conductor
- iii. Length/ Weight of Conductor

8. Tests to be witnessed by the Employer

Pre-Dispatch Inspection

- a. Conductor shall be subjected to inspection by a duly authorized representative of the Purchaser.
 - b. Inspection may be made at any stage of manufacture at the option of the purchaser.
 - c. After the mass production, the Manufacturer/Supplier shall inform the Purchaser for the nomination of representatives; so that representatives from the Purchaser could be deputed for the inspection. The appointed representatives shall select samples as required. They will witness the Acceptance Tests.
 - d. The representatives shall be entitled to have access to the works and all places of manufacturer. They shall have full facilities for un-restricted inspection of supplier's works, raw materials, manufacture of conductor and conducting necessary tests. The supplier shall keep the purchaser informed well in advance of the time of starting and process of manufacture of conductor in its various stages.
 - e. The acceptance of any quantity of materials shall in no way relieve the supplier of his responsibility for meeting all requirements of the specification and shall not prevent subsequent rejection, if such materials are later found to be defective.
- Material shall be dispatched after dispatch clearance certificate is issued.



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- g. The Purchaser shall have every right to appoint a third-party inspection to carry out the inspection process. All inspection charges shall be borne by the Purchaser.

Inspection after Receipt at Stores

- a. The Purchaser shall perform 2% physical verification after receipt at the store.
- b. If the weight of drum is found to be less than the guaranteed value, the length verification as mentioned in clause 9 at the cost of the supplier shall be carried out. For the length verification all the tools and equipment shall be provided by the Supplier.
- c. For any reduction in the weight/length of the conductor, the deduction on the contract price will be made by the NEA for the reduced quantity as per the rate quoted on the price schedule.
- d. The Purchaser may conduct acceptance test after receipt of Equipment in any lab at its own cost. If the sample fails the test or found different from the reports of the pre-dispatch inspection:
- The material shall be rejected and the supplier shall replace such material at the destination concerned.
 - Double the samples shall be tested at the cost of the Supplier. In the event of failing the test, the material shall be rejected and the supplier shall replace the lot at the destination concerned.

9. Verification of Length of Conductor

The Purchaser shall ascertain the length of conductor at supplier's works and at the receiving store centers by measuring the actual length. The supplier shall ensure that length measuring machine is available for measurement of the length by our inspecting officer.

All ends of the conductor shall be properly sealed by the supplier and the seals shall be contained in the drum and not exposed out of drum.



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Summary of Technical Specifications of ACSR Wolf Conductor

SX.	Description	Units	NEA Requirement
1	Name and Address of Manufacturer		
2	Applicable Standard of Manufacture and Testing		IS398
3	ACSR Conductors		WOLF
3	Nominal Aluminum Area	mm ²	150
4	Sectional Aluminum Area	mm ²	150.1
5	Sectional Steel Area	mm ²	
6	Total Sectional Area	mm ²	195.99
7	Stranding and Diameter		
7.1	Aluminum	Nos/mm	30/2.59
7.2	Steel	Nos/mm	7/2.59
8	Overall Diameter		
8.1	Core	mm	
8.2	Conductor	mm	
9	Weight (after stranding)		
9.1	Aluminum	kg/km	
9.2	Steel	kg/km	
9.3	Total	kg/km	
10	Rated Strength	kN	
11	Maximum Resistance at 20°C	Ω/km	
12	Current Rating	A	
13	Aluminum Wires		
13.1	Nominal Diameter	mm	2.59
13.2	Minimum Diameter	mm	2.56
13.3	Maximum Diameter	mm	2.62
13.4	Sectional Area of Nominal Diameter	mm ²	5.269
13.5	Weight of individual strand	kg/km	14.24
13.6	Maximum Resistance at 20°C	Ω/km	5.490
13.7	Minimum Breaking Load before stranding	kN	0.89
13.8	Minimum Breaking Load after stranding	kN	0.85
14	Steel Wires		



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14.1	Nominal Diameter	mm	2.50
14.2	Minimum Diameter	mm	2.54
14.3	Maximum Diameter	mm	2.64
14.4	Sectional Area of Nominal Diameter	mm ²	5.269
14.5	Weight of individual strand	kg/km	41.69
14.6	Minimum Breaking Load before stranding	kN	6.92
14.7	Minimum Breaking Load after stranding	kN	6.57

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Technical Specifications of Line Materials Hardware

CROSSARMS CHANNELS AND BRACING ANGLES

1. Scope

This Specification covers the fabrication and supply of steel cross-arms and bracing members commonly used in overhead power line construction.

2. Material

- 2.1 The steel cross-arms shall be fabricated from hot rolled channels and angles.
- 2.2 The steel channels and angles shall be fabricated and tested in accordance with Indian Standards IS: 226-1975 and IS-808-1989 or any revision thereof or other equivalent national or international standard provided that the resulting steel stock is of equal quality and strength. *The minimum tensile strength of the steel shall be 4200 kg/cm² and type test report of the materials used for channels and angles must be mandatory submitted.*

3. Description

- 3.1 The steel cross-arms and bracing angles shall be of sizes shown in the Table 1: Cross-arms and bracing angles, contained herein.
- 3.2 Conceptual hole pattern and size of holes on cross-arm channels are shown in appropriate drawings herein, however, the Supplier must confirm with the Project the locations and sizes of holes prior to the manufacture.
- 3.3 The surface of the steel shall be flat after drilling (punching) and free of dimpling or imperfections. The hole edges shall be broken by reaming. The holes shall be full dimension after galvanizing and no minus tolerance of any hole size will be accepted.
- 3.3 The steel cross-arm and bracing angles shall be furnished reasonably smooth on all surfaces and free of burrs or sharp projections.

4. Galvanizing

- 4.1 The steel cross-arms and bracing angles shall be galvanized after fabrication in accordance with IS: 2629-1985 or any revision thereof or any other national or international standards that ensure at least a minimum of equal quality to the standard mentioned above will also be acceptable and minimum galvanization of 460g/m² and must satisfy with IS standard of all galvanized materials in Bill of Quantity.

5. Tests

- 5.1 Apart from the tests indicated herein in the referenced standards, the channels and angles shall undergo following tests:



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- Visual Inspection;
- Verification of Dimensions;
- Verification of Galvanizations.

6. Bid Documentation

- 6.1 The Bidder shall provide with the Bid two (2) clear copies of the governing standards for fabrication and testing of channels and angles and two (2) clear copies of all other relevant standards referenced therein.
- 6.2 The Bidder shall provide a complete description, catalogue and certified dimensional drawings of all channels and angles.
- 6.3 A clause-by-clause commentary on specification, specifying compliance and deviations, if any.
- 6.4 All data, drawings, catalogues and other technical documents shall be bound separately from the Bid documents.

All the supplied channels shall comply and correspond with the dimensional, mass and sectional properties of sloping flange channels for MC 100, section 4 "Channel section" IS 808:1989



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FLAT CROSSARM BRACE

1. **Scope**

This Specification covers the fabrication, testing and supply of flat, galvanized steel cross-arm braces, as per specification & drawing.

2. **Material**

- 2.1 The flat cross-arms brace shall be fabricated out of hot-rolled steel flat.
2.2 The steel flat for cross-arms brace shall be fabricated and tested in accordance with Indian Standards IS- 226-1975, and IS-1731-1971 or any revision thereof or other equivalent national or international standard provided that the resulting steel stock is of equal quality and strength. The minimum tensile strength of the steel shall be 4200 kg/cm².

3. **Description**

- 3.1 The brace shall be furnished reasonably smooth on all surfaces and free of burrs or sharp projections.
3.2 The surface of the steel shall be flat after drilling or (punching) and free of dimpling or imperfections. The hole edges shall be broken by reaming. The holes shall be full dimension after galvanizing and no minus tolerance of specified hole size will be accepted.
3.3 The brace shall have a minimum tensile strength of 3182 kg at the bolt-hole and bolt slot.
3.4 The brace shall be capable of being bent 10 degrees at the bolt hole or slot and 140 degrees at any point between hole and slot without cracking of the base metal on the outside of bent portion.
3.5 The brace shall be drilled and dimensioned in accordance with drawings And Construction Standards of the Bidding Document.

4. **Galvanizing**

4.1 The steel cross-arms and bracing angles shall be galvanized after fabrication in accordance with IS: 2629-1985 or any revision thereof or any other national or international standards that ensure at least a substantially equal quality to the standard mentioned above will also be acceptable and minimum galvanization of 400g/m² and must satisfy with IS standard of all galvanized materials in Bill of Quantity.

5. **Tests**

- 5.1 Apart from the tests included herein in the referenced standards, the flat cross arm brace shall undergo following tests:
- Visual Inspection;
- Verification of Dimensions;
- Verification of Galvanizations.

6. **Quality Assurance Program**



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Along with the Bid the Bidder shall furnish quality assurance program of the manufacturer which includes the Quality System and the Quality Plans, which shall include, among others, information to meet the following requirement, failing which the Bid shall be liable for rejection.

- i. The structure of the organization;
- ii. The duties and responsibilities assigned to staff ensuring quality of works;
- iii. The system for purchasing, taking delivery and verification of materials;
- iv. The system for ensuring quality of workmanship;
- v. The quality assurance arrangement shall conform to relevant requirements of ISO9001:2000;
- vi. Statement giving list of important raw materials, names of manufacturer for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials;
- vii. List of manufacturing facilities available with supporting documents;
- viii. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections;
- ix. List of testing equipment available with the manufacturer for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

7. Bid Documentation

- 7.1 The Bidder shall provide with the Bid two (2) clear copies of the governing standards for fabrication and testing of flat cross arm brace and two (2) clear copies of all other relevant standards referenced therein.
- 7.2 The Bidder shall provide a complete description, catalogue and certified dimensional drawings of flat cross arm brace.
- 7.3 A clause-by-clause commentary on the specification, specifying compliance and deviations, if any.
- 7.4 All data, drawings, catalogues and other technical documents shall be bound separately from the Bid documents.



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GALVANISED STEEL BOLTS, NUTS

1. Scope

This Specification covers the fabrication and supply of galvanized steel bolts and nuts, as specified herein, for use in overhead electric line construction.

2. Material

- 2.1 The bolts and nuts shall be manufactured and tested in accordance with IS: 1363 (Part I)-1984 or the latest version thereof or any other national or international standards that ensures at least equal or better quality to the standard mentioned above, will also be acceptable.

3. General

- 3.1 Bolts and nuts shall be furnished in the types, diameters and lengths specified in the Price Schedule. However, the dimensions and length of threading of bolt must be confirmed with the Project prior to manufacture.
- 3.2 Thread forms shall be consistent with all material/items listed herein and shall not strip or slip under sustained tensile loading equal to the design tensile strength of the threaded material item.

4. Machine Bolt and Nut

- 4.1 Each machine bolt shall be furnished with two (2) hexagonal nuts and two (2) plain washers assembled thereon.

6. Galvanizing

The Galvanised Steel Bolts, Nuts shall be galvanized after fabrication in accordance with IS: 2629-1985 or any revision thereof or any other national or international standards that ensure at least a substantially equal quality to the standard mentioned above will also be acceptable and minimum galvanization of 200g/m² and must satisfy with IS standard of all galvanized materials in Bill of Materials.

7. Tests

- 7.1 The bolt and nut shall undergo tests in accordance with the relevant governing standard.

8. Quality Assurance Program

Along with the Bid the Bidder shall furnish quality assurance program of the manufacturer which includes the Quality System and the Quality Plans, which shall include, among others,



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information to meet the following requirement, failing which the Bid shall be liable for rejection.

- i. The structure of the organization;
- ii. The duties and responsibilities assigned to staff ensuring quality of works;
- iii. The system for purchasing, taking delivery and verification of materials;
- iv. The system for ensuring quality of workmanship;
- v. The quality assurance arrangement shall conform to relevant requirements of ISO9001:2000;
- vi. Statement giving list of important raw materials, names of manufacturer for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials;
- vii. List of manufacturing facilities available with supporting documents;
- viii. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections;
- ix. List of testing equipment available with the manufacturer for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

9. **Bid Documentation**

- 9.1 The Bidder shall provide with the Bid two (2) clear copies of the governing standards for fabrication and testing of bolt and nut and two (2) clear copies of all other relevant standards referenced therein.
- 9.2 The Bidder shall provide a complete description, and catalogue of bolt and nut.
- 9.3 The Bidder shall provide certified type test results of bolt and nut as required by governing standards.
- 9.4 A clause-by-clause commentary on specification, specifying compliance and deviations, if any.
- 9.5 All data, drawings, catalogues and other technical documents shall be bound separately from the Bid document.



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POLE CLAMPS

1. Scope

- 1.1 This Specification covers the fabrication and supply of galvanized steel pole clamps with nuts, bolts and washers for use on overhead power line construction.

2. Material

- 2.1 The pole clamp shall be fabricated out of hot-rolled steel flat.
2.2 The steel flat for pole clamp shall be fabricated and tested in accordance with Indian Standards IS: 226-1975, and IS-1731-1971 or any revision thereof or other equivalent national or international standard provided that the resulting steel stock is of equal quality and strength. The minimum tensile strength of the steel shall be 4200 kg/cm².

3. Description

- 3.1 Outline details of pole clamps are shown in the drawings. Construction standards of the Bidding Document. Dimensions may be changed to comply with the final pole sizes selected. Therefore, the dimensions must be confirmed with the Project prior to manufacturing.
3.2 The fittings shall be free of burrs, splinters, splits, sharp points and edges which may damage conductors or show evidence of poor workmanship.
3.3 The surface of the steel shall be flat after drilling or (punching) and free of dimpling or imperfections. The hole edges shall be broken by reaming. The holes shall be full dimension after galvanizing and no minus tolerance of specified hole size will be accepted.
3.4 The pole clamps shall have a minimum tensile strength of 182 kg at the bolt-hole and bolt slot.

4. Galvanizing

- 4.1 The Pole Clamps shall be galvanized after fabrication in accordance with IS: 2629-1985 or any revision thereof or any other national or international standards that ensure at least a substantially equal quality to the standard mentioned above will also be acceptable and minimum galvanization of 460g/m² and must satisfy with IS standard of all galvanized materials in Bill of Quantity.

5. Tests

- 5.1 Apart from the tests indicated herein in the referenced standards, the pole clamps shall undergo following tests:
- Visual inspection;
 - Verification of Dimensions;



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6. Quality Assurance Program

Along with the Bid the Bidder shall furnish quality assurance program of the manufacturer which includes the Quality System and the Quality Plans, which shall include, among others, information to meet the following requirement, failing which the Bid shall be liable for rejection.

- i. The structure of the organization;
- ii. The duties and responsibilities assigned to staff ensuring quality of works;
- iii. The system for purchasing, taking delivery and verification of materials;
- iv. The system for ensuring quality of workmanship;
- v. The quality assurance arrangement shall conform to relevant requirements of ISO9001:2000;
- vi. Statement giving list of important raw materials, names of manufacturer for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials;
- vii. List of manufacturing facilities available with supporting documents;
- viii. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections;
- ix. List of testing equipment available with the manufacturer for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

7. Bid Documentation

- 7.1 The Bidder shall provide a complete description catalogue and two (2) copies of certified dimensional drawings of pole clamps.
- 7.2 A clause-by-clause commentary on specification, specifying compliance and deviations, if any.
- 7.3 All data, drawings, catalogues and other technical documents shall be bound separately from the Bid documents.



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Technical Data Sheet

(To be filled by the Bidder/Manufacturer)

Technical Data Sheet

(To be filled by the Bidder/Manufacturer)

Item: Cross Arms and Bracing Angles

S.N	Description	Unit	NEA Requirement	
1	Manufacturer			
2	Country of origin			
3	Year of Manufacturing Experience			
4	Governing Standard		IS:226-1975 and IS:805-1982	
5	Governing Standard for galvanization			
6	Steel Clarification			
7	Minimum Tensile Strength of steel	kg/cm2	4200	
8	Is the cross arm and angles fabricated from hot-rolled steel sections?	yes/no	yes	
9	ISO 9001 certificate submitted	yes/no	yes	
10	Type test certificate submitted	yes/no	yes	
11	User's certificate submitted	yes/no	yes	
12	Copies of relevant standards attached	yes/no	yes	
13	Outline drawing and associated details attached	yes/no	yes	

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As representative for _____

Address _____



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Date _____

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Flat Cross Arm Brace

Description	Queries
1. Manufacturer	
2. Steel Classification	
3. Minimum tensile strength of steel	
4. Is the flat cross arm brace fabricated from hot-rolled steel sections?	Yes/No
5. Governing Standard for manufacturing and testing	
6. Governing Standard for galvanizing	
7. Standards attached?	Yes/No
8. Drawings of flat cross arm brace?	Yes/No

Signature _____
As representative for _____
Address _____
Date _____



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Pole Clamps

Description	Queries
1. Manufacturer	
2. Steel classification	
3. Referenced galvanizing specification	
4. Drawings of pole clamp furnished?	

Signature _____
As representative for _____
Address _____
Date _____



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Galvanized Steel Nuts and Bolts

Description		Queries
1.	Manufacturer	
2.	Material description Furnished?	Yes/No
3.	Governing standard for manufacturing and testing	
4.	Governing standard for galvanization	
5.	Standards attached?	Yes/No
6.	Catalog numbers attached for all items?	Yes/No
Signature _____		
As representative for _____		
Address _____		
Date _____		



Technical Specification

1. Scope

- 1.1. The specification covers design, manufacture, testing, supply, and delivery of 33kV and 11kV XLPE insulated covered All Aluminium Alloy Conductor (AAAC) suitable for use in overhead electric lines and equipment of Nepal Electricity Authority conforming to the applicable standards of Nepal Electricity Authority conforming to the applicable standards.
- 1.2. XLPE insulated covered AAAC conductors are preferred than conventional 33kV and 11kV overhead lines with bare conductors as those are not subjected to frequent faults as happens with the bare conductors, to minimize problem of tree clearance and in some cases where it is difficult to get clearance for bare conductor lines.
- 1.3. It is not intended to specify completely herein all the details of design and manufacture of XLPE insulated covered AAAC conductor. However, it shall conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser. The purchaser shall interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The goods shall be suitable for use with Nepal, and the climatic conditions are:
 - a) Annual Average Ambient Temperature 25°C
 - b) Maximum ambient temperature 55°C
 - c) Minimum ambient temperature -5°C
 - d) Relative humidity 10 to 100%
 - e) Average rainfall per annum 2,000 mm
 - f) Maximum height above sea level 3,000 m
 - g) Maximum wind pressure / wind speed 150 kg/m² / 50 m/sec
 - h) Average number of thunderstorms 50
 - i) Average number of rainy days per annum 100

3. Applicable Standards

- 3.1. Unless otherwise stipulated elsewhere in this specification, the goods shall conform to EN 60397-1 or equivalent standards in accordance with the latest editions and any amendments thereof.

4. General Requirements

- 4.1 Medium Voltage Covered Conductor (MVCC) for use in sub-transmission overhead lines shall be designed to withstand all mechanical, electrical, and thermal stresses under steady state and transient operating conditions.



- 4.2 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope for the plant where the manufacture is done.
- 4.3 All materials used in the manufacturing of conductors shall be new, unused and of the finest quality. All materials should comply with the requirements/tests as per applicable standards. The purchaser will verify the documentary evidence of the purchase and use of various raw materials used for the manufacture of the supplied cable.
- 4.4 The **Manufacture Quality Assurance Plans (MQAP)** shall be submitted to the purchaser for approval. The MQAP shall cover all the details of the manufacturing process including testing till delivery.

5. Composition and Description of the Cable and Conductor

5.1. Properties of Conductor

The conductor shall be of multi-strand round uncompact hard drawn all aluminium alloy conforming to the specified standards. The properties of conductors of various sizes shall be as below:

SN	Description	Unit	Aluminium Alloy Stranded Conductor	
1	Actual Area	sq. mm	55	100
2	Stranding & wire diameter	mm	7/3.15	7/4.26
3	Approximate overall diameter	mm	9.45	12.78
4	Approximate weight	kg/km	149.20	272.86
5	Maximum Calculated resistance at 20°C	Ω/km	0.6210	0.3390
6	Approximate calculated breaking load	kN	16.03	29.26
7	Current Rating	Amps	234	325

5.2. Freedom From Defects

The wire shall be smooth and free from all imperfections such as spills, splits, slag inclusion, diamond marks, scratches, fittings, blow holes, projections, looseness, overlapping of strands, chipping of aluminium layers etc. And all such other defects which may hamper the mechanical and electrical properties of the conductor. Special care should be taken to keep away dirt, grit etc. during stranding.

5.3. Joint in Wires

There shall be no joint in any wire of a stranded conductor containing seven wires, except those made in the base rod or wire before final drawing.

5.4. Stranding

The wires used in the construction of a stranded conductor shall, before stranding, satisfy all the relevant requirements of the applicable standard.

The lay ratio of the different layers shall be between 10 and 14.



In all constructions, the successive layers shall have opposite directions of lay, the outermost layer being right-handed. The wires in each layer shall be evenly and closely stranded.

5.5. Filling (Water Blocking)

The stranded conductor shall be longitudinally watertight by means of a water blocking material incorporated during the extrusion process. The use of grease / water swellable tape / water swellable powder etc. is not permitted. The water blocking material shall be stable at a maximum operating conductor temperature of 90°C.

The water blocking compound shall be compatible with the conductor material as well as the semi conducting polymer screen layer above it and not adversely affect its electrical or mechanical properties.

5.6. Insulation

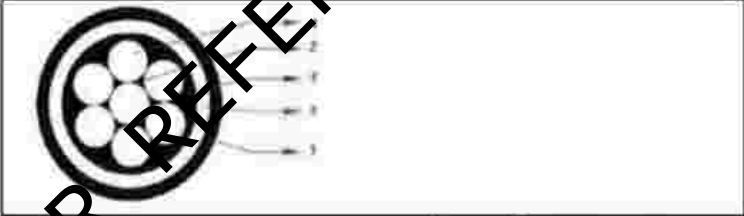
The insulation shall be dual layered with the inner layer being XLPE with a nominal thickness of 1.2 mm for 11kV & 2.43 mm for 33kV and the outer layer being a suitable XLPE which is UV resistant, non-tracking and erosion resistant with a nominal wall thickness of 1.1 mm for 11kV & 1.2 mm for 33kV. The minimum combined insulation thickness of both layers should be 2.2 mm for 11kV & 3.1 mm for 33kV.

The Conductor manufacturing and stranding process shall incorporate the longitudinal water blocking.

The semi-conduction screen, inner insulation and outer insulation shall be extruded in one step i.e., triple extrusion to ensure a good, permanent bond between the three layers and also with the conductor.

It shall be possible to remove the Semi-conducting Screen, Inner and Outer Insulation Layers without damage to the conductor.

The following figure shows the cross section of an AAAC XLPE covered conductor.



Description	Unit	Nominal Thickness	
		11kV	33kV
1. Aluminium Alloy wire	sq. mm.	As per requirement	
2. Extruded longitudinal water blocking layer	mm	As required to make water block arrangement	
3. Extruded Semi-conductive layer	mm	0.3	0.4
4. Inner insulation of XLPE, without carbon black	mm	1.2	2.43
5. Outer insulation with UV & Track resistant XLPE	mm	1.1	1.2

The XLPE material shall be of Borealis, Austria/BASF, Germany/Du Pont, USA/Sumito Chemicals, Japan or DOW Chemicals, USA make or equivalent. In the

case of another make, the bidder shall submit the certification from independent internationally recognized agency/ies to substantiate the equivalency to the above referred make. Failure to furnish the equivalency certificate will result in the offer being rejected.

9. Tests

6.1. Type Tests

- 6.1.1. For the proposed manufacturer(s), the bidder shall furnish copies of Type Test reports of Medium Voltage Covered Conductor (MVCC) conducted on 10-36kV voltage level as specified in the relevant EN or equivalent standards. The Type Test shall be conducted from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and shall not be older than five years from the date of bid submission.
- 6.1.2. After the mass production of the first lot, the Supplier (at its own cost) shall conduct the Type Test as per the relevant standards on identical unit of each item selected by the representatives of the Purchaser from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF in the presence of representatives of the Purchaser. The cost towards the Type Test shall be borne by the Supplier and be included in the bid price. The cost for the airfare, daily/travel allowances, insurances, visa fees, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Purchaser.
- 6.1.3. Dispatch clearance certificates shall be issued only after the successful type test. Shall the Type Test not be satisfactory, the whole lot shall be rejected, and the Manufacturer shall manufacture a new item and perform the Type Test on new lot. All the cost for the repeated type tests including but not limited to airfare, daily/travel allowances as per NEA rules, insurances, visa fees, living expenses, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Supplier.
- 6.1.4. The type test shall comprise but not limited to the following tests as per EN 50397-1 or equivalent international standard.

a) Electrical Tests

- (i) Conductor resistance
- (ii) High Voltage Test

Test Voltage (AC)	1U
Number of specimens	1
Length of specimen (minimum)	5m
Duration of immersion in water (minimum)	1h
Temperature of water	20 ± 5°C
Test duration	15 min (S) and 1 h (T)

- (iii) Spark test on the covering with test voltage: AC 0.7U or DC 1U
- (iv) Leakage current with test voltage: AC 0.7U
- (v) Tracking resistance

- b) Construction and Dimensions
 - (i) Compliance with the design requirements
 - (ii) Thickness of the covering
- c) Construction and Mechanical properties of the conductor
 - (i) Tensile Strength and Elongation at break
 - (ii) Resistance to UV rays
- d) Non-electrical tests on the covering
 - (i) Mechanical properties before aging of sample & after aging of sample.
 - (ii) Carbon black content
- e) Tests of compatibility
 - (i) Ageing of complete product sample
- f) Thermal properties of the covering
 - (i) Shrinkage test: Distance "L" between marks: 200 ± 5 mm
 - (ii) Hot-set-test
 - (iii) Pressure test at high temperature
- g) Further tests on the covering
 - (i) Water absorption
 - (ii) Shore D hardness
- h) Test of the longitudinal water tightness
 - (i) With a heat cycle

Number of specimens	1
Length of specimen	3m
Test duration	24h
Bending radius	20D

- (ii) Without a heat cycle

Number of specimens	1
Length of specimen	3m
Test duration	24h

- i) Marking
 - (i) Content, legibility
 - (ii) Durability
- j) Slippage Test

6.2. Routine Tests

All the routine tests as per EN 50397-1 or equivalent international standards shall be carried out on each delivery length. The Routine Test reports shall be submitted to the inspectors at the time of the Pre-Dispatch Acceptance test.



6.3. Acceptance Tests

- All the pre-dispatch acceptance tests as per EN 50397-1 or equivalent international standard shall be carried out to the samples selected by the representative of the Purchaser. The sampling shall be as per the relevant standards.
- 6.4. The Purchaser shall perform 2% physical verification of goods after receipt at the store in the presence of a representative of the Supplier. All the tools and equipment for the length and weight verification shall be provided by the Supplier.
- 6.5. Type Test/Acceptance Test/Routine Tests and any other tests not covered in different clauses of the specification but required as per relevant standards shall also be carried out.
- 6.6. The supplier shall clearly state as to what testing facilities are available in the works of manufacturer and whether the facilities are adequate for carrying out routine and acceptance tests and Anti Tracking as mentioned in relevant standards. All the testing facilities shall be provided by the bidder to the purchaser's representative for witnessing the tests in any internationally accredited laboratories or by the national board.
- 6.7. All tests (except type test) and inspection shall be made at the place of manufacturer unless otherwise agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification.

7. Packing and Marking

- 7.1. The Cable shall be supplied on suitable and non-returnable wooden drums of robust construction for each length of conductor as per IS 10418 (or equivalent standard).
- 7.2. Packing shall be sturdy to protect the cable from any injury during transportation handling and storage.
- 7.3. A layer of waterproof paper or suitable material shall be applied to the surface of the drums and over the outer cable layer. The wood used shall be treated to protect from weather and insects.
- 7.4. Wood preservative shall be applied to the entire drum. A clear space of at least 40 mm shall be left between the Cable and Logging.
- 7.5. Both the ends shall be sealed with suitable size PVC/Rubber Caps with sealant to prevent ingress of moisture. The seals shall be contained in the drum and not exposed out of drum.
- 7.6. Each cable drum shall have the following information stenciled on it:
- (i) Manufacturer's Name and Brand Name
 - (ii) Year of Manufacture
 - (iii) Nominal Cross-sectional area of the cable conductor
 - (iv) Type of Insulation
 - (v) Type of cable and voltage grade
 - (vi) Length of the Cable
 - (vii) Direction of rotation of drum (by means of an arrow)
 - (viii) Approximate gross weight in kg/km



- (ix) Drum Identification Number
- (x) Name of Purchaser
- (xi) Contract No.

- 7.7. Each drum of the cable furnished shall contain only one (1) length of conductor.
- 7.8. The standard length of the cable in each drum shall be as per the table below.

Conductor size in mm ²	Standard length (m/drum) for 11kV cable	Standard length (m/drum) for 33kV cable
55 (7/3.15 mm)	1000	-
100 (7/4.26 mm)	1000	500

- 7.9. The standard length in each drum is subject to a tolerance of $\pm 2\%$. The payment for the excess length and within the positive tolerance value shall be made as per the actual length. If any drums have an excess length of cable greater than 2% positive tolerance value, the length of cable in such drum shall be treated as standard length as mentioned in table above plus 2% only and no additional payment shall be made for excess length greater than +2% tolerance. Similarly, the payment for the reduced length and within the negative tolerance value shall be made as per the actual length. If any drums have the cable less than the negative tolerance value, the entire drum shall be rejected, and no payment shall be made. The total length of the delivered cable in aggregate of all drums shall not exceed the total quantity as per the Schedule of Requirements, and no additional payment shall be made for excess length in total.

- 7.10. The following particulars shall be properly legible, embossed/printing on the covered conductor for identification at intervals of more than one meter throughout the length of the cable. Font size of letters shall be minimum 5 mm.

- (i) Manufacturer's Name and Brand Name
- (ii) Voltage Grade
- (iii) Size of conductor
- (iv) Successive length
- (v) Type of Cable
- (vi) Type of insulation
- (vii) Year and month of manufacturing
- (viii) Provincial or Nepal Electricity Authority
- (ix) Contract No.

8. Verification of Length of Conductor at Factory and after Delivery

- 8.1. The Purchaser shall ascertain the length of the conductor at supplier's works and at the receiving store centers by measuring the actual length. The supplier shall ensure that the length measuring machine is available for measurement of the length by the inspecting officer.
- 8.2. The weight of the conductor shall also be checked to ensure correct lay and length.
- 8.3. For the verification of the length of the conductor, 10% of total lot (in drums) shall be selected at the manufacturer's work and 2% of total lot (in drums) shall be selected at each store for each size of the conductor.



- 8.4. If the average length is found correct or more, the lot shall be accepted for delivery. If the average length is found to be less than the declared, the percentage of such short length will be applied for reduction for the entire quantity supplied in the lot at respective stores for acceptance.
- 8.5. In case of dispute, a joint inspection along with the representative of the supplier shall be carried out after giving 10 (ten) days' notice to the supplier to remain present at stores center for this purpose. If the representative fails to attend the stipulated date for joint inspection, the decision of the consignee shall be final and binding.

9. Quality Assurance

- 9.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 9.2 The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit the Manufacture Quality Plan (MQP) along with the offer.
- 9.3 The bidder/manufacturer shall provide detailed Drawings and QIP along with the offer.

10. Schedule of Guaranteed Technical Particulars

S.No.	Description	Unit	NEA Requirements	
1	Name of the Supplier			
2	Name of the Manufacturer			
3	Country of Origin			
4	List of Standard Applicable			
5	Rated Voltage			
6	Conductors			
6.1	Material			
6.2	Actual Area	mm ²		
6.3	Strand size & wire diameter	Nos / mm		
6.4	Approximate overall diameter	mm		
6.5	Approximate weight	kg/km		
6.6	Maximum Calculated D.C. resistance at 20°C	Ω/km		
6.7	Approximate calculated breaking load	kN		
6.8	Reactance per-km	Ω/km		
6.9	Current Rating	Amps		
6.10	Lay ratio			



S.No.	Description	Unit	NEA Requirements	
6.11	Direction of lay			
7	Wire (strand) used in the construction of conductors:			
7.1	Nominal Diameter:	mm		
7.2	Maximum Diameter	mm		
7.3	Cross-section area of nominal diameter wire	mm ²		
7.4	Weight:	kg/km		
7.5	Maximum Calculated D.C. resistance at 20°C	Ω/km		
7.6	Minimum breaking load after stranding	kN		
8	Semi-conduction screen			
8.1	Material			
8.2	Nominal thickness	mm		
9	Insulation (Inner layer)			
9.1	Material			
9.2	Nominal thickness	mm		
9.3	Carbon Content	%		
10	Insulation (Outer layer)			
10.1	Material			
10.2	Nominal thickness	mm		
10.3	Carbon Content	%		
11	Combined insulation (i.e. both layers)			
11.1	Minimum thickness			
11.2	Min. Tensile strength of insulation	N/mm ²		
11.3	Elongation (min)			
11.4	Volumetric resistivity at room temperature of 27 °C	Ω-cm		
11.5	Volumetric resistivity at 70 °C	Ω-cm		
11.6	Hot set Max. Elongation under load	%		
11.7	Hot set Max. Permanent elongation	%		
11.8	High Voltage water immersion Test (4 kV AC for 5 minutes)			
12	Covered Conductor			
12.1	Minimum Breaking Strength	kN		



S.No.	Description	Unit	NEA Requirements	
12.2	Short time current rating: 1 sec	kA		
12.3	Maximum conductor operating temperature during continuous operation	°C		
12.4	Maximum conductor operating temperature during emergency operation	°C		
12.5	Maximum conductor operating temperature during short circuit operation	°C		
12.6	Overall diameter	mm		
12.7	Approximate weight of complete cable	kg/km		
12.8	Maximum DC resistance of conductor at 20 °C	Ω/km		
12.9	Reactance per km	Ω/km		
13	Size of cable drum			
14	Standard Length of conductor per drum	km		

11. Non-Compliance Schedule (If any)

- 11.1. If there is any non-compliance with the technical specifications, the bidder shall provide a list of non-compliance with the specific specification clause, documenting the effects that such non-compliance is likely to have on the equipment's life and operating characteristics.

S.N.	Clause No.	Details of non-compliance with justifications



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PARALLEL GROOVE (PG) CLAMPS

1. Scope

This Specification covers design fabrication testing and supply of universal parallel groove (UPG) clamps and fittings commonly used in overhead electric power lines.

2. Description

- 2.1 The PG clamp shall be designed and manufactured to achieve full compatibility between clamps and conductors and produce uniform and electrically efficient connections between conductors for the class of connection intended.
- 2.2 The PG clamp is intended to be used for ACSR to ACSR conductor.
- 2.3 ~~The body of PG clamp shall be made of aluminum alloy from a permanent mould process and hardware consisting of steel nuts, bolts and washer shall be made of hot dip galvanized steel.~~ The PG clamps shall have sufficient mass and contact area to provide the thermal capacity required for load cycling and fault current. The clamps shall be designed to provide the distributed current density necessary to prevent hot spots and current carrying rating of the conductors for which they are designated. PG clamps shall have oxide inhibiting compound and contact aid.
- 2.4 The clamps shall be manufactured to accommodate ACSR conductors as shown in Table I.
- 2.5 The grooves on the clamps shall be open-edged on two (2) sides for easy installation over a run conductor and insertion of tap conductor.
- 2.6 The clamp shall be tested in accordance with the relevant ANSI/Indian standard or other equivalent national or international standard specifying the performance requirement for the electrical and mechanical characteristics of clamps. The clamps shall conform to all testing requirements of that standard for the classes of clamps considered.
- 2.7 Each clamp shall be marked with the type and size of conductor, which will correctly fit each groove.
- 2.8 The manufacturer of PG clamp must have been accredited with ISO 9001 quality certification.
- 2.9 Galvanization shall conform to IS 2633-1964 and shall satisfy the requirement of standard.
- 2.10 Steel bolts and nuts shall conform to IS 1363-1967 and IS 1367-1961.
- 2.11 No parts of the clamps shall be less than 15 mm thick for fitting suitable ACSR DOG, RAB and WOLF conductor



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- 2.12 No. of bolts along with lock nuts, plain washer and spring washer shall be at least 3 must be made from steel.
Bolt size: 12x50 mm
Clamp length: 125 mm for ACSR DOG and 135 mm for ACSR WOLF and length 75mm for Rabbit
- 2.13 Rated Current: 400 A for DOG-DOG PG Clamp and 630 A for WOLF-WOLF PG Clamp and 160 A for RABBIT-RABBIT PG Clamp
- 2.14 Rated short circuit current: 16 kA for 1 s
- 2.15 Weight:
WOLF-WOLF PG Clamp: 800 gm minimum (Aluminium to steel ratio: 2-3)
DOG-DOG PG Clamp: 635 gm minimum (Aluminium to steel ratio: 2-3)
RABBIT-RABBIT PG Clamp: 165 gm minimum (Aluminium to steel ratio: 2-3)

3. Tests

The PG clamps shall undergo type and routine test in accordance with the relevant governing standard.

4. Quality Assurance Program

Along with the Bid the Bidder shall furnish the assurance program of the manufacturer which includes the Quality System and the Quality Plans, which shall include, among others, information to meet the following requirement, failing which the Bid shall be liable for rejection.

- i. The structure of the organization;
- ii. The duties and responsibilities assigned to staff ensuring quality of works;
- iii. The system for purchasing, taking delivery and verification of materials;
- iv. The system for ensuring quality of workmanship;
- v. The quality assurance arrangement shall conform to relevant requirements of ISO 9001:2000;



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- vi. Statement giving list of important raw materials, names of manufacturer for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials;
- vii. List of manufacturing facilities available with supporting documents;
- viii. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections;
- ix. List of testing equipment available with the manufacturer for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

5. **Bid Documentation**

- 5.1 The Bidder shall provide with the Bid two (2) clear copies of the governing standards for fabrication and testing of PG clamp. 5.2 The Bidder shall provide a complete description, and catalogue/drawing of PG clamp. 5.3 The Bidder shall provide certified type test results of PG clamp as required by governing standards. 5.4 A clause-by-clause commentary on specification, specifying compliance and deviations, if any. 5.5 All data, drawings, catalogues and other technical documents shall be bound separately from the Bid documents.



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TABLE 1
PG CLAMP for ACSR to ACSR conductor

Groove A	Groove B	Identification
D	D	D-D
R	R	R-R
W	W	W-W

D= 100 mm: ACSR Conductor
R= 50 mm: ACSR Conductor
W= 150 mm: ACSR Conductor



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Item: Universal Parallel Groove Clamp

S.N	Description	Unit	NEA Requirement	
1	Manufacturer			
2	Country of origin			
3	Year of Manufacturing Experience			
4	Governing Standard for manufacturing and testing			
5	Governing Standard for galvanization			
6	Type/Model			
7	Body Material		Aluminum alloy with steel nut/bolts	
8	Screw Material			
9	Weight (WOLF)	g	min. 800 (Aluminum to steel ratio: 2:3)	
10	Weight (DOG)	g	min. 635 (Aluminum to steel ratio: 2:3)	
11	Weight (Rabbit)	g	min. 160 (Aluminum to steel ratio: 2:3)	
12	Current Carrying Capacity (WOLF)	A	400	
13	Current Carrying Capacity (DOG)	A	400	
14	Current Carrying Capacity (Rabbit)	A	160	
15	Rated Short Circuit Current 1.s	kA	16	
16	ISO 9001 Certificate Submitted	yes/no		
17	Type Test Certificate Submitted	yes/no		
18	User's Certificate Submitted	yes/no		
19	Copies of relevant standards attached	yes/no		
20	Catalogue/Dimensional drawings attached	yes/no		



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Technical Specifications

STAY SETS

- 1. Scope**
 - 1.1 This Specification covers the fabrication and supply of adjustable threaded, galvanized, ferrous, stay sets and nuts for use in overhead line construction.
- 2. Material**
 - 2.1 Each stay set shall consist of all components listed as in Table 1 attached herewith : mild steel; galvanized stay rod; stay tightener (turn buckle) or adjustable head complete, eyebolt for PSC pole & Steel Tubular poles, or two-way clamp and twisted double-eye, thimbles, preformed tie complete with stay plate of dimensions shown in Table 2 attached herewith.
 - 2.2 The manufacturer of the Stay Set must have been accredited with ISO 9001 or ISO 9002 quality certification.
 - 2.3 The stay rod shall be fabricated of mild steel of minimum tensile strength of 4200 kg/sq.cm. The other technical features and dimensions are given in Table 2 attached herewith.
 - 2.3 The stay tightener shall be made of mild steel of minimum ultimate tensile strength of 4200 kg/sq.cm. The thimbles shall be made of 1.219mm (18 SWG) mild steel and shall be suitable for terminating steel stay wire with a preformed grip.
 - 2.4 The stay plate shall be square type MS galvanized plate of dimensions shown in the attached drawings and mentioned in Table 2 herewith.
 - 2.5 The performed tie shall be hot dip galvanized steel wire in coiled loop suitable for Stay wire 7/8 SWG, having minimum 5 nos. of strands of 2.5mm to 3.8mm diameter and minimum 600mm length.
 - 2.6 Type test reports of the materials used for stay set components must be submitted mandatory.
- 3. Description**
 - 3.1 The stay rod is either thimble-eye type or twin-eye type. The stay rod and suitable nut shall be fabricated to the shape and dimensions as in Table 1 & Table 2. The thimble-eye or twin-eye of the stay rod shall be made by drop forged processing.
 - 3.2 The thread form at the internal end of the rod, and that of the accompanying nut, shall be optional with the supplier. However, it shall be the responsibility of the Supplier to supply the stay rod with a thread form that shall sustain the rated loads specified in Table 1,2 without creep or stripping over the full life of the rod material at specified diameter.
 - 3.3 The stay tightener shall be fabricated in accordance with the technical specification and approved drawing (Internal thread in both directions, Thickness 3.5mm)
 - 3.4 The eyebolt shall be oval-eye type. The eyebolt shall be made by drop-forged processing. The eyebolt shall be supplied with suitable nut and washer.
 - 3.5 The two-way clamp required for mounting stay set (stay tightener) shall be made of hot-rolled steel flat. The clamp shall be two halve type and shall be provided with two numbers of nuts



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and bolts, diameter not less than 16 mm. The both ways of the clamp shall be suitable for accommodating two numbers of twisted double-eye fittings.

- 3.6 The twisted double eye shall be made by drop-forged processing. The twisted double-eye shall be twisted in 90°. The diameter of the steel shall not be less than 16 mm, and eye of the twisted-eye shall be suitable for accommodating stay tightener.
- 3.7 The stay plate shall have a matching hole at the center to fit the end of the stay rod.
- 3.8 The thimble shall be suitable for terminating steel stay wire with a preformed tie.
- 3.9 After galvanizing, the nut and rod threading shall be such that the nut may be run the full length of the thread without the use of tools.

4 Galvanization

- 4.1 All ferrous parts of the stay set shall be galvanized after fabrication in accordance with IS: 2629-1985 or the latest version thereof or any other national or international standards that ensures at least equal or better quality to the standard mentioned above, will also be acceptable. Minimum galvanization of 460 gm/m² must be satisfied for stay plate, stay rod, turn buckle, bolt and thimble of stay set.

5 Test

- 5.1 Apart from the tests indicated in the relevant referenced standard of steel, the stay set shall undergo following tests:
 - Visual Inspection.
 - Verification of dimensions.
 - Tensile strength: The stay set assemblies shall withstand a minimum tensile loads specified in Table 1.2.
 - Bend test: The stay rod shall be bend-tested over a mandrel of 19 mm through an angle of 90 degrees at any point in the un-threaded section of the rod without fracture of the steel. Temperature of the test shall be 68 degrees Fahrenheit (22.5 deg Celsius).
- 5.2 Routine tests shall be performed on each lot of the stay sets as per the relevant governing standards.

6 Quality Assurance Program

Along with the Bid the Bidder shall furnish quality assurance program of the manufacturer which includes the Quality System and the Quality Plans, which shall include, among others, information to meet the following requirement, failing which the Bid shall be liable for rejection.

- i. The structure of the organization;
- ii. The duties and responsibilities assigned to staff ensuring quality of works;
- iii. The system for purchasing, taking delivery and verification of materials;
- iv. The system for ensuring quality of workmanship;
- v. The quality assurance arrangement shall conform to relevant requirements of ISO9001;
- vi. Statement giving list of important raw materials, names of manufacturer for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials;



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- vii. List of manufacturing facilities available;
- viii. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections;
- ix. List of testing equipment available with the manufacturer for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

Table 1 : HT Stay Set Composition

1 set of HT Stay set must include following components:

S.N.	Description	Unit	Quantity
1	MS Galvanized Stay Plate (600*600*6 mm)	Nos	1
2	MS Galvanized Stay Rod M19*1800 mm	Nos	1
3	HDG M19 Turn Buckle (4200kg/sq.ctn)	Set	1
4	Thimble (18 SWG)	Nos	2
5	Preform Tie Compatible for Stay Wire 7/8 SWG	Set	4
6	HDG M16*300 mm Eye Bolt and Washer	Set	1
7	HT Stay Insulator 88KN, Type C, IS 5300	Nos	1

Table 2 : Ratings and Features

HT Stay Set

Length of stay rod	1.8 m
Diameter of stay rod	19 mm
Ultimate tensile strength of stay rod & turn-buckle	200 kg/sq.cm
Minimum breaking load	10,454 kg
Length of threaded portion	300 mm
Thimble shape	Suitable for 7/8 SWG Stay wire
Thimble section	18 SWG (min.)
Preform Tie shape	Suitable for 7/8 SWG Stay wire
Preform Tie section	Min. 5 nos. of strands of 2.5mm-3.8mm dia, 600mm length min.
Stay plate section	600x600x6 mm
Eyebolt size	16 Dia*300 mm (150mm thread)
Galvanization	IS: 2629-1985, IS 4759-1996
Stay Insulator	IS 5300 (1969) Type C, Mechanical failing load minimum 88KN, Creepage distance minimum 57mm, One minute Power frequency withstand voltage Dry - 27kV Wet -13kV



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STRANDED STAY WIRE

1. **Scope**
 - 1.1 This Specification covers the fabrication and supply of galvanized stranded steel wire for use in overhead power line as stay wire ropes for line supports (poles).
2. **Description**
 - 2.1 The steel strand shall be fabricated in accordance with B.S. 183 1972/ (1983) or IS 2141-2000 or any revision thereof or an equivalent national or international standard provided that the resulting steel stock is of equal quality and strength. The minimum tensile strength of the steel shall be 700 N/mm². The wires shall be 4S-ton quality fully galvanized by hot dip process.
 - 2.2 The steel wire strand shall have a left-hand lay. The steel wires shall have no joint throughout the whole length. Strands shall be uniform and shall have no defects such as cracks, dust encapsulation or crevices. Further details are given in Table 3 herein.
 - 2.3 The manufacturer of the Stranded Stay Wire must have been accredited with ISO 9001 or ISO 9002 quality certification.
 - 2.4 **Type test reports of the materials used for stay wire must be submitted mandatory.**
3. **Galvanization**
 - 3.1 The stranded stay wire shall be galvanized after fabrication in accordance with B.S. 443 (1982) or IS 4826-1979 or any revision thereof or any other national or international standards that ensure at least equal or better quality to the standard mentioned above will also be acceptable.
4. **Tests**
 - 4.1 The stranded stay wire shall undergo type and routine tests in accordance with the governing standard.
5. **Packing**
 - 5.1 The stranded stay wire shall be furnished in reels holding approximately 100 kg. Each reel shall have a weather-resistant tag securely fastened showing the Contract No., length, weight, nominal diameter, number of individual wires, grade of the strand, and the class of zinc coating.
6. **Quality Assurance Program**
 - 6.1 Along with the Bid the Bidder shall furnish quality assurance program of the manufacturer which includes the Quality System and the Quality Plans, which shall include, among others, information to meet the following requirement, failing which the Bid shall be liable for rejection:
 - i. The structure of the organization;
 - ii. The duties and responsibilities assigned to staff ensuring quality of works;
 - iii. The system for purchasing, taking delivery and verification of materials;
 - iv. The system for ensuring quality of workmanship;
 - v. The quality assurance arrangement shall conform to relevant requirements of ISO 9001;
 - vi. Statement giving list of important raw materials, names of manufacturer for the raw materials, list of standards according to which the raw materials are tested, list of test normally carried out on raw materials;
 - vii. List of manufacturing facilities available;



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- viii. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections;
- ix. List of testing equipment available with the manufacturer for final testing of equipment specified and the test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards.

7. Bid Documentation

- 7.1 The Bidder shall provide with the Bid copies of the governing standards for fabrication and testing of stranded stay wire and copies of all other relevant standards referenced therein.
- 7.2 The Bidder shall provide a complete description, and catalogue of stranded stay wire.
- 7.3 A clause-by-clause commentary on specification, specifying compliance and deviations, if any.
- 7.4 All data, drawings, catalogues and other technical documents shall be bound separately from the Bid documents.

Table 3
Ratings and Features

Steel Wire Size (No. of wire/SWG)	7/8
Grade	700
Steel quality	45 ton
Diameter of Wires	4.064 mm
Breaking Load	10.6 kN
Minimum Weight	720 kg/km
Applicable Standard	BS 183: 1972(1983), IS 2141-2000
Galvanization Standard	B.S. 443: (1982), IS 4826-1979



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Technical Data Sheet

Item: HT Stay Set

S.N	Description	Unit	NEA Requirement	
1	Manufacturer			
2	Country of Origin			
3	Year of Manufacturing Experience			
4	Model no			
5	Applicable Standard			
6	Governing Standard for Galvanization		IS: 2629-1985, IS: 4759-1996	
7	Length of Stay Rod	m	1.8	
8	Diameter of Stay Rod	mm	19	
9	Ultimate Tensile Strength	kg/cm ²	4200	
10	Minimum Breaking Load	kg	10,454	
11	Length of threaded portion	mm	300	
12	Thimble shape & Preformed Tie		Suitable for 7/8 SWG Stay Wire	
13	Thimble section		18.5x70 mm.	
14	Stay Plate section	mm	600x300x6	
15	Eyebolt length	mm	300	
16	Eyebolt diameter	mm	16	
17	Preform Tie no. of strands		5	
18	Preform Tie Strand Diameter	mm	2.5mm-3.8mm	
19	Preform Tie Length	mm	Minimum 600	
20	ISO 9001 certificate submitted	yes/no	yes	
21	User's certificate submitted	yes/no	yes	
22	Copies of relevant standards attached	yes/no	yes	
23	Outline Drawing and associated	yes/no	yes	
24	Type tests : Tensile test data attached	yes/no	yes	
25	Type tests : Bend test data attached	yes/no	yes	
26	Drawing attached	yes/no	yes	



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Technical Data Sheet

Item: Stay Wire 7/8 SWG

S.N	Description	Unit	NEA Requirement	
1	Manufacturer			
2	Country of origin			
3	Year of Manufacturing Experience			
4	Applicable Standard		BS 183: 1972/(1983), IS 2141:2000	
5	Governing Standard for Galvanization		B.S. 443 (1982) IS 4826:1979	
6	Stay wire size	nos of wire/ SWG	7/8	
7	Diameter of each strand	mm	4.064	
8	Stay wire Diameter (overall)	mm	12.2	
9	Steel Quality		Gr.700	
10	Ultimate Tensile Strength	N/mm ²	700	
11	Min. breaking load of single strand	kN	18	
12	Min. breaking load of stay wire	kN	610	
13	Approx. Weight	kg/km	720	
14	Min. weight of wire in each reel	kg	100	
15	Left hand Lay	yes/no	yes	
16	Minimum weight of Zinc Coating	g/m ²	275	
17	ISO 9001 certificate submitted	yes/no	yes	
18	Type test certificate submitted	yes/no	yes	
19	User's certificate submitted	yes/no	yes	
20	Copies of relevant standard attached	yes/no	yes	
21	Class of zinc coating			



Technical Specification

1. Scope

- 1.1. This Specification covers the design, manufacture, testing, supply, and delivery of Low Voltage Aerial Bunched Cable (LV ABC) of rated voltage up to and including 1100V, having XLPE insulation, stranded compact circular aluminum wire twisted over an XLPE insulated aluminum alloy Neutral cum messenger wire for use as overhead distribution feeders suitable for use on 3-phase/1-phase AC Distribution System of Nepal Electricity Authority.
- 1.2. It is not intended to specify completely all the details of design and construction of Aerial Bunched Cable (ABC). However, Aerial Bunched Cable (ABC) shall conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The Low Voltage Aerial Bunched Cable (LV ABC) shall be suitable for use within Nepal and the climatic conditions are:
- | | |
|---|----------------------------------|
| a) Annual Average Ambient Temperature | 25°C |
| b) Maximum ambient temperature | 55°C |
| c) Minimum ambient temperature | -5°C |
| d) Relative humidity | 10 to 100% |
| e) Average rainfall per annum | 2,000 mm |
| f) Maximum height above sea level | 3,000 m |
| g) Maximum wind pressure (wind speed) | 150 kg/m ² / 50 m/sec |
| h) Average number of thunder storms | 50 |
| i) Average number of rainy days per annum | 100 |

3. Applicable Standards

- 3.1. Unless otherwise stipulated elsewhere in this specification, the goods shall conform to the following or equivalent standards in accordance with the latest editions and any amendments thereof.
- | | |
|------------------|---|
| IS 1422 | Specification for Aerial Bunched Cable for working voltage up to & including 1100 V |
| IS 1270 | Specification for Conductors for Insulated Cable |
| IS 7098 (P-1) | XLPE Insulation |
| IS 398 (Part-IV) | Specification for Aluminum Alloy Conductor |
| IS 10418 | Drum for Electric Cables |

4. General Requirements

- 4.1 Aerial Bunched Cable of rated voltage up to and including 1100V for use in overhead lines shall be designed to withstand all mechanical, electrical, and thermal stresses under steady state and transient operating conditions.



- 4.2 All materials used in the manufacturing of cable and conductors shall be new, unused and of the finest quality. All materials shall comply with the requirements/tests as per applicable standards. The purchaser will verify the documentary evidence of the purchase and use of various raw materials used for the manufacture of the supplied cable.
- 4.3 The **Manufacture Quality Assurance Plans (MQAP)** shall be submitted to the purchaser for approval. MQAP shall cover all the details of the manufacturing process including testing till delivery.

5. Composition and Description of the Cable and Conductor

- 5.1 The Aerial Bundled Cable shall comprise three single core XLPE insulated All Aluminum conductor twisted around an XLPE insulated aluminum alloy Neutral cum messenger conductor in case of three phase and One core XLPE insulated All Aluminum conductor twisted around an XLPE insulated aluminum alloy Neutral cum messenger conductor in case of single-phase system. The messenger wire will carry the overall weight of the conductor.
- 5.2 The standard technical characteristics of the aerial bundled conductor shall be as follows:

AB Cable Type (sq.mm.)	Minimum Number of Strands		Minimum thickness of Insulation (mm)		Max. DC resistance at 20°C (Ω/km)		Minimum Tensile Strength of Messenger (kN)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)
	Phase	Messenger	Phase	Messenger	Phase	Messenger			
1Cx25 + 1Cx25	7	7	1.2	1.2	1.38	1.38	7.0	22.4	195
3Cx25 + 1Cx25	7	7	1.2	1.2	1.38	1.38	7.0	25	300
3Cx50 + 1Cx35	7	7	1.3	1.2	0.641	0.936	9.8	32.3	602
3Cx95 + 1Cx70	19	7	1.5	1.5	0.320	0.492	19.7	42.7	1227
3Cx120 + 1Cx70	19	7	1.5	1.5	0.243	0.492	19.7	46	1482
3Cx150 + 1Cx70	19	7	1.8	1.5	0.206	0.492	19.7	50	1791

5.3. Conductors

The conductor shall be of H2 (sizes of 50 mm² and below) or H4 (all sizes above 50 mm²) grade Aluminum – Governed by IS 8130 (or equivalent standard). The Neutral cum messenger wire shall be of heat-treated aluminum magnesium-silicon alloy wires containing approximate 0.5% magnesium and 0.5% silicon conforming to IS-398 (Part-IV) (or equivalent standard). The stranded conductor shall be clean & reasonably uniform in size and shape, and its surface shall be free from sharp edges. Not more than two joints shall be allowed in any of the wires forming every complete length of conductor and no joint shall be within 300 mm of any other joint in the same layer. The joint shall be brazed, silver soldered, or electric or gas welded. No joint shall be made in the conductor once it has been stranded.



The conductor shall generally conform IS 14255 and IS 7079 (P-I) (or equivalent standard).

The conductor shall be suitably compact, and outer diameter shall be within the specified limits as per applicable standard of Aerial Bundled Cable (IS 14255 or equivalent standard).

The Tensile strength of Aluminum wire used in conductor shall not be less than 90N/mm².

5.4. Insulation

The Conductor (with protective barrier, wherever applied) shall be provided with cross linked polyethylene (XLPE) applied by extrusion conforming to the standard specification as per IS 14255 (or equivalent standard).

The insulation material shall be cross-linked by a dry process. A cross-linking process using steam curing will not be permitted. The insulation should have minimum thickness as specified. No tolerance on the negative side shall be acceptable. The insulation compound shall be clean with low levels of contamination. The upper surface of cable insulation should be Ultraviolet Ray Resistant, and color of insulation shall be black.

The make of XLPE compound shall be from reputed manufacturers like DuPont (USA), Hanwha (Korea), Borealis (Austria), BASF (Germany), Sumit Chemicals (Japan) or equivalent reputed manufacturer. In the case of another make, the bidder shall submit the certification from an independent, internationally recognized agency/ies to substantiate the equivalency to the above referred make. Failure to furnish the equivalency certification will result in the offer being rejected.

5.5. Core Identification

The Phase Conductors shall be insulated with black weather resistant, XLPE suitable for 1100 V insulation. Each Phase Conductor shall be provided with one, two and three ridges for quick identification. The individual cores thus formed shall then be laid up around insulated messenger wire. The insulated messenger wire shall have four ridges as per IS 14255 (or equivalent standard).

5.6. Laying Up

Three Power Cables having Ridges one, two and three should be twisted over insulated messenger wire with right hand direction of lay. This will form the Aerial Bundled Cable. Lay ratio shall be as specified in IS: 14255.

6. Tests

6.1. Type Tests

6.1.1. The bidder shall furnish copies of Type Test reports of Aerial Bundled Cable (LV ABC) of rated voltage up to and including 1100 V as specified in relevant IEC, IS & IEE standards. The Type Test shall be conducted from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and shall not be older than five years from the date of bid submission.

6.1.2. After the mass production of the first lot, the Supplier (at its own cost) shall conduct the Type Test as per the relevant standards on identical unit of each item selected by the representatives of the Purchaser from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF in the presence



of representatives of the Purchaser. The cost towards the Type Test shall be borne by the Supplier and be included in the bid price. The cost for the airfare, daily/travel allowances, insurances, visa fees, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Purchaser.

6.1.3. Dispatch clearance certificates shall be issued only after the successful type test. Shall the Type Test not be satisfactory, the whole lot shall be rejected, and the Manufacturer shall manufacture all new items and perform the Type Test on new lot. All the cost for this repeated type tests including but not limited to airfare, daily/travel allowances as per NEA rules, insurances, visa fees, living expenses, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Supplier.

6.1.4. The type test shall contain but not limited to the following tests as per IS 8130 and IS 10810 (or equivalent standard).

- a) Tests on Phase Conductor
 - (i) Tensile test
 - (ii) Wrapping test (if applicable)
 - (iii) Resistance test
- b) Tests on Messenger Conductor
 - (i) Breaking Load
 - (ii) Elongation test
 - (iii) Resistance test
- c) Physical Test for XLPE insulation
 - (i) Tensile Strength and Elongation at break
 - (ii) Ageing in an oil bath
 - (iii) Hot Set Test
 - (iv) Shrinkage Test
 - (v) Water Absorption (Gravimetric) test
 - (vi) Carbon Black Content
 - (vii) Carbon Black Dispersion
- d) Tests on thickness of Insulation
 - (i) Breaking Load
 - (ii) Elongation Test
 - (iii) Resistance Test
- e) Insulation performance (Volume resistivity) Test
- f) High Voltage Test

6.2. Routine Tests

6.2.1. The following tests as well as other routine tests as per relevant standard shall be carried out on all sizes and drums of cables by the manufacturer. The Routine Test reports shall be submitted to the inspectors at the time of the Pre-Dispatch Factory Acceptance Test.



- (i) Conductor Resistance Test
- (ii) High Voltage Test at room temperature

6.3. Acceptance Tests

- 6.3.1. All the Pre-Dispatch Acceptance Tests as per IS 7098, IS 14255 or equivalent standards in the presence of the Purchaser's representative on the samples selected by the Purchaser's representatives. The sampling shall be as per the relevant standards.
- 6.3.2. The following minimum tests shall be included under routine/acceptance tests.
- (i) Tensile Test
 - (ii) Wrapping Test (if applicable)
 - (iii) Breaking Load Test for messenger Conductor
 - (iv) Elongation test for messenger Conductor
 - (v) Conductor Resistance Test
 - (vi) Test for thickness of insulation
 - (vii) Tensile Strength and Elongation at Break Test
 - (viii) Hot Set Test for XLPE Insulation
 - (ix) Insulation Resistance Test
 - (x) High Voltage Test
 - (xi) Verification of length and weight of AB cable.
- 6.4. The Purchaser shall perform 2% physical verification of goods after receipt at the store in the presence of a representative of the Supplier. All the tools and equipment for the length and weight verification shall be provided by the Supplier.
- 6.5. Type Test/Acceptance Test/Routine Tests and any other tests not covered in different clauses of the specification but required as per relevant standards shall also be carried out.
- 6.6. The supplier shall clearly state what testing facilities are available in the work of the manufacturer and whether the facilities are adequate for carrying out routine and acceptance tests as mentioned in the relevant standards. All the testing facilities shall be provided by the Supplier to purchaser's representative for witnessing the acceptance tests in any internationally accredited laboratories or by national board.
- 6.7. All tests (except type test) and inspection shall be made at the place of manufacturer unless otherwise agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification.

7. Packing and Marking

- 7.1. The Cable shall be supplied on suitable sized non-returnable wooden drums of robust construction for each length of conductor as per IS 10418 (or equivalent standard).
- 7.2. The drums shall be sturdy to protect the cable from any injury during transportation, handling and storage.
- 7.3. The wood used shall be treated to protect from weather and termite.
- 7.4. Wood preservative shall be applied to the entire drum. A clear space of at least 40 mm shall be left between the Cable and Logging.



- 7.5. A layer of waterproof paper or suitable material shall be applied to the surface of the drums and over the outer cable layer.
- 7.6. Both Cable ends shall be sealed with suitable size PVC/Rubber Caps with sealant to eliminate ingress of moisture. The seals shall be contained in the drum and not exposed out of drum.
- 7.7. Each cable drum shall have the following information stenciled on it:

- (i) Manufacturer's Name and Brand Name
- (ii) Year of Manufacture
- (iii) Nominal Cross-sectional area of the cable conductor
- (iv) Type of Insulation
- (v) Type of cable and voltage grade
- (vi) Length of the Cable
- (vii) Number of the cores
- (viii) Direction of rotation of drum (by means of an arrow)
- (ix) Approximate gross weight in kg/km
- (x) Drum Identification Number
- (xi) Name of Purchaser
- (xii) Contract No.

- 7.8. Each drum of the cable furnished shall contain only one (1) length of conductor. The standard length of the cable in each drum shall be as per the table below.

Cable Size (sq. mm)	150 (3C+1)	120 (3C+1C)	95 (3C+1)	50 (2C+1C)	25 (3C+1)	25 (2C)
Normal Length of the Cable (m)	500	500	500	1000	2000	2000

- 7.9. The standard length in each drum is subject to a tolerance of $\pm 2\%$. The payment for the excess length and within the tolerance value shall be made as per the actual length. If any drums have an excess length of cable greater than 2% positive tolerance value, the length of cable in such drum shall be treated as standard length as mentioned in table above plus 2% only and no additional payment shall be made for excess length greater than +2% tolerance. Similarly, the payment for the reduced length and within the negative tolerance value shall be made as per the actual length. If any drums have cable less than the negative tolerance value, the entire drum shall be rejected and no payment shall be made. The total length of the delivered cable in aggregate of all drums shall not exceed the total quantity as per the Schedule of Requirements, if so and no additional payment shall be made for excess length in total.
- 7.10. All whole bundled cable while rolling in the drum shall be passed through the jet printing station to be printed with cumulative length of AB Cable. The cable shall have properly legible embossed/printing at intervals not more than one meter throughout the length of the cable. The font size of letters shall be a minimum of 5 mm.

- (i) Manufacturer's Name and Brand Name
- (ii) Voltage Grade
- (iii) Size of cable
- (iv) Successive length
- (v) Type of Cable i.e., LV ABC



- (vi) Type of insulation
- (vii) Year and month of manufacturing
- (viii) Property of Nepal Electricity Authority
- (ix) Contract Number

8. Verification of Length of Cable at Factory and after Delivery

- 8.1. The Length of Aerial Bunched Cable as mentioned in the Price Schedule and List of Goods is the total length of bunched cable not individual conductor.
- 8.2. The Purchaser shall ascertain the length of the cable at supplier's works and at the receiving store centers by measuring the actual length. The supplier shall ensure that the length measuring machine is available for measurement of the length by the inspecting officer.
- 8.3. The weight of the complete cable shall also be checked to ensure correct lay and length.
- 8.4. For the verification of the length of the cable, 10% of the total lot (in drums) shall be selected at the manufacturer's work and 2% of the total lot (in drums) shall be selected at each store for each size of the cable.
- 8.5. If the average length is found correct or more, the lot shall be accepted for delivery. If the average length is found to be less than the declared, the percentage of such short length will be applied for reduction for the entire quantity supplied in the lot at respective stores for acceptance.
- 8.6. In case of dispute, a joint inspection along with the representative of the supplier shall be carried out after giving 10 (ten) days' notice to the supplier to remain present at stores center for this purpose. If the representative fails to attend the stipulated date for joint inspection, the decision of the committee shall be final and binding.

9. Quality Assurance

- 9.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 9.2 The manufacturer shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit the Manufacture Quality Plan (MQP) along with the offer.
- 9.3 The bidder/manufacturer shall provide detailed Drawings and GTP along with the bid.



10. Guaranteed Technical Particulars

SN	Description	Unit	NEA Requirements	
1	Manufacturer's Name & Address			
2	List of Standard Applicable			
3	Number of Cores			
3.1	Power Core			
3.2	Neutral-cum-messenger core			
4	Power Core Conductors			
4.1	Nominal cross-sectional area (mm ²)			
4.2	No. of strands (No.)			
4.3	Diameter of strands (mm)			
5	Neutral-cum-messenger core			
5.1	Nominal cross-sectional area			
5.2	No. of strands			
5.3	Diameter of strands			
6	Max. DC resistance of conductor at 20°C (Ω/km)			
6.1	Power Core			
6.2	Neutral-cum-messenger core			
7	Approximate diameter of conductor			
7.1	Power Core (mm)			
7.2	Neutral-cum-messenger core (mm)			
8	Approximate diameter with insulation			
8.1	Power Core (mm)			
8.2	Neutral-cum-messenger core (mm)			
9	Tensile strength of Power Core (N/mm ²)			
10	Minimum Breaking Load of Neutral-cum-messenger core (kN)			
11	Insulation minimum thickness (mm)			
11.1	Power Core			
11.2	Neutral-cum-messenger core			
12	Approximate weight (kg/km)			
12.1	Power Core			
12.2	Neutral-cum-messenger core			
12.3	Overall A/B Conductor			
13	Continuous current carrying capacity of cable in air at ambient temperature of 40°C			
13.1	Power Core			
13.2	Neutral-cum-messenger core			



SN	Description	Unit	NEA Requirements	
14	Derating Factor: Derating factors for variation in air temperature			
14.1	Air Temperature °C			
15	Laying			
16	Conductor Materials			
16.1	Power Core			
16.2	Neutral-cum-messenger core			
17	Raw Material sources			
17.1	Aluminium			
17.2	Alloy Aluminium			
17.3	XLPE			
18	Insulation			
18.1	Core identification			
18.2	Min. Tensile strength of insulation (N/mm ²)			
18.3	Elongation (mm)			
18.4	Volume resistivity (Ω-cm)			
18.4.1	At room temperature of 27 °C			
18.4.2	At 70 °C			
18.5	Hot set (%)			
18.5.1	Max. Elongation under load			
18.5.2	Max. Permanent elongation			
18.6	High Voltage Test (3 kV AC for minutes)			
18.7	Bending Test (No cracks visible to the naked eye)			
19	Standard Length of Conductor Cable per drum (km)			

11. Non-Compliance Schedule (If any)

11.1. If there is any non-compliance with the technical specifications, the bidder shall provide details of non-compliances with the specific specification clause, documenting the effects that such non-compliance is likely to have on the equipment's life and operating characteristics.

SN	Clause No.	Details of non-compliance with justifications



Technical Specifications of Dropout Fuse Cutout

1. Scope

- 1.1. The specification covers design, manufacture, testing, supply, and delivery of outdoor, open, drop out expulsion type fuse cutouts complete with fuse carriers, stickers, and mounting brackets suitable for installation in 50Hz, 11kV distribution system for protection of lines and transformer of Nepal Electricity Authority conforming to the applicable standards of Nepal Electricity Authority and the governing standards.
- 1.2. It is not the intent to specify completely herein all the details of design and manufacture of goods. However, it shall conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The goods shall be suitable for use within Nepal and the climatic conditions are:
- | | |
|--|----------------------------------|
| a) Annual Average Ambient Temperature | 25°C |
| b) Maximum ambient temperature | 55°C |
| c) Minimum ambient temperature | -5°C |
| d) Relative humidity | 10 to 100% |
| e) Average rainfall per annum | 2,000 mm |
| f) Maximum height above the sea level | 2,000 m |
| g) Maximum wind pressure (wind speed) | 150 kg/m ² / 50 m/sec |
| h) Average number of thunder storms | 50 |
| i) Average number of rain days per annum | 100 |

3. System Particulars

- 3.1. The drop out fuse cutout shall work satisfactorily in the system with the following particulars:
- | | |
|---------------------------|-------------------------|
| a) Nominal System Voltage | 11 kV |
| b) Highest System Voltage | 12 kV |
| c) System Frequency | 50 Hz with 5% tolerance |
| d) Number of phases | 3 |
| e) Neutral Earthing | Effectively grounded |
| f) System Fault Current | 20 kA (rms) |

4. Applicable Standards

- 4.1. The design, performance and test requirements shall conform to this specification and the standards specified hereunder. In case of any conflict, the requirements of this specification shall prevail.



IEC 60282-2	H. V. Fuses – Expulsion and similar fuses
IEC 60071-1	Insulation co-ordination - Part 1 Definitions, principles and rules
IEC 60071-2	Insulation co-ordination - Part 2 - Application guide
IEC 60383	Insulators for overhead lines with a nominal voltage above 1000 V Part 1: Ceramic or glass insulator units for AC systems – Definition, test methods and acceptance criteria
IEC 60273	Characteristic of indoor & outdoor post insulators for systems with nominal voltages greater than 1000V.
IEC 60694	Common Specifications for high-voltage switchgear & control gear standards
IEC 60060-2	High-voltage test techniques -Part 2 Measuring systems
ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles

5. General Requirements

- 4.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope for the plant where the manufacture is done.
- 4.2 All materials used in the manufacturing shall be new, unused and of the finest quality. All materials should comply with the requirements/tests as per applicable standards. The purchaser will verify the documentary evidence of the purchase and use of various raw materials used for the manufacture of the supplied goods.
- 4.3 The **Manufacture Quality Assurance Plan (MQAP)** shall be submitted to the purchaser for approval. MQAP shall cover all the details of the manufacturing process including testing till delivery.

6. Specific Requirements

- 6.1. The dropout fuse cutouts shall be of Class A as per IEC 60282-2.
- 6.2. The dropout fuse cutouts shall be suitable for use in outdoor circuits under tropical conditions.
- 6.3. A complete set of dropout fuse cutouts shall consist of three units of dropout fuse cutouts, one in each phase.
- 6.4. The minimum technical requirements of dropout fuse cutouts are tabulated below.

SN	Details	Unit	Requirements
1	Type of DO Fuse		Expulsion, Class A
2	Rated/Service Voltage	kV	12/11
3	Rated Frequency	Hz	50
4	No. of Phases		3
5	Rated Continuous Current	A	100



SN	Details	Unit	Requirements
6	Dry Impulse withstand (1.2 kV/50µs) voltage (positive & negative polarity)		
6.1	Across the isolating distance of the fuse base	kVp	85
6.2	To Earth and between poles	kVp	75
7	Wet 1 min. power frequency withstand voltage		
7.1	Across the isolating distance of the fuse base	kV rms	32
7.2	To Earth and between poles	kV rms	28
8	Total Creepage distance (min)	mm	320
9	Interrupting rating		
9.1	Symmetrical interrupting rating (minimum)	kA rms	8.0
9.2	Asymmetrical interrupting rating (minimum)	kA rms	9.6
9.3	X/R Ratio		4.0
10	Temperature Rise Limit (in Air)		
10.1	Copper contacts silver faced	deg C	65
10.2	Terminals	deg C	50
10.3	Spring: The temperature shall not such a value that elasticity of the Metal is changed.		
11	Mounting angle (in vertical plane)	deg	15 ~ 20
12	Length of the Fuse barrel	mm	285 ± 2
13	Tensile strength	kN	10

7. Design and Constructional Details

7.1. Operation

- 7.1.1. The dropout fuse cutouts shall be designed and constructed such that on closing the fuse carrier-fuse link no additional stress shall be applied to the fuse link which could cause it to fail. It shall not be possible to close the fuse carrier without the top cap fitted.
- 7.1.2. The fuse carriers shall be interchangeable between dropout fuse cutouts of the same voltage class from different manufacturers.



- 7.1.3. The dropout fuse cutouts units shall be able to mount on a single channel iron cross arm (100 mm x 50 mm x 6 mm) at an angle of 15 to 20° to the vertical plane. The whole unit shall be complete with long mounting bracket, bolts, nuts & washers.
- 7.1.4. Lifting rings of 25 mm nominal internal diameter shall be provided on the bottom end and on the top of the fuse tube to enable the removal and replacement of the fuse tube using a standard operating rod fitted with a hook-link stick.
- 7.1.5. The fuse carrier shall drop out immediately following the blowing of the fuse.

7.2. Fuse Base

- 7.2.1. The drop-out fuse cutouts shall be designed with a solid core, ball proof, one piece porcelain insulator with 320 mm minimum creepage distance and, it shall be robust enough to withstand shocks due to frequent operations.
- 7.2.2. The porcelain insulator shall be as per IEC 60383.
- 7.2.3. The top and bottom assemblies with the middle clamping hardware, shall be fitted suitably through riveting so as to provide a strong clamping arrangement in a suitable position.
- 7.2.4. The assembly shall have enough mechanical strength as per the requirement.
- 7.2.5. The top and bottom current carrying parts (contact and contact terminal plate) shall be made of copper and shall be silver plated for corrosion resistance efficient current flow. The top contact shall have a socket cavity for latching and holding firmly the fuse carrier.
- 7.2.6. The top contact shall be actuated by a strong stain-less steel spring which keeps it under sufficient pressure to maintain firm contact with the fuse carrier during all operating conditions. The spring shall also provide flexibility and absorbs most of the stresses when the fuse carrier is pushed into the closing position.
- 7.2.7. The current carrying parts of the assembly shall be protected from water and dust formation by a hot dip galvanized steel top cover. The size of the top cover shall be 150 mm x 85 mm x 35 mm with thickness of 2 mm.
- 7.2.8. The top contact assembly shall have a robust galvanized steel hook to align and guide the fuse carrier into the socket latch even when the fuse carrier is closed at an off-center angle.
- 7.2.9. The top assembly shall be robust enough to absorb the bulk of the forces during the fuse carrier closing and opening operations and shall not over stress the spring contact. It shall also prohibit accidental opening of the fuse carrier due to vibrations or impact.
- 7.2.10. The bottom assembly shall have hinge contacts made from highly conductive, anti-corrosive silver-plated brass. It shall accommodate and



make a firm contact with the fuse carrier bottom assembly. The fuse carrier shall be placed easily in or lifted from the hinges without any maneuvering. The fuse carrier shall be prevented from slipping out of the self-locking hinges during all operating conditions and only when the fuse carrier has reached its fully open position then only it can be removed from the hinge support.

7.2.11. The material for other parts shall be as per the drawings attached.

7.3. Fuse Carrier

- 7.3.1. The fuse carrier shall be made of high strength fiber-glass filament wound tube or suitable insulating material and it shall be protected from weather and environment by an ultraviolet resistant coating. Inside liner of the fuse tube shall be constructed of a synthetic arc quenching material. The tube shall have high bursting strength to sustain high pressure of the gases during fault interruption. The inside diameter of the fuse tube shall be 17.5 mm and outer diameter shall be 22 mm.
- 7.3.2. The fuse carrier top contact shall have a solid replaceable tip made from highly conductive, anti-corrosive silver-plated brass to provide a low resistance current path from the fuse base top contact to the fuse link.
- 7.3.3. Copper arc shortening rod shall be attached to the cap of the fuse tube to obtain higher interrupting rating. A removable button head type fuse link having M6x1 thread shall be able to fit into the arc shortening tube.
- 7.3.4. The installation and removal of the fuse carrier shall be facilitated by inserting the operating rod into a lifting eye at the hinge end (lower) of the fuse carrier when it is in the dropped position. An operating lever eye shall be provided at the top of the carrier to facilitate a downward pull by the operating rod to release the latch incorporated in the stationary upper contact.
- 7.3.5. The upper stationary contact shall be capable of absorbing shock when the fuse carrier is pushed into the closed position and shall not allow the fuse link to be damaged.
- 7.3.6. The fuse carrier bottom assembly shall be made of silver-plated brass casting to efficiently transfer current to fuse base. It shall make smooth contact with the fuse base bottom assembly during closing operation.
- 7.3.7. The upper stationary contact assembly shall be provided with a safety latch and the hinge at lower stationary contact shall be so designed to prevent fuse carrier from dropping due to vibration.
- 7.3.8. The lower contact shall be capable of absorbing the shock when the fuse carrier is pushed into the closed position and shall not allow the fuse link to be damaged.
- 7.3.9. The lower contact shall keep the fuse link in the center of the fuse carrier and keep it tension under all operating conditions.



7.3.10. The Asymmetrical breaking current ratings shall be permanently marked on the upper metal part.

7.3.11. The material for other parts shall be as per drawings attached.

7.4. Terminals

7.4.1. The lower and upper terminal/connector for receiving aluminum conductors of diameter from 5 mm to 16 mm. shall be made from tin plated brass while the terminal support and bolt for groove connector shall be made from galvanized steel.

7.4.2. The upper terminal shall be positioned to receive the conductor from either side or upward direction while the lower terminal shall be able to receive the conductor from either side or downward direction.

7.5. Galvanizing

7.5.1. All steel parts such as mounting and support brackets, bolts and nuts, washers etc. shall be galvanized after processes such as sawing, shearing, drilling, punching, filing, bending and machining are completed. Galvanizing shall be the hot-dip process to comply with the relevant ISO standards.

7.6. Mounting Bracket

7.6.1. The dropout fuse cutout unit shall be provided with suitable mounting brackets, bolts, nuts & washers of appropriate size to mount these units on a single channel iron cross arm (100 mm x 50 mm x 6 mm).

7.6.2. It shall provide the necessary clearance from the support.

7.6.3. Mounting arrangement shall be made of high strength galvanized steel flat and shall be robust enough to sustain the various stresses encountered during all operating conditions of the cutout.

8. Tests

8.1. Type Tests

8.1.1. The bidder shall furnish copies of dropout fuse cutouts conducted on 10-36kV voltage level as specified in the relevant standards.

8.1.2. The Type Test shall be conducted from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and shall not be older than five years from the date of bid submission.

8.1.3. The followings tests in addition to those mentioned in the relevant standards shall have been carried out as the Type Test:

- a) Dielectric Tests (Rated impulse withstand and rated one minute power frequency withstand test voltages)
- b) Temperature Rise Tests
- c) Mechanical Tests (for fuse base and fuse links)
- d) Breaking Tests



- e) Tests for time-current characteristics

8.2. Routine Tests

- 8.2.1. The routine shall be carried out in accordance with relevant standards.
- 8.2.2. The following tests shall be carried out by the manufacturer on each unit to check the essential requirements:
- a) Visual Inspection
 - b) Verification of all dimensions
 - c) Power frequency voltage dry test
- 8.2.3. The manufacturer shall maintain the register for routine tests and shall submit it to the representatives of the purchaser before acceptance tests.

8.3. Acceptance Tests

- 8.3.1. All the pre-dispatch factory acceptance tests as per the applicable standards shall be carried out on the samples selected by the representative of the purchaser. The sampling shall be as per the relevant standards.
- 8.3.2. The followings tests shall be carried out as the acceptance tests:
- a) Nameplate Marking and Dimensional Verification
 - b) Creepage Distance Verification
 - c) Dielectric Tests
 - d) Mechanical Tests (For Fuse base and Fuse Links)
 - e) Breaking Tests on minimum one sample
 - f) Galvanize test on all galvanized steel
 - g) Physical Operation Test i.e. ON-OFF observations

8.4. Pre-Dispatch Type Test to be witnessed by the Purchaser

- 8.4.1. After the mass production, the following tests as a type test shall be carried out at the independent ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF in the presence of nominated representatives on the selected samples selected by the nominated representatives:
- a) Dielectric Tests
 - b) Temperature Rise Tests
 - c) Mechanical Tests (For Fuse base and Fuse Links)
 - d) Breaking Tests
 - e) Electric strength of 25 kV when tested edgewise in oil at 90°C (Fiber glass tube)
 - f) Insulation resistance of minimum 10 MΩ at 500 V DC after emersion in water (Fiber tube)
 - g) Tests for time-current characteristics
 - h) Physical Operation Test i.e. ON-OFF observations
 - i) Pull out test for embedded components of the Fuse base (porcelain) in addition to other tests mentioned in IEC 60383
 - j) Creepage Distance and Dimensional Verification
- 8.4.2. The Manufacturer/Supplier shall intimate the Purchaser with a list of independent ISO/IEC 17025 certified independent test laboratory accredited



to ILAC/IAF so that representatives from the Purchaser could be deputed. The nominated representatives shall select samples as required. The cost of the type tests shall be borne by the supplier/manufacturer. The Purchaser shall bear the cost towards the travel expenses and daily allowances of the Purchaser's representatives for one visit. Should there be any repeated tests due to the reason of Supplier/Manufacturer, the Supplier/Manufacturer shall bear the cost of of the travel and daily allowances of two nominated representatives of the Purchaser.

- 8.4.3. The manufacturer may carry out the acceptance tests during the time of type test after mass production. But for that, one hundred percent of the goods shall be manufactured.

8.5. Inspection after Receipt at Stores

- 8.5.1. The Purchaser shall perform physical verification of goods after receipt at the store of 2% of the delivered quantity of goods before accepting the goods.
- 8.5.2. The Purchaser may conduct the tests after receipt of the delivered goods in any lab at its own cost.
- 8.5.3. If the sample fails the test and it is found that the reports are different from the reports of the pre-dispatch acceptance tests, the Purchaser shall reject all of the delivered goods and the supplier shall replace such materials at the destination concerned.
- 8.5.4. If the Supplier is not satisfied with the reports, the Purchaser can agree for testing of double of the quantity at the cost of the Supplier. In the event of failing the tests on repeated samples, the Purchaser shall reject all of the delivered goods and the supplier shall replace the lot at the destination concerned.

- 8.6. Type Test/Acceptance Test/Routine tests and any other tests not covered in different clauses of this specification but required as per relevant standards shall also be carried out.

- 8.7. The supplier shall clearly state as to what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out routine and acceptance tests and tracking as mentioned in relevant standards. All the testing facilities shall be witnessed by the bidder to purchaser's representative for witnessing the tests in any internationally accredited laboratories or by national board.

- 8.8. All tests (except type test) and inspection shall be made at the place of manufacturer unless otherwise agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification.

- 8.9. All the costs towards the Inspection and Testing shall be borne by the Supplier/Manufacturer. The Purchaser shall bear the cost towards the travel and daily allowances of nominated representatives for one visit. Should there be any repeated tests due to the reason of Supplier/Manufacturer, the Supplier/Manufacturer shall bear the cost of of the travel and daily allowances of two nominated representatives of the Purchaser.



9. Packing and Marking

9.1. Packing

- 9.1.1. The Supplier shall ensure that all equipment covered under this specification shall be prepared for sea/rail/road transport and be packed in such a manner as to protect it from damage in transit.
- 9.1.2. The goods shall be packed in strong corrugated boxes of a minimum of 5 ply with maximum 6 Nos. of dropout fuse cutout units and accessories (Fuse Base, Fuse Carrier, and Mounting Bracket) in one box with proper cushion. Spare fuse carrier shall be supplied in suitable hardboard boxes, the quantity and the voltage rating applicable shall be clearly marked on the boxes.

9.2. Name Plate and Marking

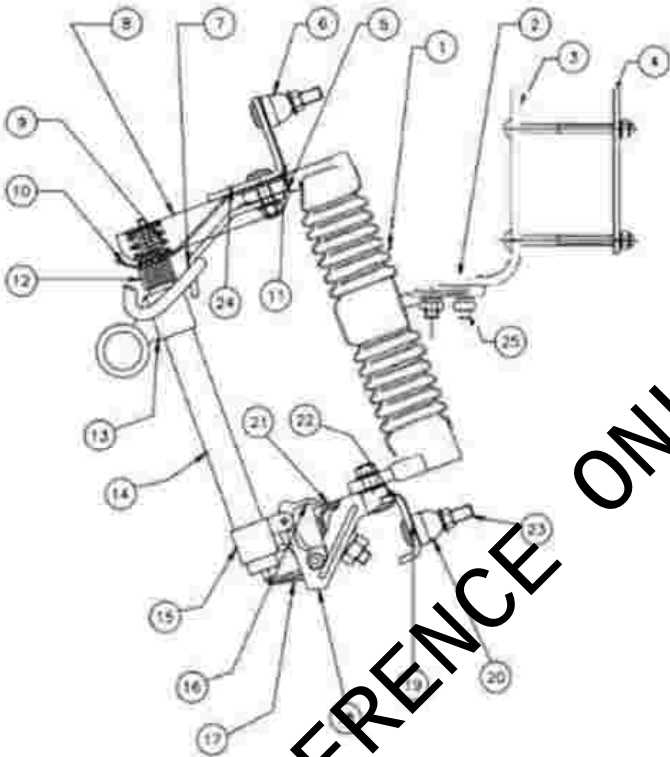
- 9.2.1. Each unit shall carry the rating and nameplate with the following information:
- Serial Number
 - Manufacturer's Name and Identification
 - Contract No.
 - Property of NEA
 - Type / Class Designation
 - Number and Year of the Standard adopted
 - Rated Voltage / Rated maximum current
 - Relevant standards of manufacturing
 - Year and month of manufacture
- 9.2.2. The following information shall be marked on the fuse carrier:
- Manufacturer's Name
 - Rated Voltage
 - Rated Frequency
 - Rated maximum current / Breaking Capacity
 - Contract No.
 - Year and month of manufacture

10. Quality Assurance

- 10.1. The manufacturer shall possess valid ISO 9001:2015 Quality Management System certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 10.2. The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit Manufacture Quality Plan (MQP) along with the offer.
- 10.3. The bidder/manufacturer shall provide detailed Drawings and GTP along with the bid.



11. General Arrangement Diagram and Drawings



Item	Qty	Description	Material	Item	Qty	Description	Material
1	1	Insulator	Porcelain	14	1	Frame Holder Tube	Epoxy Fiber Glass
2	1	Fixing Rod	Stainless Steel	15	1	Lower Tube Holder	Brass
3	1	Mounting Bracket	Galvanized Steel	16	1	Crankshaft	Silver plated Brass
4	1	Back Plate	Galvanized Steel	17	1	Trigger	Stainless Steel
5	1	Upper Contact Support	Galvanized Steel	18	1	Crankshaft Support/ Lower Housing	Brass
6	1	Upper Contact	Tin Plated Brass	19	1	Lower Contact Plate	Silver Plated Copper
7	1	Lower Contact Support Plate	Galvanized Steel	20	1	Lower Connection	Tin Plated Brass
8	1	Upper Housing	M.S. hot dip galvanized	21	2	Lower Contact	Silver Plated Copper
9	1	Spring	Stainless Steel	22	1	Lower Terminal Support	Galvanized Steel
10	1	Upper Contact	Silver plated copper	23	2	Bolt Kit Ginepro Compactor	Galvanized Steel
11	1	Upper Contact Terminal Plate	Silver plated copper	24	1	Upper Terminal Support	Galvanized Steel
12	1	Contact Cap/Nut	Silver plated brass	25	2	M10 Carriage Bolt with plain & Spring Washer	Galvanized Steel
13	1	Upper Tube Holder	Brass				



12. Guaranteed Technical Particulars

SN.	Description	Unit	NEA Requirements	
1	Name of the Supplier			
2	Name of the Manufacturer			
3	Country of Origin			
4	List of Standards Applicable			
5	Type of DO Fuse		Expulsion, Class A	
6	Rated Voltage	kV	12	
7	Service Voltage	kV	11	
8	Rated Frequency	Hz	50	
9	No. of Dropout Fuse units per set		3	
10	Rated Continuous Current	A	100	
11	Switching Voltage (max)	kV		
12	Dry Impulse withstand voltage (1.2 kV/50µs) Across the isolating distance of the fuse base	kVp	85	
13	Dry Impulse withstand voltage to Earth and between poles	kVp	85	
14	Wet 1 min. power frequency withstand voltage across the isolating distance of the fuse base	kVrms	32	
15	Wet 1 min. power frequency withstand voltage to Earth and between poles	kVrms	28	
16	Creepage distance (minimum)	mm	320	
17	Symmetrical interrupting rating (min)	kArms	8	
18	Asymmetrical interrupting rating (min)	kArms	9.6	
19	A/R Ratio		4	
20	Temperature Rise Limit (in Air) for copper contacts silver faced	deg C	65	
21	Temperature Rise Limit (in Air) for Terminals	deg C	50	
22	Temperature Rise Limit (in Air) for Spring (The temperature shall	deg C		



SN.	Description	Unit	NEA Requirements	
	not such a value that elasticity of the Metal is changed.)			
23	Mounting angle (to vertical plane)	deg	~15-20	
24	Length of the Fuse barrel	mm	285 ± 2	
25	Diameter of the Fuse barrel	mm		
26	Tensile Strength	kN	10	
27	Thickness of Galvanization			
28	Mounting Bracket GI 'L' shape with two bolts	mm	200 x 200	
29	Approximate weight of Porcelain Fuse Base (with embedded parts)	kg		
30	Approximate weight of Lower and Upper metal portion of Fuse Base	kg		
31	Approximate weight of Fuse Carrier	kg		
32	Approximate weight of Upper and Lower metal portion of fuse carrier	kg		

13. Non-Compliance Schedule (If any)

If there is any non-compliance with the Technical specifications, the bidder shall provide a list of non-compliances with the specific specification clause, documenting the effects that such non-compliance is likely to have on the equipment's life and operating characteristics.

S.N.	Clause No.	Details of non-compliance with justifications



Technical Specifications of Surge Arrester

1. Scope

- 1.1. The specification covers design, manufacture, testing, supply, and delivery of gapless metal-oxide, polymer type surges arrester suitable for installation in 50Hz, 11kV distribution system for protection of lines and transformer of Nepal Electricity Authority conforming to the applicable standards of Nepal Electricity Authority and the governing standards.
- 1.2. It is not the intent to specify completely herein all the details of design and manufacture of goods. However, it shall conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The goods shall be suitable for use within Nepal and the climatic conditions are:

j) Annual Average Ambient Temperature	25°C
k) Maximum ambient temperature	55°C
l) Minimum ambient temperature	-25°C
m) Relative humidity	10 to 100%
n) Average rainfall per annum	2,000 mm
o) Maximum height above the sea level	2,000 m
p) Maximum wind pressure / wind speed	150 kg/m ² / 50 m/sec
q) Average number of thunder days	50
r) Average number of rainy days per annum	100

3. System Particulars

- 3.1. The Drop out fuse shall work satisfactorily in the system with the following particulars:

g) Nominal System Voltage	11 kV
h) Highest System Voltage	12 kV
i) System Frequency	50 Hz with 5% tolerance
j) Number of phases	3
k) Neutral Earthing	Effectively grounded
l) System Fault Current	20 kA (rms)

4. Applicable Standards

- 4.1. The design, performance and test requirements shall confirm to this specification and the standards specified hereunder. In case of any conflict, the requirements of this specification shall prevail.

IEC 60090-4	Surge Arresters – Metal-oxide surge arresters without gaps for AC System



IEC 60099-5	Surge Arresters – Selection and Application Recommendations
IEC 61109	Composition Insulator for A.C. over-headlines with a nominal voltage greater than 1000 V – Definitions, Test Methods and Acceptance Criteria
IEC 60509	Artificial Pollution Tests on High Voltage Insulators to be used in AC Systems
IEC 60270	High-voltage Test Techniques – Partial Discharge Measurements
IEC 60071	Insulation co-ordination – Part 1: Definitions, Principles and Rules, Part 2: Application Guide

5. General Requirements

- 4.4 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope for the plant where the manufacture is done.
- 4.5 All materials used in the manufacturing shall be new, unused and of the finest quality. All materials should comply with the requirements as per applicable standards. The purchaser will verify the documentary evidence of the purchase and use of various raw materials used for the manufacture of the supplied goods.
- 4.6 The **Manufacture Quality Assurance Plan (MQAP)** shall be submitted to the purchaser for approval. MQAP shall cover all the details of the manufacturing process including testing till delivery.

6. Specific Requirements

- 6.1. The surge arresters shall be suitable for use in outdoor circuits under tropical conditions.
- 6.2. A complete set of surge arresters shall consist of three units, one in each phase.
- 6.3. The minimum technical requirements of the surge arresters are tabulated below.

SN	Details	Unit	Requirements
1	Type of Surge Arrestors		Gapless Metal Oxide - Outdoor
2	Rated Voltage	kV	12
3	Continuous Operating Voltage	kV	10
4	Rated Frequency	Hz	50
5	Standard nominal discharge current	kA	10
6	Line discharge class		1
7	High Current Impulse	kAp	100



SN	Details	Unit	Requirements
8	Steep Current maximum impulse residual voltage	kV	40
9	Impulse Residual Voltage - Peak		
9.1	Maximum Residual Voltage at 10 kA	kV	35
9.2	Switching impulse (30-100/60-200µs) maximum residual voltage	kV	30
10	One second TOV withstand capability	kV	$> 1.15 \times 12$
11	Type of Housing Insulator		Polymeric
12	Insulation withstand level		
12.1	Lighting impulse voltage	kVp	75
12.2	Power Frequency withstand voltage (wet)	kV	25
13	Total Creepage distance (min)	mm	360
14	Energy Absorption Capability	kJ/kV	> 3.2

7. Design and Constructional Details

7.1. General

- 7.1.1. The surge arresters shall be designed for outdoor service conditions stipulated above.
- 7.1.2. The Surge Arrester shall be of the non-linear metal-oxide resistor type without spark gaps and the non-linear metal-oxide resistor shall be housed in a hermetically sealed enclosure casing to prevent ingress of moisture.
- 7.1.3. The surge arresters shall be connected between phase and earth to protect distribution transformers and switchgear. It shall be complete with the following:
 - Disconnector and Terminal connectors.
 - Terminals with built in clamping device of tin-plated brass suitable to receive Copper/Aluminum (Line) Conductors of size from 4 mm to 16 mm both horizontal and vertical take-off.
 - The mounting clamps suitable for bracket mounting on a structure made out of 100 x 50 x 60 mm Steel.
- 7.1.4. The surge arresters shall draw negligible current at operating voltage and at the have least resistance during the flow of surge current.
- 7.1.5. The surge arrester shall be provided with line and earth terminals of suitable size. The ground side terminal of surge arrester shall be connected with 25 x 6 mm galvanized strip, one end connected to the surge arrester and other end connected to a separate ground electrode.



- 7.1.6. The surge arrester shall not operate under power frequency and temporary over voltage conditions; but under surge conditions the surge arrester shall change over to the conducting mode.
- 7.1.7. The surge arrester shall be thermally stable, and the supplier/manufacturer shall furnish a copy of thermal stability test along with the MQAP.
- 7.1.8. The surge arrester shall be capable of handling terminal energy for high surges, external pollution and transient over voltage and have low losses at operating voltages.

7.2. Arrester Housing

- 7.2.1. The housing insulator of the surge arrester shall be of polymeric type and shall be homogenous, free from laminations, cavities and other flaws of imperfections that might affect the mechanical and dielectric properties.
- 7.2.2. The housing shall be of uniform grey color, free from blisters, burrs, and other similar defects.
- 7.2.3. The insulator sheds shall be designed to minimize tracking or contamination and shall not fail due to contamination.
- 7.2.4. The housing shall be so coordinated that external flashover shall not occur due to application of any impulse or switching surge voltage up to the maximum design value for arrester.
- 7.2.5. The complete arrester shall withstand 1000 hr salt fog test at continuous voltage as described in IEC60269-1/IEC60507. The arrester shall pass additional cycle tests as described in IEC61109.

7.3. Moisture Sealing

- 7.3.1. The manufacturing procedure shall include an effective leak test and the manufacturers shall carry out the Special Thermal Stability Test as specified in IEC 60099-4.

7.4. Partial Discharge

- 7.4.1. Each surge arrester shall be tested to prove absence of partial discharge contact noise as specified in IEC 60099-4.

7.5. Arrester Disconnecter

- 7.5.1. The surge arrester shall have a device for disconnecting it from the system in the event of arrester failure to prevent a persistent fault in the system and it shall give a visible indication when the arrester has failed. The arrester disconnector shall be tested as per IEC 60099-1.

7.6. Insulating Bracket

- 7.6.1. The surge arrester shall be provided with a robust insulating bracket.



- 7.6.2. The power frequency withstand voltage of the insulating bracket shall not be less than 20 kV.

8. Tests

8.1. Type Tests

- 8.1.1. The bidder shall furnish copies of Surge Arrester conducted on 10-36kV voltage level as specified in the relevant standards.
- 8.1.2. The Type Test shall be conducted from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and shall not be older than five years from the date of bid submission.
- 8.1.3. The followings tests in addition to those mentioned in the relevant standards shall have been carried out as the Type Test:
- a) Insulation withstand test
 - b) Residual voltage test
 - c) Reference voltage test
 - d) Long duration current impulse test
 - e) Operation duty test
 - f) Test of arrester disconnector
 - g) Accelerated Ageing test
 - h) Seal leakage test
 - i) Partial discharge test
 - j) Thermal stability
 - k) Tracking & erosion test for polymeric insulation
 - l) Power frequency voltage vs characteristics
 - m) Mechanical Failing load test
 - n) Weather ageing test

8.2. Routine Tests

- 8.2.1. The routine shall be carried out in accordance with relevant standards.
- 8.2.2. The following tests shall be carried out by the manufacturer on each unit to check the technical requirements:
- d) Visual inspection
 - e) Verification of all dimensions
 - f) Power frequency voltage dry test
- 8.2.3. The Manufacturer shall maintain the register for routine tests and shall submit it to the Representative of the Purchaser before Acceptance Tests.

8.3. Acceptance Tests

- 8.3.1. All the pre-dispatch factory acceptance tests as per the applicable standards shall be carried out on the samples selected by the representative of the Purchaser. The sampling shall be as per the relevant standards.
- 8.3.2. The followings tests shall be carried out as the Acceptance Test:
- a) Nameplate Marking and Dimensional Verification



- b) Creepage Distance Verification
- c) Insulation withstand test
- d) Residual voltage test
- e) Reference voltage test
- f) Long duration current impulse test
- g) Operation duty test
- h) Test of arrester disconnector
- i) Leakage test

8.4. Pre-Dispatch Type Test to be witnessed by the Purchaser

8.4.1. After the mass production, the following tests as a type test shall be carried out at the independent ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF in the presence of nominated representatives on the selected samples selected by the nominated representatives.

- a) Creepage Distance and Dimensional Verification
- b) Insulation withstand test
- c) Residual voltage test
- d) Reference voltage test
- e) Long duration current impulse test
- f) Operation duty test
- g) Test of arrester disconnector
- h) Accelerated Ageing test
- i) Seal leakage test
- j) Partial discharge test
- k) Thermal stability
- l) Tracking & erosion test for polymeric insulation
- m) Power frequency voltage with time characteristics
- n) Test of arrester disconnector
- o) Mechanical Failing test
- p) Weather ageing test

8.4.2. The Manufacturer/Supplier shall intimate the Purchaser with a list of independent ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and that representatives from the Purchaser could be deputed. The nominated representatives shall select samples as required.

8.4.3. The manufacturer may carry out the Acceptance Tests during the time of type test after mass production. But for that, one hundred percent of the goods shall be manufactured.

8.5. Inspection after Receipt at Stores

8.5.1. The Purchaser shall perform physical verification of goods after receipt at the store of 2% of the delivered quantity of goods before accepting the goods.

8.5.2. The Purchaser may conduct the tests after receipt of the delivered goods in any lab at its own cost.

8.5.3. If the sample fails the test and it is found that the report is different from the reports of the pre-dispatch acceptance tests, the Purchaser shall reject all of



the delivered goods and the supplier shall replace such materials at the destination concerned.

8.5.4. If the Supplier is not satisfied with the reports, the Purchaser can agree for testing of double of the quantity at the cost of the Supplier. In the event of failing the tests on repeated samples, the Purchaser shall reject all of the delivered goods and the supplier shall replace the lot at the destination concerned.

8.6. Type Test/Acceptance Test/Routine Tests and any other tests not covered in different clauses of this specification but required as per relevant standards shall also be carried out.

8.7. The supplier shall clearly state as to what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out routine and acceptance tests and Anti Tracking as mentioned in relevant standards. All the testing facilities shall be provided by the bidder to purchaser's representative for witnessing the tests in any internationally accredited laboratories or by national board.

8.8. All tests (except type test) and inspection shall be made at the place of manufacturer unless otherwise agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification.

8.9. All the costs towards the Inspection and Testing shall be borne by the Supplier/Manufacturer. The Purchaser shall bear the cost of the travel and daily allowances of nominated representatives for one visit. Should there be any repeated tests due to the reason of Supplier/Manufacturer, the Supplier/Manufacturer shall bear the cost of the travel and daily allowance of two nominated representatives of the Purchaser.

9. Packing and Marking

9.1. Packing

9.1.1. The Supplier shall ensure that all equipment covered under this specification shall be prepared for sea/rail/road transport and be packed in such a manner as to protect it from damage in transit.

9.1.2. The goods shall be packed in strong corrugated boxes of a minimum of 5 ply with maximum 12 units in one box with proper cushion. Spare fuse carrier shall be supplied in suitable hardboard boxes, the quantity and the voltage rating applicable shall be clearly marked on the boxes.

9.2. Name Plate and Marking

9.2.1. Each unit shall carry the rating and nameplate with the following information.

- a) Serial Number
- b) Manufacturer's Name and identification
- c) Contract No.
- d) Property of NEA



-
- e) Type and Discharge Class
 - f) Rated Voltage / Frequency
 - g) Continuous Operating Voltage
 - h) Nominal Discharge Current
 - i) Relevant standards of manufacturing
 - j) Year and month of manufacture

10. Quality Assurance

- 10.1.** The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 10.2.** The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit Manufacture Quality Plan (MQP) along with the offer.
- 10.3.** The bidder/manufacturer shall provide detailed Drawings and GTD along with the bid.



S.N.	Description	Unit	NEA Requirements	
1	Name of the Supplier			
2	Name of the Manufacturer			
3	Country of Origin			
4	List of Standards Applicable			
5	Type of Lightning Arrester		Gapless Metal-Oxide Polymeric	
6	Rated Voltage	kV (rms)	12	
7	Continuous Operating Voltage	kV (rms)	10	
8	Rated Frequency	Hz	50	

SN.	Description	Unit	NEA Requirements	
9	No. of Surge Arrester units per set	Nos	3	
10	Nominal discharge current, 8/20 μ s	kA (rms)	10	
11	Long duration discharge class	Class		
12	High Current Impulse (4/10 μ s) - Peak	kA	100	
13	Steep Current maximum impulse residual voltage (1/20 μ s)	kV	40	
14	Impulse Residual Voltage - Peak			
14.1	Maximum Residual Voltage at 10 kA for 8/20 μ s	kV	35	
14.2	Switching impulse (30-100/60-200 μ s) maximum residual voltage	kV	30	
15	One second TOV withstand capability	kV	> 1.1 x 12	
16	Type of Housing Insulator		Polymeric	
17	Insulation withstand level			
17.1	Lighting Impulse (1.2/50 μ s) voltage - peak	kV	75	
17.2	Power Frequency withstand voltage (wet)	kV	28	
18	Creepage distance (minimum)	mm	360	
19	Energy Absorption Capability (with 4/10 wave)	kJ/kV	≥ 3.2	
20	Insulating Bracket			
20.1	Power Frequency withstand voltage	kV	20	
20.2	Cantilever strength	Nm		
21	Approximate Weight of a Unit	kg		

13. Non-Compliance Schedule (If any)

If there is any non-compliance with the Technical specifications, the bidder shall provide a list of non-compliances with the specific specification clause, documenting the effects that such non-compliance is likely to have on the equipment's life and operating characteristics.



Technical Specification

1. Scope

- 1.1. This Specification covers the design, manufacture, testing, supply, and delivery of porcelain insulators and galvanized iron hardware suitable for use on 3-phase/1-phase overhead AC Distribution System of Nepal Electricity Authority.
- 1.2. It is not intended to specify completely herein all the details of the design and construction of the goods. However, the offered goods shall conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The goods shall be suitable for use within Nepal and the climatic conditions are:

a) Annual Average Ambient Temperature	25°C
b) Maximum ambient temperature	55°C
c) Minimum ambient temperature	-5°C
d) Relative humidity	10 to 100%
e) Average rainfall per annum	2,000 mm
f) Maximum height above sea level	2,000 m
g) Maximum wind pressure / wind speed	150 kg/m ² / 50 m/sec
h) Average number of thunderstorm	50
i) Average number of rainy days per annum	100

- 2.2. The goods shall work satisfactorily in the system with the following particulars for 11kV Distribution System:

a. Nominal System Voltage	11 kV	33kV
b. Highest System Voltage	12 kV	36kV
c. System Frequency	50 Hz	
d. Number of phases	3	
e. Neutral grounding	Effectively grounded	
f. Basic Insulation Level	75 kV	170kV

3. Applicable Standards

- 3.1. Unless otherwise stipulated elsewhere in this specification, the goods shall conform to the following or equivalent standards in accordance with the latest editions and any amendments thereof.

IEC 60383-1	Insulators for Overhead Lines with Nominal Voltage above 1000V
IEC 60120	Ball and Socket Couplings of String Insulator Units
IEC 60372	Locking Devices for Ball and Socket Couplings of String Insulator Units



ISO 1461	Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles
IS 5300	Porcelain Guy Strain Insulators
IS 2486 (Pt I-IV)	Specification for Metal Fittings of Insulators for Overhead Power Lines with a Nominal Voltage greater than 1000V.
IS 731	Specification for Porcelain Insulators for Overhead Power Lines with a Nominal Voltage greater than 1000V.

4. General Requirements

- 4.1 The specifications mentioned are indicative only. The bidder shall furnish the dimensional details for each accessory supported by brochures, manuals etc. of its standard product.
- 4.2 All materials used in the manufacturing of cable and conductors shall be new, unused and of the finest quality. All materials shall comply with the requirements/tests as per applicable standards. The purchaser will verify the documentary evidence of the purchase and use of various raw materials used for the manufacture of unsupplied cable.
- 4.3 The **Manufacture Quality Assurance Plans (MQAP)** shall be submitted to the purchaser for approval. MQAP shall cover all the details of the manufacturing process including testing till delivery.
- 4.4 The manufacturer of **Insulator and Hardware** shall possess a **valid ISO 9001:2015 Quality Management System Certificate with design and manufacture** in scope of certification for the plant where manufacture is done. A copy of the ISO certificate shall be submitted along with the bid.
- 4.5 For all insulators and hardware, the type tests as per the applicable standards shall be carried out in an internationally recognized ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF. The Type Test reports shall not be older than five years from the date of bid submission. Copies of the Type Test shall be submitted along with the bid.
- 4.6 For all insulators and hardware, the Factory Acceptance Tests (FAT) shall be carried out by the manufacturer before dispatch in the presence of the Purchaser's representatives. FAT shall be carried out in manufacturer's laboratory provided that the test laboratory is ISO/IEC 17025 certified and accredited to ILAC/IAF. In absence of such an accredited laboratory, FAT shall be carried out in an ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF at the cost of the Supplier/Manufacturer.
- 4.7 **Porcelain Insulators**
 - 4.7.1 The specifications mentioned are indicative only. The bidder shall furnish the dimensional details for each accessory supported by brochures, manuals etc. of its standard product.
 - 4.7.2 All porcelain insulators shall be manufactured and tested in accordance with the standards referenced or other equivalent standards.
 - 4.7.3 Porcelain insulators shall be sound, free from defects, thoroughly vitrified and smoothly glazed. The glaze color shall be brown for 45kN and green for 70kN. The glaze shall cover all exposed parts of the insulator except those areas which serve as support during firing or left unglazed for the purpose of

assembly. Glaze shall have a good luster, smooth surface and good performance under the extreme weather conditions of a tropical climate. It shall not crack or chip by ageing under the normal Service Conditions. The glaze shall have the same co-efficient of expansion as of the porcelain body throughout the working temperature range.

- 4.7.4 The design of insulators shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. The porcelain shall not engage directly with hard metal.
- 4.7.5 Cement used in the manufacture of the insulator shall not cause fracture by expansion or loosening by contraction. The cement shall not give rise to chemical reaction with metal fittings and its thickness shall be as small and uniform as possible. Proper care shall be taken to correctly center and locate individual parts during cementing.
- 4.7.6 The insulators should be manufactured in tunnel kilns having automatic temperature controllers to obtain uniform baking and better electrical and mechanical properties.

4.8 Insulator Hardware Fittings

- 4.8.1 The Hardware fittings shall be supplied complete in a set.
- 4.8.2 All forgings and castings shall be of good finish and free from flaws and other defects. The edges on the outside of fittings such as the eye, clevis and holes shall be rounded.
- 4.8.3 All ferrous components except those made of steel shall be hot dip galvanized. The threads of nuts and tapped holes when cutting after galvanizing shall be well oiled and greased.

5. Specific Requirements

5.1. Pin Insulator

- 5.1.1. The lead thread on the pin insulator shall be compatible with the insulator pin specified in these documents.
- 5.1.2. The pin insulator shall have the following ratings and features:

SN	Description	Requirements
1	Highest System Voltage	36kV
2	Rated Voltage	33kV
3	Creepage Distance	840mm
4	Wet Power Frequency Withstand Voltage	75kV
5	Impulse Withstand Voltage	170kV
6	Puncture Power Frequency Voltage (min)	180kV
7	Visible Discharge Voltage (effective)	27kV
8	Cantilever Strength	10kN
9	G.I. Pin Head	Large L300N

5.2. Disc Insulator

- 5.2.1 The disc insulator shall be ball and socket fitting type.
5.2.2 The disc insulator shall have the following ratings and features:

SN	Description	Requirements
1	Highest System Voltage	12 kV
2	Rated Voltage	11kV
3	Porcelain Diameter (min)	255mm
4	Spacing	145mm
5	Creepage Distance	320 mm
6	Power Frequency Puncture Withstand Voltage	1.3x Actual dry flashover voltage
7	Wet Power Frequency Withstand Voltage (1 min)	35 kV rms
8	Impulse Withstand Voltage	75kV
9	Visible Discharge Voltage (effective)	9kV
10	Mechanical Strength	70kN
11	Ball and Socket Size	16mm B
12	Color	Green

5.3. Insulator Pin/Studle

- 5.3.1 The insulator pins shall be fabricated from hot rolled steel.
5.3.2 The insulator pin shall be a single piece, obtained by the process of forging. It shall not be made by joining, welding, shrink fitting or any other process from more than one piece of material.
5.3.3 The insulator pin shall be of good finish free from flaws and other defects. The finish of the collar shall be such that a sharp angle between the collar and the shank is avoided.
5.3.4 All insulator pins shall be reasonably smooth on all surfaces and free of sharp projections.
5.3.5 The insulator pin shall be furnished with a spring washer, stainless steel split lock, and nut assembled on the insulator pin.
5.3.6 The insulator pins shall be compatible with the pin insulators specified above.
5.3.7 The ferrous parts shall be hot dipped and galvanized with minimum zinc coating of 640 gsm. The spring washer should be electro galvanized.
5.3.8 The insulator pin shall have the following ratings and features:

SN	Description	Requirements
1	Head Type	Large L300N
2	Stalk Length	300mm
3	Shank Length	150mm (with 100 mm thread)
4	Stalk Diameter (just below head)	27mm

SN	Description	Requirements
5	Stalk Diameter (near collar)	44mm
6	Collar diameter	67mm
7	Shank diameter	24mm
8	Collar thickness	6 mm
9	Minimum Failing Load	10kN

5.4. Disc Insulator Fittings

- 5.4.1 All parts of different fittings, which provide for interconnection, shall be made such that sufficient clearance is provided at the connection point to ensure free movement of insulator assembly.
- 5.4.2 All forging and casting shall be of a good finish and free from flaws and other defects. The edges on the outside of fittings, such as at the eye, socket, and holes, shall be rounded.
- 5.4.3 All components of disc insulator fittings shall be such that they fulfill all requirements of this specification and compatible with disc insulators specified above.
- 5.4.4 The insulator pin shall be furnished with ball and socket couplings (socket eye, ball eye/ball clevis, etc.), twisted straps, and bolted type tension clamps.
- 5.4.5 The ultimate strength of disc insulator fittings shall be more than 70 kN.
- 5.4.6 The twisted strap shall be suitable for 50, 100, 150 mm, cross arm. The size of the holes for the bolt, which anchors twisted strap with cross arm shall be suitable for insulator pins specified in above and width of the twisted strap shall be designed accordingly. The diameter of nuts and bolts of the strap shall be equal to shank diameter of insulator pins. Nuts and bolts shall also be provided with spring washer and split pin.
- 5.4.7 The disc insulator fitting accessories like ball eye/ball clevis, socket eye, nuts, and bolts shall be made of hot rolled steel and obtained preferably by process of forging. Twisted cross arm straps shall be made of MS sheet metal. Cotter bolts and U bolts shall be of galvanized steel. Cotter pins shall be stainless steel.
- 5.4.8 U bolt, Hexagonal Bolt, Nut, Plain Washer and all other ferrous parts shall be Hot dip Galvanized. With minimum value of mass of zinc coating should be 600 gsm. The spring washer should be electro galvanized.

5.5. Shackle Insulator

- 5.5.1. The shackle insulator shall have the following ratings and features:

SN	Description	Requirements
1	Highest System Voltage	1000V
2	Rated Voltage	500V
3	Power frequency puncture withstand voltage, 1m	1.3 x Actual dry Flash over voltage
4	Power Frequency Withstand Voltage, 1min (Dry)	25 kV

SN	Description	Requirements
5	Power Frequency Withstand Voltage, 1min (Wet)	10 kV
6	Leakage Distance (mm)	63 mm
7	Mechanical Strength	11.5 kN
8	Type	B
9	IS Type	I

5.6. Shackle Insulator Fittings (D-Iron)

- 5.6.1. The shackle fittings shall be free of burrs, splinters, splits, sharp points and edges which may damage conductors or show evidence of poor workmanship. All ferrous fittings and parts other than stainless steel shall be galvanized with minimum coating thickness of 640 gm per sq.m.
- 5.6.2. Shackle insulator fittings shall consist of the following main components:
- Mild Steel D-Iron,
 - 1 No. Mild Steel Bolt and Nut,
 - 1 No. Spring Washer.

6. Tests

6.1. Type Tests of Porcelain Insulators

- 6.1.1. The bidder shall furnish copies of Type Test reports of Porcelain Insulators of rated voltage as specified in relevant IEC/IS standards. The Type Test shall be conducted from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and shall not be older than five years from the date of bid submission.
- 6.1.2. After the mass production of the first lot, the Supplier (at its own cost) shall conduct the Type Test as per the relevant standards on identical unit of each item selected by the representatives of the Purchaser from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF in the presence of representatives of the Purchaser. The cost towards the Type Test shall be borne by the Supplier and be included in the bid price. The cost for the airfare, daily travel allowances, insurances, visa fees, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Purchaser.
- 6.1.3. Match clearance certificates shall be issued only after the successful type test. Shall the Type Test not be satisfactory, the whole lot shall be rejected, and the Manufacturer shall manufacture all new items and perform the Type Test on new lot. All the cost for this repeated type tests including but not limited to airfare, daily travel allowances as per NEA rules, insurances, visa fees, living expenses, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Supplier.
- 6.1.4. The type test shall contain but not limited to the following tests:
- (i) Visual examination



- (ii) Verification of dimensions
- (iii) Visible discharge test
- (iv) Impulse voltage withstand test
- (v) Wet power frequency voltage withstand test
- (vi) Temperature cycle test
- (vii) Electro-mechanical failing load test (for string insulators)
- (viii) Mechanical failing load test
- (ix) Thermal Mechanical Performance Test
- (x) Residual Strength Test
- (xi) 24-hour mechanical strength test for strain insulators
- (xii) Puncture test
- (xiii) Impact Test
- (xiv) Porosity test
- (xv) Galvanizing test

6.2. Acceptance Tests of Porcelain Insulators

6.2.1. All the Pre-Dispatch Factory Acceptance Tests (FAT) shall be conducted as per applicable standards in the presence of the Purchaser's representative on the samples selected by the Purchaser's representative. The sampling plan shall be as per the relevant standards.

6.2.2. The following minimum tests shall be included under routine/acceptance tests.

- (i) Verification of dimensions.
- (ii) Temperature cycle test
- (iii) Twenty-four hours mechanical strength test (for string insulator)
- (iv) Electro-mechanical failing load test (for string insulators)
- (v) Mechanical failing load test
- (vi) Puncture test
- (vii) Porosity test and
- (viii) Galvanizing

6.3. Type Tests of Insulator Hardware

6.3.1. The bidder shall furnish copies of Type Test reports of Insulator Hardware as specified in relevant IEC & IS standards. The Type Test shall be conducted from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF and shall not be older than five years from the date of bid submission.

6.3.2. After the mass production of the first lot, the Supplier (at its own cost) shall conduct the Type Test as per the relevant standards on identical unit of each item selected by the representatives of the Purchaser from ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF in the presence of representatives of the Purchaser. The cost towards the Type Test shall be borne by the Supplier and be included in the bid price. The cost for the airfare, daily/travel allowances, insurances, visa fees, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Purchaser.

6.3.3. Dispatch clearance certificates shall be issued only after the successful type test. Shall the Type Test not be satisfactory, the whole lot shall be rejected, and the Manufacturer shall manufacture all new items and perform the Type Test on new lot. All the cost for this repeated type tests including but not limited to airfare, daily/travel allowances as per NEA rules, insurances, visa fees, living expenses, etc. incurred by two representatives of the Purchaser during their visit to the laboratory to witness the Type Test shall be borne by the Supplier.

6.3.4. The type tests shall contain but not limited to the following tests.

- (i) Visual examination
- (ii) Verification of dimensions
- (iii) Galvanizing Test
- (iv) Mechanical test

6.4. Acceptance Tests of Insulator Hardware

6.4.1 All the Pre-Dispatch Factory Acceptance Tests (FAT) shall be conducted as per applicable standards in the presence of the Purchaser's representative on the samples selected by the Purchaser's representatives. The sampling plan shall be as per the relevant standards.

6.4.2 The following minimum tests shall be included under acceptance tests:

- (i) Verification of dimensions,
- (ii) Visual Examination
- (iii) Mechanical Test
- (iv) Galvanizing Test

6.5. Type Test/Acceptance Test/Routine Tests and any other tests not covered in different clauses of the specification but required per relevant standards shall also be carried out.

6.6. The supplier shall clearly state to what testing facilities are available in the work of the manufacturer and whether the facilities are adequate for carrying out routine and acceptance tests as mentioned in the relevant standards. All the testing facilities shall be provided to the bidder to purchaser's representative for witnessing the acceptance tests in any internationally accredited laboratories or by national board.

7. Packing and Marking

7.1. The marking on porcelain insulator shall be applied before firing. Each unit of the insulator shall be engraved or embossed to show the following:

- (i) Name or trademark of the manufacturer.
- (ii) Name of the Purchaser i.e. NEA-DCSD
- (iii) Year of manufacture.
- (iv) Contract No.
- (v) Minimum failing load in Newton (for pin and disc insulators only)

7.2. The marking on insulator hardware shall be embossed before galvanization. Each unit of the insulator hardware shall be marked on it following:

- (i) Name or trademark of the manufacturer.
- (ii) Name of the Purchaser i.e. NEA-DCSD



- (iii) Year of manufacture.
- (iv) Contract No.

7.3. All Insulators shall be packed in sturdy crates or boxes suitable for rough handling during transit, storage at site and subsequent handling in the field including multiple loading and unloading. The gross weight of the crates along with the material shall not normally exceed 100 kg to avoid handling problems. For marine transportation, crates shall be palette.

7.4. All packing cases shall be marked legibly and correctly so as to ensure safe arrival at their destination and to avoid the possibility of goods being lost or wrongly dispatched on account of faulty packing and faulty or illegible markings. Each wooden case/crate shall have all the markings stenciled on it in indelible ink.

7.5. Each package shall have the following information stenciled on it:

- (i) Manufacturer's Name and Brand Name
- (ii) Year of Manufacture
- (iii) Mechanical Strength if Applicable
- (iv) Voltage grade if applicable
- (v) Approximate gross weight
- (vi) Package Identification Number
- (vii) Name of Purchaser
- (viii) Contract No.

7.6. If any wood is used, the wood shall be treated to protect from weather and termite.

7.7. The standard packages shall be as per the table below:

SN	Goods	Packaging
1	33kV Pin Insulator	3 Nos in one crate
2	11kV Disc Insulator	4 Nos in one crate
3	33kV Pin Spindle	20 Nos in one Gunny Bag (Double)
4	11kV Tension Clamp	20 Nos in one Gunny Bag (Double)
5	400V Shackle Insulator	20 Nos in one Gunny Bag (Double)
6	400V D-Tro	20 Nos in one Gunny Bag (Double)

8. Quality Assurance

9.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.

9.2 The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit the Manufacture Quality Assurance Plan (MQAP) along with the offer.

9.3 The bidder/manufacturer shall provide detailed Drawings and GTP along with the bid.



9. Guaranteed Technical Particulars

9.1. GTP for Pin Insulator

SN	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Address of Manufacturer			
3	Country of Origin			
4	Applicable Standards			
5	Material used for insulator housing		Porcelain	
6	Color of Disc Insulator		Brown	
7	Minimum failing load	kN	40	
8	Minimum total creepage distance	mm	840	
9	Rated Voltage	kV	33	
10	Highest System Voltage	kV	36	
11	Impulse withstand voltage	kVp	170	
12	Visible discharge voltage	kV	27	
13	Puncture Power frequency voltage (min)	kV rms	180	
14	Dry Power Frequency withstand Voltage (1 min)	kV rms	75	
15	Wet Power Frequency withstand Voltage (1min)	kV rms	75	
16	Marking			
17	Weight of single insulator (approx.)			
18	Dimensions			
19	Packaging		3 Nos per Crate	
20	Weight of each crate	kg	≤100	
21	GI Pin Head		Large L300N	

9.2. GTP for GI Pin Spindle

SN	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Address of Manufacturer			
3	Country of Origin			
4	Applicable Standards			
5	Type of Steel Used			
6	Head Type		Large L300N	
7	Total Length	mm		
8	Stalk Length	mm	300	
9	Shank Length	mm	150 (with 100 mm thread)	
10	Stalk Diameter (just below head)	mm	27	
11	Stalk Diameter (near collar)	mm	44	
12	Collar diameter	mm	67	
13	Shank diameter	mm	24	

SN	Description	Unit	NEA Requirements	
14	Collar thickness	mm	6	
15	Minimum Failing Load	kN	10	
16	Thickness of Galvanization	gsm	6-40	
17	Weight (approx.)			
18	Dimensions			
19	Marking			
20	Packaging		20 Nos in one Gunny Bag (Double)	
21	Weight of each crate/bag	kg	<100	

9.3. GTP for Disc Insulator

SN	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Address of Manufacturer			
3	Country of Origin			
4	Applicable Standards			
5	Material used for insulator housing		Porcelain	
6	Color of Disc Insulator		Green	
7	Diameter of disc insulator	mm	255	
8	Diameter of pin hole shank	mm	16	
9	Center to center distance between ball and socket	mm	145	
10	Minimum failing load		70	
11	Minimum total creepage distance	mm	320	
12	Rated Voltage	kV	11	
13	Highest System Voltage	kV	12	
14	Impulse withstand voltage	kVp	75	
15	Visible discharge voltage	kV	9	
16	Puncture Power Frequency withstand voltage	kV rms	1.2 X Actual dry flashover voltage	
17	Dry Power Frequency withstand Voltage (1min)	kV rms		
18	Wet Power Frequency withstand Voltage (1min)	kV rms	35	
19	Marking on each disc			
20	Weight of single disc (approx.)	kg		
21	Dimensions			
22	Packaging		4 Nos in one crate	
23	Weight of each crate	kg	<100	



9.4. GTP for Disc Insulator Fittings

SN	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Address of Manufacturer			
3	Country of Origin			
4	Applicable Standards			
5	Materials used			
5.1	Bolted type Tension Clamp & keeper		High Strength Aluminum Alloy	
5.2	Cross arm Strap		Mild Steel, hot dip galvanized	
5.3	Ball eye/clevis		Forged Steel and hot dipped galvanized	
5.4	Spring Washer		Spring Steel, Electro Galvanized	
5.5	Plain Washer		Mild Steel, hot dip galvanized	
5.6	Split Pin, Coner pin		Stainless Steel	
6	Thickness of Galvanization	gms	640	
7	Type of Insulator Fittings			
8	Ultimate Tensile Strength of Tension Clamp	kN	70	
9	Ultimate Tensile Strength of Complete Fittings	kN	70	
10	Marking			
11	Weight (approx.)	kg		
12	Dimensions			
13	Packaging		20 Nos in one Gunny Bag (Double)	
14	Weight of each crate/bag	kg	<100	

9.5. GTP for Shackle Insulator

SN	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Address of Manufacturer			
3	Country of Origin			
4	Applicable Standards			
5	Material used for insulator housing		Porcelain	
6	Color of Disc Insulator		Brown	
7	Minimum failing load	kN	11.5	
8	Highest System Voltage	V	1000	
9	Rated Voltage	V	500	
10	Dry power frequency flashover voltage	kV rms	25	
11	Power Frequency Puncture Withstand Voltage, 1 min	kV	1.3x Actual dry flashover voltage	

SN	Description	Unit	NEA Requirements	
12	Power Frequency Withstand Voltage, 1min (Dry)	kV rms	23	
13	Power Frequency Withstand Voltage, 1min (Wet)	kV rms	10	
14	Leakage Distance (minimum)	mm	83	
15	Mechanical Strength	kN	11.5	
16	Type		B	
17	IS Type		I	
18	Marking			
19	Weight of one unit (approx.)	kg		
20	Dimensions			
21	Packaging		20 Nos in one Gunny Bag (Double)	
22	Weight of each crate/bag	kg	<100	

9.6. GTP for Shackle Insulator Fittings

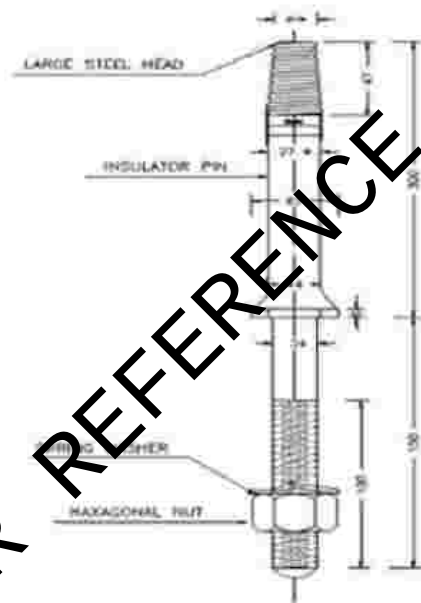
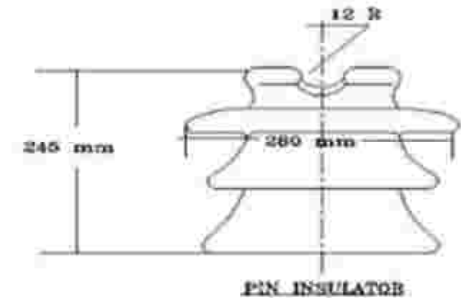
SN	Description	Unit	NEA Requirements	
1	Name of Manufacturer			
2	Address of Manufacturer			
3	Country of Origin			
4	Applicable Standards			
5	Material details			
6	Thickness of Galvanization (min)	mm	640	
7	Weight (approx.)			
8	Dimensions of D-Iron and Nut/Bolt			
9	Marking			
10	Packaging		20 Nos in one Gunny Bag (Double)	
11	Weight of each crate/bag	kg	<100	

10. Non-Compliance Schedule (if any)

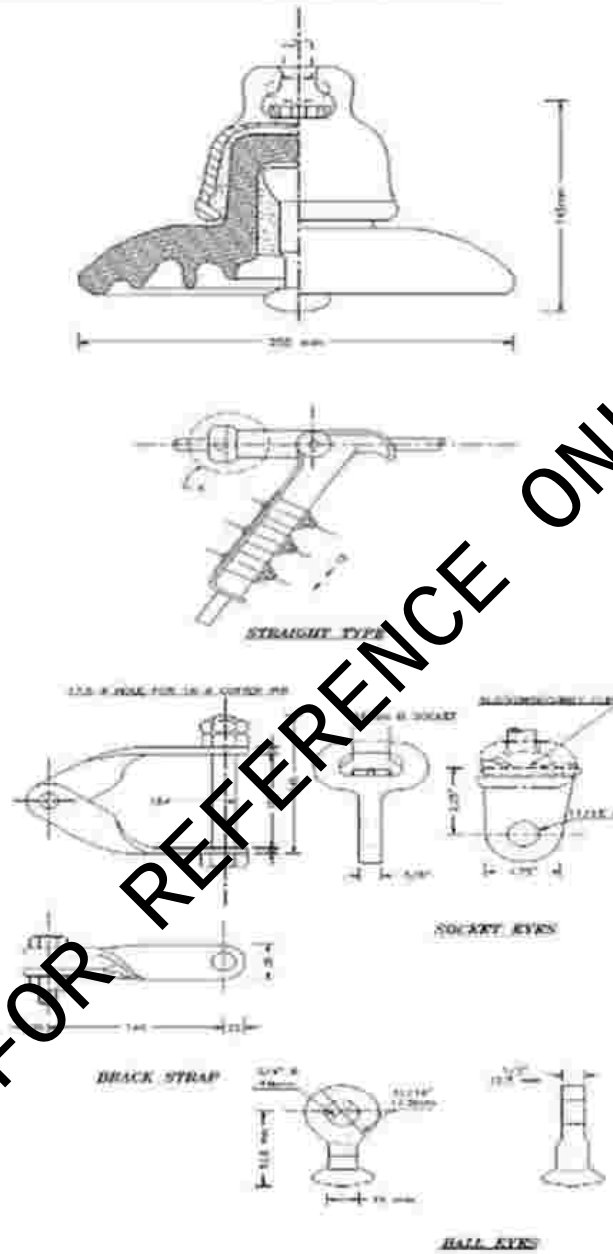
10.1. If there is any non-compliance with the technical specifications, the bidder shall provide a list of non-compliances with the specific specification clause, documenting the effect that such non-compliance is likely to have on the equipment's life and operating characteristics.

SN	Clause No.	Details of non-compliance with justifications

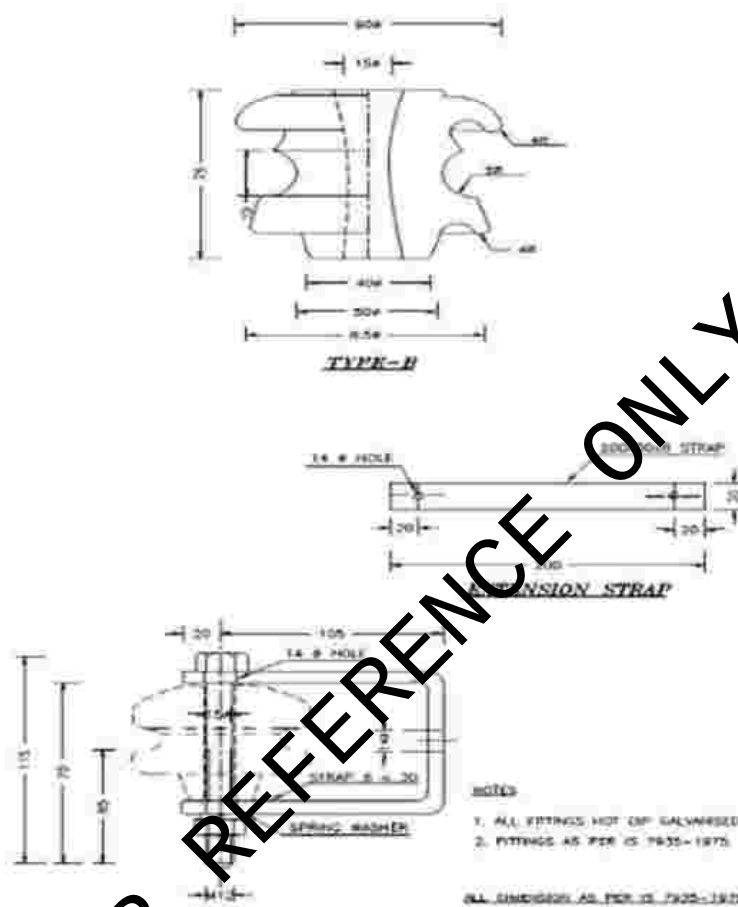
General Arrangement Drawings of Pin Insulator and Spindle (33kV)



General Arrangement Drawings of Disc Insulator and Fittings (H&V)



General Arrangement Drawings of Shackle Insulator and Fittings (400V)



- 4.7.1 The specifications mentioned are indicative only. The bidder shall furnish the dimensional details for each accessory supported by brochures, manuals etc. of its standard product.
- 4.7.2 All porcelain insulators shall be manufactured and tested in accordance with the standards referenced or other equivalent standards.
- 4.7.3 Porcelain insulators shall be sound, free from defects, thoroughly vitrified and smoothly glazed. The glaze shall be brown in color. The glaze shall cover all exposed parts of the insulators.
- 4.7.4 The design of insulators shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. The porcelain shall not engage directly with hard metal.
- 4.7.5 The cement used in the construction of insulators shall not give rise to a chemical reaction with metal fittings and its thickness shall be as uniform as possible.
- 4.7.6 The insulators should be manufactured in tunnel kiln having automatic temperature controllers to obtain uniform baking and better electrical and mechanical properties.

4.8 Insulator and Insulator Hardware

- 4.8.1 The Hardware fittings for Suspension and Tension string shall be supplied complete in all respect.
- 4.8.2 All forgings and castings shall be of good finish and free from flaws and other defects. The edges and the outside of fittings such as the eye, clevis and holes shall be rounded.
- 4.8.3 All ferrous components except those made of stainless steel shall be hot dip galvanized. The threads of nuts and tapped holes, when cutting after galvanizing shall be well oiled and greased.

5. Specific Requirements

5.1 Pin Insulator

5.1.1 The lead thread on the pin insulator shall be compatible with the insulator pin specified in these documents.

5.1.2 The pin insulator shall have the following ratings and features:

SN	Description	Requirements
1	Highest System Voltage	12 kV
2	Rated Voltage	11kV
3	Creepage Distance	265 mm
4	Wet Power Frequency Withstand Voltage	15kV



5	Impulse Withstand Voltage	75kV
6	Puncture Power Frequency Voltage (min)	105kV
7	Visible Discharge Voltage (effective)	9kV
8	Cantilever Strength	5kN
9	G.I. Pin Head	Small S165P

5.2 Disc Insulator

5.2.1 The disc insulator shall be ball and socket fitting type.

5.2.2 The disc insulator shall have the following ratings and features:

SN	Description	Requirements
1	Highest System Voltage	12 kV
2	Rated Voltage	11kV
3	Porcelain Diameter (mm)	255mm
4	Spacing	145mm
5	Creepage Distance	280 mm
6	Power Frequency Puncture Withstand Voltage	1.2 times normal dry flashover voltage
7	Wet Power Frequency Withstand Voltage	35kV
8	Impulse Withstand Voltage	75kV
9	Puncture Power Frequency Voltage (min)	105kV
10	Visible Discharge Voltage (effective)	9kV
11	Mechanical Strength	45kN
12	Ball and Socket Size	10 mm B

5.3 Stay Insulator

5.3.1 The stay insulator shall be Type A as per IS 5300.

5.3.2 The stay insulator shall have the following ratings and features:

SN	Description	Requirements
1	Highest System Voltage	12 kV
2	Rated Voltage	11kV
3	Creepage Distance	41 mm
4	Dry Power Frequency Withstand Voltage (1 min)	18kV
5	Wet Power Frequency Withstand Voltage (1 min)	8kV
6	Mechanical Failing load	44kS
7	IS Type	A

5.4 Insulator Pin/Spindle

5.4.1 The insulator pins shall be fabricated from hot rolled steel.



5.4.2 The insulator pin shall be a single piece, obtained by the process of forging. It shall not be made by jointing, welding, shrink fitting or any other process from more than one piece of material.

5.4.3 The insulator pin shall be of good finish free from flaws and other defects. The finish of the collar shall be such that a sharp angle between the collar and the shank is avoided.

5.4.4 All insulator pins shall be reasonably smooth on all surfaces and free of sharp projections.

5.4.5 The insulator pin shall be furnished with a spring washer, stainless steel split lock, and nut assembled on the insulator pin.

5.4.6 The insulator pins shall be compatible with the pin insulators specified above.

5.4.7 The insulator pin shall have the following ratings and features:

SN	Description	Requirements
1	Head Type	Head in 18SP
2	Total Length	375mm
3	Stalk Length	165mm
4	Shank Length	150mm
5	Minimum Tension Load	5kN

5.5 Disc Insulator Fittings

5.5.1 The insulator pin shall be furnished with ball and socket couplings (socket eye, ball eye/ball clevis), twisted straps, and bolted type tension clamps.

5.5.2 The ultimate strength of disc insulator fittings shall be more than 45 kN.

5.5.3 All components of disc insulator fittings shall be such that they fulfill all requirements of this specification and compatible with disc insulator specifications.

5.5.4 All parts of different fittings, which provide for interconnection, shall be made such that sufficient clearance is provided at the connection point to ensure free movement of insulator assembly.

5.5.5 The twisted strap shall be suitable for 50x100x50 mm cross arm. Size of the holes for the bolt, which anchors twisted strap with cross arm shall be suitable for insulator pins specified in above and width of the twisted strap shall be designed accordingly. The diameter of nuts and bolts of the strap shall be equal to shank diameter of insulator pins. Nuts and bolts shall also be provided with spring washer and split pin.

5.5.6 The disc insulator fitting accessories like ball eye/ball clevis, socket eye, nuts, and bolts shall be made of hot rolled steel and obtained preferably by process of forging. Twisted cross arm strap shall be made of MS sheet



7.5 If any wood is used, the wood shall be treated to protect from weather and termite.

7.6 The standard packages shall be as per the table below:

11kV Pin Insulator	6 Nos in one crate
11kV Disc Insulator	4 Nos in one crate
11kV Type A Stay Insulator	40 Nos in one Gunny Bag (Wrapped in Grass)
11kV Pin Spindle	50 Nos in one Gunny Bag (Double)
11kV Tension Clamp	15 Nos in one Gunny Bag (Double)

8. Guaranteed Technical Particulars (GTP)

8.1 GTP for Pin Insulator

S.N.	Description	NEA Requirement
1	Name of Manufacturer	
2	Address of Manufacturer	
3	Country of Origin	
4	Applicable Standards	
5	Highest System Voltage	
6	Rated Voltage	
7	Creepage Distance (mm)	
8	Wet Power Frequency withstand Voltage	
9	Impulse withstand voltage	
10	Positive Power frequency voltage (min)	
11	Visible discharge voltage (accepted)	
12	Cast/lever strength	
13	GL Pin Head	
14	Weight (kg)	
15	Dimensions	
16	Marking	
17	Packaging	

1.1 GTP for Disc Insulator

S.N.	Description	NEA Requirement
1	Name of Manufacturer	
2	Address of Manufacturer	
3	Country of Origin	
4	Applicable Standards	
5	Highest System Voltage	
6	Rated Voltage	
7	Creepage Distance (mm)	



8	Porcelain Diameter (mm)		
9	Spacing		
10	Power Frequency Puncture Withstand Voltage		
11	Wet Power Frequency Withstand Voltage		
12	Impulse Withstand Voltage		
13	Puncture Power Frequency Voltage (min)		
14	Visible Discharge Voltage (effective)		
15	Mechanical Strength		
16	Ball and Socket Size		
17	Weight (approx.)		
18	Dimensions		
19	Marking		
20	Packaging		

8.2 GTP for Stay Insulator

S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards		
5	Highest System Voltage		
6	Rated Voltage		
7	Creepage Distance		
8	Dry Power Frequency Withstand Voltage (1 min)		
9	Wet Power Frequency Withstand Voltage (1 min)		
10	Mechanical Working load		
11	IS Type		
12	Weight (approx.)		
13	Dimensions		
14	Marking		
15	Packaging		

8.3 GTP for Insulator Pin Spindle

S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		



4	Applicable Standards		
5	Type of Steel Used		
6	Head Type		
7	Total Length		
8	Stalk Length		
9	Shank Length		
10	Minimum Failing Load		
11	Weight (approx.)		
12	Dimensions		
13	Marking		
14	Packaging		

8.4 GTP for Disc Insulator Fittings

S.N.	Description	NEA Requirement
1	Name of Manufacturer	
2	Address of Manufacturer	
3	Country of Origin	
4	Applicable Standards	
5	Material details	
6	Ultimate strength of clamps	
7	Weight (approx.)	
8	Dimensions	
9	Marking	
10	Packaging	

9. Quality Assurance

- 9.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 9.2 The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit Manufacture Quality Plan (MQP) along with the offer.
- 9.3 The bidder/manufacturer shall provide detailed Drawings and GTP along with the bid.



Technical Specification

1. Scope

- 1.1. This specification covers the design, manufacture, testing, supply and delivery of hardware and accessories of 11 kV XLPE Covered Conductor for use as overhead distribution feeders suitable on 3-phase AC System conforming to EN 50397-2 standards.
- 1.2. It is not the intent to specify completely herein all the details of design and construction of hardware and accessories of medium voltage covered conductor. However, the offered goods shall confirm in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications/drawings.

2. Climatic Conditions and System Particulars

- 2.1. The Hardware and Accessories of Medium Voltage Covered Conductor shall be suitable for use within Nepal and the climatic conditions are:
 - a) Annual Average Ambient Temperature
 - b) Maximum ambient temperature 55°C
 - c) Minimum ambient temperature -5°C
 - d) Relative humidity 10 to 100%
 - e) Average rainfall per annum 2,000 mm
 - f) Maximum height above the sea level 2,000 m
 - g) Maximum wind pressure / wind speed 150 kg/m² / 30 m/sec
 - h) Average number of thunderstorm 50
 - i) Average number of rainy days per annum 100
- 2.2. The hardware and accessories shall work satisfactorily in the system with the following particulars:
 - a. Nominal System Voltage 11 kV
 - b. Highest system voltage 12 kV
 - c. System Frequency 50 Hz with 5% tolerance
 - d. Number of phases 3
 - e. Neutral Earthing Effectively grounded
 - f. System Insulation Level 75 kV (Peak)

3. Applicable Standards

- 3.1. The design, manufacture and test requirements of the Hardware and Accessories of Medium Voltage Covered Conductor shall confirm with EN 50397-2 standards.
- 3.2. The hardware and accessories shall be compatible with the cables and insulators of sizes & dimensions as defined in the CONDUCTOR AND INSULATOR DATA for the cables with which they are intended to be used.



- 3.3 The manufacturer of hardware and accessories shall possess a valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of certification for the plant where manufacture is done. A copy of the ISO certificate shall be submitted along with the bid.
- 3.4 For all hardware and accessories, the type tests as per the EN 50397-2 standards shall be carried out in an ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF. The Type Test reports shall not be older than five years from the date of bid submission. Copies of the Type Test shall be submitted along with the bid.
- 3.5 For all hardware and accessories, the Factory Acceptance Tests (FAT) shall be carried out by the manufacturer before dispatch in the presence of the Purchaser's representatives. FAT shall be carried out in manufacturer's laboratory provided that the test laboratory is ISO/IEC 17025 certified and accredited to ILAC/IAF. In absence of such accredited laboratory, FAT shall be carried out in an ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF at the cost of the Supplier/Manufacturer.

4. Conductor and Insulator Data

- 4.1 The conductors used by Nepal Electricity Authority confirm the following standards EN 50397-1. The covered conductors are of 55 sq. mm. and 100 sq. mm. based circular All Aluminium Alloy (AAAC), stranded compacted/non-compact, stay blocked with non-swellable compound, screened with extruded semiconducting layer, natural color XLPE insulated followed by outer covered Anti-tracking XLPE having UV-resistance properties for rated voltage grade of 11 kV.
- 4.2 The Tension/Anchoring Clamp and Cable Ties shall be compatible with the Pin and Disc Insulators being used by Nepal Electricity Authority.
- 4.3 The Pin Insulators used by Nepal Electricity Authority are manufactured and tested in accordance with IEC 60383-1 or equivalent Indian Standards. It has the following ratings and features:
- | | |
|--|--------|
| - Highest System Voltage | 12 kV |
| - Rated Voltage | 11 kV |
| - Creepage Distance (mm) | 265 mm |
| - Wet Power Frequency Withstand Voltage | 35 kV |
| - Impulse Withstand Voltage | 75 kV |
| - Puncture Power Frequency Voltage (min) | 105 kV |
| - Visible Discharge Voltage (effective) | 9 kV |
| - Tensile Strength | 5 kN |
| - Pin Head | S165P |
- 4.4 The Disc Insulators used by Nepal Electricity Authority are manufactured and tested in accordance with IEC 60383-1, IEC 60120, or equivalent Indian Standards (IS 2486-2). It has the following ratings and features:
- | | |
|--|-----------------------------------|
| - Highest system Voltage | 12 kV |
| - Rated Voltage | 11 kV |
| - Porcelain Diameter (mm) | 255 mm |
| - Spacing | 145 mm |
| - Creepage Distance (mm) | 280 mm |
| - Power frequency puncture withstand voltage | 1.35 actual dry flashover voltage |
| - Wet Power Frequency withstand Voltage | 35 kV |



- Impulse Withstand Voltage	75 kV
- Puncture Power Frequency Voltage (min)	105 kV
- Visible Discharge Voltage	9 kV
- Mechanical Strength	45 kN
- Ball and Socket Size	16 mm B

5. General Requirements

- 5.1 The specifications mentioned are indicative only. The bidder shall furnish the dimensional details for each accessory supported by brochures, manuals etc. of its standard product.

SN	Description	Application
1	Tension/Anchoring Assembly (TA)	- For fitting on to a pole for tensioning at the beginning or end of a length of covered conductor, or for anchoring at a major deviation in direction of line. - The Tension assembly consists of one wedge type tension/anchoring clamp and one Tracking protection IPC.
2	Cable Ties for Pin Insulator	For supporting and holding covered conductor at an intermediate point in a length, with small angle of deviation. These tie hold the covered conductor in its position on top of the pin insulator.
3	Insulation Piercing Connectors (IPC)	- For connecting Tap-Off/Branch Connection/Earthing Connection etc. to the Covered Conductor. - These are the electrical characteristics within the required limits, while ensuring necessary insulation protection against tracking and water penetration on covered conductor.
3.1	IPC for Bare to Covered Interconnection (IPC-Type 1)	For main (bare) to main (Covered Conductor) networking connection.
3.2	IPC for Networking/Branching/Looping (IPC-Type 2)	For main (Covered Conductor) to main (covered Conductor) networking or branching of covered conductor to another covered conductor or Branch Cable or Looping for transformer anchorage.
3.3	IPC with Aluminum Bail for Earthing (IPC-Type 3)	For temporary earthing provision from covered conductor for maintenance purpose.
4	Straight Through Joints	For joining end to end of covered conductors and
5	Cable End Caps	To protect the conductor from moisture.

5.2 Tension/Anchoring Assembly (TA)

Tension/Anchoring assemblies are used to firmly hold the XLPE Covered Conductor to a concrete or steel pole and transmit the mechanical tension at the end of a run and at a major change in direction of over 20 degrees.

The assembly shall consist of an aluminum alloy corrosion resistant body, rigid sling ("bail") of galvanized steel with tracking IPC, self-adjusting plastic wedges, which shall anchor/hold the cable, and socket eye for connecting it with disc insulator.



Tension/Anchoring assembly shall be suitable and complete for disc insulator and its fittings as mentioned above.

5.2.1 Tension/Anchoring Clamp

The following key criterion to be followed for the design of Tension/Anchoring Clamp:

- There shall be no loose part (except Tracking IPC and bail) in the process of clamping arrangement.
- The locking mechanism should be wedge type self-locking. Wedges are to be made of high strength, climatic resistance engineering plastic with glass fiber ensuring the tight tightening of the wedges without damaging the outside sheath of the cover.
- There shall be no metal teeth inside the wedges to avoid any insulation damage to MVCC.

The fittings shall be able to withstand the Specific Minimum Failure Load (SMFL) and shall not damage the covering. SMFL is the minimum load specified by the purchaser or declared by the supplier at which mechanical failure will not take place. The values are to be specified by the manufacturer.

5.2.2 Rigid Sling (Bail) of Anchor Assembly

The Anchoring assembly shall be supplied with a galvanized steel rod to connect the Tension Clamp to the Insulator through socket eye.

The Rigid Bail forming part of clamp should have sufficient distance between bracket and body of clamp and shall have sufficient mechanical strength to withstand the mechanical tests or complete assembly tests in this specification.

Flexible bail is not acceptable due to the reason to withstand the load.

Rigid Bail should be fitted with provision to remove from the clamp to have easy installation.

5.2.3 Wedge Type Tension Clamp for Anchor Assembly

Wedge type clamps shall be used for clamping the Covered Conductor without damaging the insulation and shall be capable of clamping an uncut Covered Conductor so that it can continue without break to the connecting point or next span.

The tension clamp shall be equipped with all aluminum tracking insulation piercing connector to ensure same potential level and wedges to be attached to connector for smooth travel and ensuring no damage to conductor.

The clamp shall be of aluminum with fully insulating type of mechanical and weather resisting thermoplastic wedges.

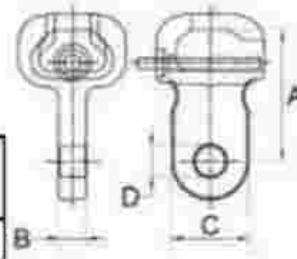
No tools shall be needed for fitting the covered conductor into the clamp.

5.2.4 Socket Eye



The Socket eye shall be of steel, forged, hot dip galvanized according to IEC. The sizes shall be suitable for disc insulator as mentioned above with ball eye of 16 mm. The dimension and drawing shall be as below:

Dimensions in mm				Ball Eye	kN	kA	Approx. Weight (kg)
A	B	C	D				
71	19	45	26	16	130	14	0.69



5.2.5 Marking

Each clamp shall be legibly and indelibly marked to show the following:

- Name & Trademark of the Manufacturer
- Month & Year of Manufacturing
- Minimum Failing Load (in kN)
- "Contract No" marking

5.2.6 Drawing

The bidder shall furnish along with the bid the outline drawing of the assemblies together with insulators and hardware fittings all complete. The general arrangement diagrams and drawings are provided in Annexure.

5.2.7 Testing Requirements

The following tests are intended to establish design characteristics as per EN 50397-2:

S.N.	Test	Type test	Acceptance Test	Routine test
1	Visual examination	☒	☒	☒
2	Dimensional verification	☒	☒	☒
3	Mechanical tests			
3.1	Tensile test at ambient temperature	☒	☒	
3.2	Tensile test at low temperature	☒		
3.3	Tensile test at high temperature	☒		
4	Slippage test at ambient temperature	☒	☒	
4	Environmental tests			
4.1	Corrosion test	☒		
4.2	Climate ageing test	☒		
5	Check for permanent marking	☒	☒	☒

5.3 Cable Ties for Porcelain Pin Insulator

The ties shall be designed suitably to hold the covered conductor in its position on top of the porcelain pin insulator and shall confirm to EN 50397-2. The ties shall be non-metallic helical type to ensure tracking resistance and to avoid any insulation damage to covered conductor due abrasion while mechanical or wind induced vibration. The non-



metallic helical ties shall retain good physical characteristics without deteriorating in function from the effects of severe weather conditions and industrial fumes.

5.3.1 Marking

Each tie shall be legibly and indelibly marked to show the following:

- Name & Trademark of the manufacturer
- Month & Year of manufacturing
- "Contract No" marking

5.3.2 Drawing

The bidder shall furnish along with the bid the outline drawing of the ties together with insulators and hardware fittings all complete. The general arrangement diagrams and drawings are provided in Annexure.

5.3.3 Testing Requirements

The following tests are intended to establish design characteristics as per EN 50397-2.

SN	Test	Type test	Acceptance test	Routine test
1	Visual examination	☒	☒	☒
2	Dimensional verification	☒	☒	☒
3	Mechanical tests			
3.1	Failure Load Tests	☒	☒	☒
3.2	Slip Load Tests	☒	☒	☒
3.3	Lift / Side Load Tests	☒	☒	☒
3.4	Thermal Tests under load	☒		
4	Environmental tests			
4.1	Corrosion test	☒		
4.2	Climate ageing test	☒		
5	Check for permanent marking	☒	☒	☒

5.4 Insulation Piercing Connectors (IPC) for Covered Conductor

5.4.1 General Requirements

Insulation Piercing Connectors (IPC) are used for making Tee / Tap-off / connections to a XLPE Covered Conductor / Bare Overhead Line.

Insulation Piercing Connectors are designed to make a connection between the main conductor and a branch cable conductor without having to strip either cable to expose the conductor. Instead, the tightening action of the IPC will first pierce the insulation, then make good electrical contact between the main and branch conductor while simultaneously insulating and sealing the connection.

IPCs shall ensure the electrical characteristics within the required limits, while ensuring necessary insulation protection against tracking and water penetration on covered conductor.

The IPCs shall be of the following type (s) depending on the application:

Type – 1 For main (Bare) to main (Covered Conductor) network connection



- Type – 2** For main (Covered Conductor) to main (Covered Conductor) networking.
Branching of Covered Conductor to another Covered Conductor or Branch Cable.
Looping for Transformer junctions.
- Type – 3** IPC with Aluminum Bail for temporary Earthing Provision from Covered Conductor for maintenance purpose.

5.4.2 Technical Requirements

The connector bodies shall be made entirely of mechanical, and weather resistant plastic insulation material made of weather & UV resistant reinforced polymer and no metallic part outside the housing is acceptable except for the tightening bolt or nuts.

The contact plates shall be made of tinned copper/aluminium alloy.

Connector teeth shall be factory greased & sealed to retard water and moisture ingress & corrosion.

The insulation material shall be made of weather & UV resistant reinforced polymer.

The outer metallic part shall have potential free tightening bolts to allow safe installation on live lines.

Any metallic part that is exposed must be free from potential during or after connector installation.

Screws or nuts assigned for fitting cables (Insulating Piercing connector), must be fitted with torque limiting washers to prevent over tightening or under tightening. The minimum and maximum torque values are to be specified by the manufacturer.

The IPC must perform piercing and connection on main and branch cable simultaneously using single bolt for tightening as multiple bolts do not ensure even tightening. The shear bolt/nut shall be suitable for tightening with a hexagonal socket of 13 mm or 17mm.

The tip shall be waterproof, and the water tightness shall be ensured by appropriate elastomer materials and not by grease, gel or paste alone. Grease can be applied to protect the contact blade alone and shall not be visible on the outer surface of the connector. Connector should not be dipped in grease.

The connector shall have a rigid removable end cap which can slide onto the main connector body on either right or left by the installer (depending on site requirement) for sealing the cut end of the branch cable. Once the connector is fitted, it should not be possible to remove the cap without removing the connector.

All the metallic parts of the connector shall be corrosion resistant and there shall not be any appreciable change in contact resistance & temperature after overloads & load cycling and should conform to the long duration tests specified in this standard.

5.4.3 Marking and Packaging



Each IPCs shall be packed in an air-tight plastic. In a hard-box, max 24 nos. of IPC shall be packed. Each IPCs and each hard box shall be legibly and indelibly marked to show the following:

- Name & Trademark of the manufacturer
- Month & Year of manufacturing
- "Contract No" Marking

5.4.4 Drawing

The bidder shall furnish along with the bid the outline drawing of the IPCs together with covered conductor all complete. The general arrangement diagrams and drawings are provided in Annexure.

5.4.5 Testing Requirements

The following tests are intended to establish design characteristics as per EN 50397-2.

SN	Test	Type test	Acceptance Test	Routine test
1	Visual examination	☒	☒	☒
2	Dimensional verification	☒	☒	☒
3	Voltage and Water Tightness Test	☒	☒	☒
4	Mechanical tests	☒	☒	☒
5	Corrosion test	☒		
6	Climate ageing test	☒		
7	Electrical Ageing Test	☒		
8	Check for permanent marking	☒	☒	☒

5.5 Straight-Through Joints

The sleeves shall be insulated type. The automatic tension jointing sleeves shall be made of aluminum. The sleeve shall be wedge type and need no tool for fixing. Insulation shall be provided by an anti-UV black crimpable tube.

However, pre-insulated type of sleeves made of aluminum alloy with anti-UV black thermoplastic resin is also acceptable. On the pre-insulated sleeve, the strip length, crimping die size and size shall be marked on the outer surface.

The following tests are intended to establish design characteristics as per EN 50397-2.

SN	Test	Type test	Acceptance Test	Routine test
1	Visual examination	☒	☒	☒
2	Dimensional verification	☒	☒	☒
3	Voltage and Water Tightness Test	☒	☒	☒
4	Mechanical tests	☒	☒	☒
5	Corrosion test	☒		
6	Climate ageing test	☒		
7	Electrical Ageing Test	☒		



8	Check for permanent marking	☒	☒	☒

5.6 End Cap

The insulated end cap with sealant shall be suitable for effectively sealing the end terminal of the covered conductors. The inner diameter range of the cap shall be such that it shall tightly fit to the covered conductors to prevent entry of moisture.

6. Guaranteed Technical Particulars (GTP)

6.1 GTP for Tension/Anchoring Assembly (TA)

S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards	EN 50397-2	
5	Type of Design		
6	Product Code		
7	Cable Range (50 sq. mm.)	Φ13-16 mm	
8	Cable Range (100 sq. mm.)	Φ17-19 mm	
9	Material of Body		
10	Material of Wedge		
11	Material of Socket Eye		
12	Ultimate Tensile Strength (50 sq. mm.)		
13	Ultimate Tensile Strength (100 sq. mm.)		
14	Ultimate Tensile Strength of (250 N)		
15	Installation (with/without disassembly)	Ready to use (without disassembling)	
16	Weight (approx.)		
17	Dimensions		
18	Marking		

6.2 GTP for Cable Joints

S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards	EN 50397-2	
5	Product Code		
6	Cable Range (50 sq. mm.)	Φ13-16 mm	
7	Cable Range (100 sq. mm.)	Φ17-19 mm	
8	Material		
9	Installation (with/without disassembly)	Ready to use (without disassembling)	
10	Length (approx.)		



11	Weight (approx.)		
12	Marking		

6.3 GTP for Insulation Piercing Connectors (IPC)

S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards	EN 50397-2	
5	Product Code		
6	Type of IPC		
6.1	Type - 1: Bare to Covered Conductor		
6.2	Type - 2: Covered to Covered Conductor		
6.3	Type - 3: Tapping Connector		
7	Are torque limiting shear heads provided to tightening bolts?	Yes	
8	Tightening Torque		
9	Torque for establishing connection between main and Tap (Nm)	70% of minimum torque specified	
10	Cable Range (50 sq. mm.)	Φ13-17 mm	
11	Cable Range (100 sq. mm.)	Φ17-19 mm	
12	Material		
13	Weight (approx.)		
14	Dimensions		
15	Marking		

6.4 GTP for Straight-through Joining

S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards	EN 50397-2	
5	Product Code		
6	Cable Range (50 sq. mm.)	Φ13-16 mm	
7	Cable Range (100 sq. mm.)	Φ17-19 mm	
8	Is any metallic part carrying potential in operation exposed during installation?	No	
9	Installation		
10	Material		
11	Weight (approx.)		
12	Dimensions		
13	Marking		

6.5 GTP for Cable End Caps



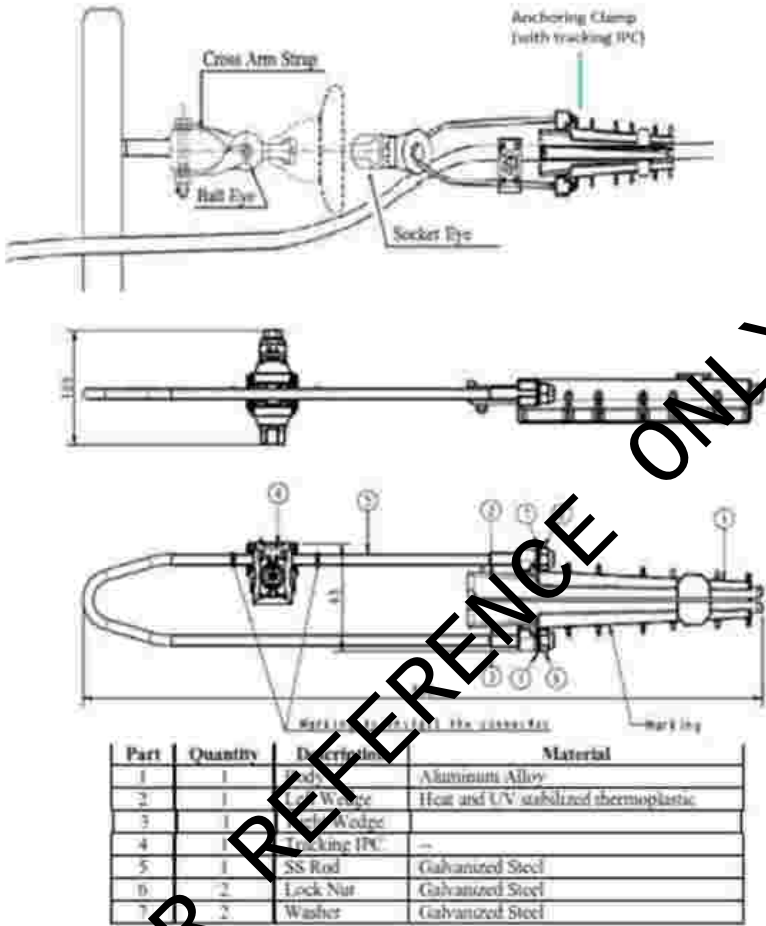
S.N.	Description	NEA Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards	EN 50397-2	
5	Product Code		
6	Cable Range (50 sq. mm.)	Φ13-16 mm	
7	Cable Range (100 sq. mm.)	Φ17-19 mm	
8	Installation		
9	Material		
10	Weight (approx.)		
11	Dimensions		
12	Marking		

7. Quality Assurance

- 7.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration at the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 7.2 The manufacturers shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit Manufacture Quality Plan (MQP) along with the offer.
- 7.3 The bidder/manufacturer shall provide detailed drawings and GTP along with the bid.



General Arrangement Drawings of Tension / Anchoring Assembly (TA)



General Arrangement Drawings of Cable Ties



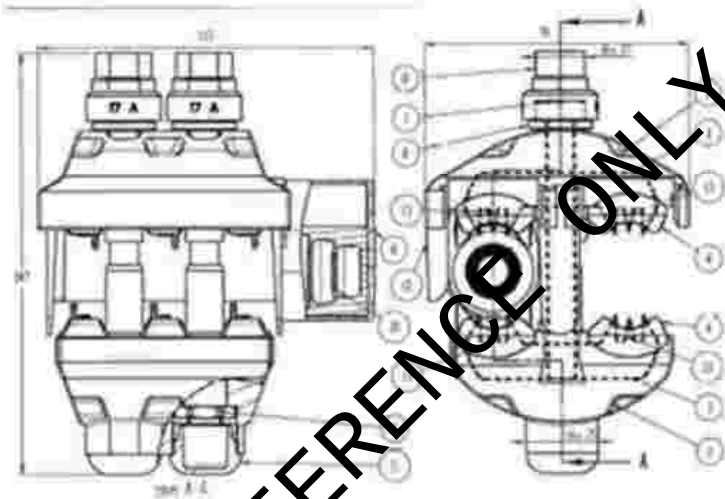
The diagram illustrates three applications of Insulation Piercing Connectors (IPCs) on a horizontal conductor line:

- Insulation Piercing Connector MVCC to MVCC:** Shows an IPC connecting two conductors, with a green arrow pointing to the connection point.
- Insulation Piercing Connector Earthing:** Shows an IPC connecting a conductor to a ground plane, with a green arrow pointing to the connection point.
- Mid-span Tension Joints:** Shows a series of IPCs used to join conductors at mid-span, with a green arrow pointing to the connection point.

Parts	Qty.	Description	Particulars
1	1	1/4 Body Screw Saddle	Polyamide GF-Black
2	1	1/4 Body Nut Side	Polyamide GF-Black
3	1	Electrical Contact Blade	Timed Copper Alloy
4	2	Nut	Galvanized Steel
5	2	Washer	Stainless Steel

6	2	Screw	Galvanized Steel
7	2	Shear Head	Polycarbonate GF-Black
8	1	End Cap	Polyamide GF- Black
9	1	Cap seal	Thermoplastic rubber-Green
10	2	Screw Protection	Polyethylene-Pink
11	1	Marking	Color white
12	1	Marking	Color white
13		Lubricant	Silicone Based

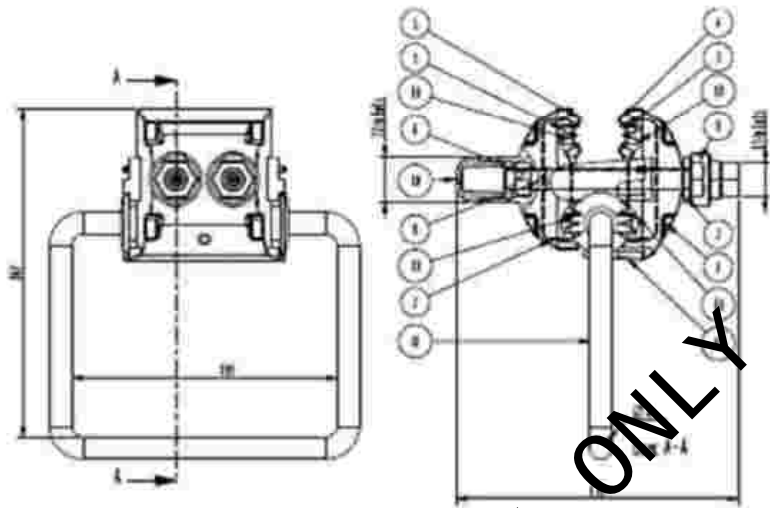
General Arrangement Drawings of IPC Type-2 (Covered Conductor to Covered Conductor for Networking/Branching/Looping)



Parts	Qty.	Description	Particulars
1	1	End Cap, New Side	Polyamide GF- Black
2	1	End Cap, Nut Side	Polyamide GF- Black
3	1	Electrical Contact Blade	Tinned Copper Alloy
4	2	Seal	Thermoplastic Rubber Black
5	2	Nut	Galvanized Steel
6	2	Washer	Stainless Steel
7	2	Screw	Galvanized Steel
8	2	Shear Head	Polycarbonate GF-Black
9	1	End Cap	Polyamide GF- Black
10	1	Cap seal	Thermoplastic rubber-Green
11	2	Screw Protection	Polyethylene-Pink
12	1	Marking	Color white
13		Lubricant	Silicone Based



General Arrangement Drawings of IPC Type-3 (with Aluminum Ball for Earthing)



Parts	Qty.	Description	Particulars
1	1	1/2 Body Screw Side	Polycarbonate GF-Black
2	1	1/2 Body Nut Side	Polycarbonate GF-Black
3	1	Electrical Contact Blade	Tempered Copper Alloy
4	1	Seal: Nut Side	Thermoplastic Rubber - Black
5	1	Seal: Screw Side	Thermoplastic Rubber - Black
6	2	Nut	Galvanized Steel
7	2	Washer	Stainless Steel
8	2	Screw	Galvanized Steel
9	2	Shear Pin	Polycarbonate GF-Black
10	2	Screw Pin	Polycarbonate-Pink
11	1	Aluminum Ball	As described in technical specification
12	1	Paint	Color white
13	1	Grease	Silicone Based



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TECHNICAL SPECIFICATION COPPER CASTING EARTHING ROD

1. General

- a. This specification covers the general requirements for Supply and Delivery of Copper Coated Earthing Rod. The steel used in the production of the ground rod core shall meet the requirements of ASTM-A370, and shall have a minimum tensile strength of 80,000 PSI and a minimum Rockwell B hardness of 80. The rod steel core shall be cold-drawn to assure enhanced hardness and straightness.

The ground rod shall be 19mm in diameter and 1828 mm (6 ft.) in overall length. 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. The manufacturing process shall assure that ground rod does not bend when driven into hard soils.

And suitable provision for earthing rod so that it must be attached with earthing wire may be use of clamp/ nuts and bolts and shoe clamp terminal clamp whichever appropriate and can be easily installed at site.

- b. The Copper Coated Earthing Rod is for earthing purpose of distribution transformers conforming to the Technical particulars as available in Technical Data Sheet and should comply with IEC 62561-4, IS 3043:2011 and IS 1772:1973 with latest amendments or any other specifications conforming to the said governing standard.
- c. It is not the intent to specify completely herein all details of Technical Specifications of Goods supplied. However, the goods 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.

2. Description

1. Material:

The steel used in the production of the ground rod core shall meet the requirements of ASTM-A370 and shall have a minimum tensile strength of 80,000 PSI and a minimum Rockwell B hardness of 80. The rod steel core shall be cold-drawn to assure enhanced hardness and straightness.

The ground rod shall be 19mm in diameter and 1828 mm (6 ft.) in overall length. The driven end of the ground rod shall have a truncated cone point. The cone point shall



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

The copper coated earthing rod manufactures should have ISO Certification.

Coating:

The coating thickness for copper-coated rods shall not be less than 50 micron (As per IS 1772-1973 and IS 3543:2010) thick at any point on the rod when measured with an eddy-current device per ASTM E-376.

Threads:

Threads on rods on copper-coated sectional rods shall be of the "roll thread" type, and shall conform the rod electrode 40mm.

2. Test:

Adhesion Test:

The length of the rod with one end cut to a 45 degree point shall be driven between two steel clamping plates, or the jaws of a vise set 0.04 inch less than the diameter of the rod, so as to shear off sufficient metal to expose the bond between the jacket and rod. Peeling of the jacket by the steel plates or the jaw of the vise is acceptable, but there shall be no other evidence of separation of the jacket from the steel core.

Bend Test:

There shall be no evidence of cracking of the jacket if at room temperature a length of the rod is rigidly held in a clamp or vise and the free end bent by applying a force normal to the rod at a distance from the clamping device equal to 40 times the rod diameter. The magnitude of the force and the direction of application shall be such that the rod is permanently bent through a 30-degree angle without failure of the copper coating.

Surface Evaluation:

The surface of the ground rod, including point and chamfer ends, shall be smooth and uniform and free from blisters, pitting, slivers, peeling, flaking and other types of sharp projections as safety criteria. There shall also be no evidence of cracking of the coating.

3. Packaging:



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Rods shall be packaged in sub-bundles of five (5) rods, and master bundles shall be secured with metal banding. Master bundles shall consist of five (5) sub-bundles of 5 rods producing a master bundle of twenty five (25) rods.

4. Specification of Copper Coated Earthing Rod

The Copper Coated Earthing Rod should comply IEC 62561-4, IS 3043:2010 and IS 1772:1973 with latest amendments or any other standard conforming to IS. **And suitable provision for earthing rod so that it must be attached with earthing wire may be use of clamp/ nuts and bolts and shoe clamp/ terminal clamp whichever appropriate and can be easily installed at site.**

RATINGS AND FEATURES

Earth Rod Specification

Material: MS Copper Coating
Diameter: 19mm
Length: 6 ft
Width of Coating: minimum 50 micron(AS per IS 1772-1973 and IS 3043:2010)
Thread length: 40 mm
Cone: 13mm



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5. Inspection and Testing

The Supplier must provide sample of copper coated earthing rod prior to dispatch for confirmation of Quality as per NEA standard and after obtaining confirmation whole consignment should be supplied within delivery period time.

6. Manufacturer's Authorization

The manufacturer shall be an ISO certified company and should have manufactured copper coated earthing rod.

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7. Standard and Specifications of Copper Coated Earthing Rod:

The Bidder shall provide with the Bid one (1) clear copies of all standards governing manufacture and testing standards offered.

- a. Manufacturer
- b. Place of manufacturing
- c. Brand Name
- d. Standard

S.NO	Description	NEA Requirement	
1	Manufacture and Country of Origin		
2	Catalogue Number		
3	Model Number		
4	Material	MS /Carbon Steel and Copper Coating	
5	Length	3000	
6	Diameter	19mm	
7	Width of Coating	As Per IS 1772:1973 (Not less 50 microns)	
8	Thread Length	40mm	
9	Cone	13mm	
10	Applicable Standard	IS 9901, IEC 62561-4, IS 1772:1973 or Equivalent	
11	Standard Document attached or not	Yes	
12	Equivalent Standard If applicable Only	Yes/NO	



Technical Specification

1. Scope

- 1.1. This specification covers the design, manufacture, testing, supply and delivery of hardware and accessories of rated voltage up to and including 1100V Aerial Bundled Cable (ABC) having XLPE insulated, stranded compact circular aluminium conductor twisted over an XLPE insulated aluminium alloy neutral cum messenger wire for use as overhead distribution feeders suitable for use on 3-phase AC System.
- 1.2. It is not the intent to specify completely herein all the details of design and construction of the Hardware and Accessories of rated voltage up to and including 1100V Aerial Bundled Cable. However, the offered goods shall confirm in all respects to high standards of engineering design and workmanship and shall be capable of performing continuous commercial operation in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e., not in accordance with the specifications.

2. Climatic Conditions and System Particulars

- 2.1 The Hardware and Accessories of Low Voltage Aerial Bundled Conductor shall be suitable for use within Nepal and the climatic conditions are:

a) Annual Average Ambient Temperature	25°C
b) Maximum ambient temperature	55°C
c) Minimum ambient temperature	-5°C
d) Relative humidity	10 to 100%
e) Average rainfall per annum	2,000 mm
f) Maximum height above the sea level	2,000 m
g) Maximum wind pressure and wind speed	150 kg/m ² / 50 m/sec
h) Average number of thunderstorm	50
i) Average number of frost days per annum	100

- 2.2 The hardware and accessories shall work satisfactorily in the system with the following particulars:

a. Nominal System Voltage	1000 V
b. Highest System Voltage	1100 V
c. System Frequency	50 Hz with 3% tolerance
d. Number of phases	3
e. Neutral Earthing	Effectively grounded.

3. Applicable Standards

- 3.1 The design, manufacture and test requirements of the Hardware and Accessories of Low Voltage Aerial Bundled Cable shall confirm to the following international standards.

I	NFC 33-020	Insulated Cables and their Accessories for Power Systems - Insulation Piercing Branch Connectors for Overhead Distributions and Services with Bundle Assembled Cores of Rated Voltage 0.6/1 kV



2	NFC 33-021	Insulated Cables and their Accessories for Power Systems - Pre-Insulated Compression Type Connecting Equipment for Overhead Distributions and Services with Bundle Assembled Cores of Rated Voltage 0.6/1 kV
3	NFC 33-040	Insulated Cables and their Accessories for Power Systems - Suspension Equipment for Overhead Distribution with Bundle Assembled Cores of Rated Voltage 0.6/1 kV
4	NFC 33-041	Insulated Cables and their Accessories for Power Systems - Anchoring Devices for Overhead Distribution with Bundle Assembled Cores of Rated Voltage 0.6/1 kV
5	EN 50483	Test Requirements for Low Voltage Aerial Bunched Cable Accessories

- 3.2 The hardware and accessories shall be compatible with the cables sizes & dimensions as defined in the **CONDUCTOR AND INSULATOR DATA** for the cables with which they are intended to be used.
- 3.3 The manufacturer of hardware and accessories shall possess a valid ISO 9001:2015 Quality Management System Certificate with design and manufacturing in scope of certification for the plant where manufacture is done. A copy of the certificate shall be submitted along with the bid.
- 3.4 For all hardware and accessories, the type tests as per the NFC or EN standards shall be carried out in an internationally recognized ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF. The Type Test reports shall not be older than five years from the date of bid submission. Copies of the Type Test shall be submitted along with the bid.
- 3.5 For all hardware and accessories, the Factory Acceptance Tests (FAT) shall be carried out by the manufacturer before dispatch in the presence of the Purchaser's representatives. FAT shall be carried out in manufacturer's laboratory provided that the test laboratory is ISO/IEC 17025 certified and accredited to ILAC/IAF. In absence of such accredited laboratory, FAT shall be carried out in an ISO/IEC 17025 certified independent test laboratory accredited to ILAC/IAF at the cost of the Supplier/Manufacturer.

4. Conductor and Insulator Data

- 4.1 The standard sizes and characteristics of the phase and neutral cum messenger shall be as specified in IS 1425 which is procured and used by Nepal Electricity Authority.

1	50 + 1C x 35 sq.mm.
2	25 + 1C x 25 sq.mm.
3	25 x 25 sq.mm.

- 4.2 Since the hardware and accessories are to be used with insulated neutral-cum-messenger, their design should incorporate specific features to prevent damage to the insulation which shall meet the electrical, mechanical & thermal requirements.
- 4.3 All mechanical, electrical & thermal ratings of hardware and accessories shall meet or exceed 90% of the corresponding ratings of the cable, or the values specified herein, whichever are more stringent.



- 4.4 The hardware and accessories shall provide "Double Insulation" so that a single point failure of insulation shall not result in the system tripping.

5. General Requirements

- 5.1 The specifications mentioned are indicative only. The bidder shall furnish the dimensional details for each accessory supported by brochures, manuals etc. of its standard product.

SN	Description	Application
1	Suspension Assembly for Insulated Neutral Cum Messenger (SA)	For supporting a length of ABC at an intermediate pole in a length, with small angle of deviation.
2	Anchoring Assembly for Insulated Neutral Cum Messenger (AA)	For fitting onto a pole for anchoring the end of a length of ABC, or for a major change in direction.
3	Straight Through Joints	For joining end to end of phase and neutral messenger of ABC.
4	Cable End Caps	To protect the phase and neutral messenger of ABC from moisture.
5	Insulation Piercing Connector	To provide service connection.

5.2 Materials

Materials used in the manufacture of accessories by this specification shall be:

- Of adequate strength for the intended application of the accessories and free from any defects that impair performance.
- Compatible with cable materials such that there is no detrimental effect on the cable or the accessories because of their association.
- Compatible with the physical and electrical requirements of this specification and retain these characteristics during the normal life of the accessories whilst in an outdoor environment.

5.3 Protection against corrosion and UV radiation

All ferrous parts of the accessories shall be hot dip galvanized (heavy duty) in accordance with the applicable standards.

All components of the accessories shall be manufactured from ultraviolet stabilized material. Details of the offered material shall be submitted.

6. Specific Requirements

6.1 Suspension Assembly for Insulated Neutral cum Messenger (SA)

It is required for supporting a length of ABC at an intermediate pole in a length, with small angle of deviation.



It shall consist of one suspension clamp, one aluminum alloy pole bracket, one 16x300 mm fully galvanized steel bolt/pigtail for fixing the pole brackets.

6.1.1 Technical Requirement of Suspension Assembly (SA)

Suspension Assembly is used for supporting an ABC by installation on the messenger at an intermediate point of support such as a pole. It can accommodate small angles of deviation up to 30°.

Each Suspension Assembly shall consist of one number suspension bracket, one number moveable (articulated) connecting link and one number suspension clamp. Suspension Assemblies shall be supplied in sets to ensure compatibility of the materials against corrosion or wear of rotating/moving parts.

The clamp shall be designed to hang LT AB cable with insulated neutral messengers and shall conform to standard NFC 33 040 or EN standards. The neutral messengers shall be fixed by an adjustable grip device. A moveable link shall allow longitudinal and transversal movement of the clamp body. There shall not be any loose part in the process of clamping arrangement.

The clamp and the link made of polymer shall provide additional insulation between the cable and the pole. The clamps and moveable links shall be made of weather and UV resistant glass fiber reinforced polymer.

Clamps shall be fixed with pole by hook / hooks. The bracket shall be made of corrosion resistant aluminum alloy. Ultimate tensile strength of the clamp shall not be less than 15 kN for 70-95 sq.mm insulated messenger wire and 12 kN for 25-34 sq.mm insulated messenger wire.

Maximum allowable load of the clamp should not be less than 20kN for 70-95 sq.mm. insulated messenger wire and 15kN for 25-35 sq.mm insulated messenger wire.

6.1.2 Suspension Bracket of Suspension Assembly (SA)

The suspension bracket shall be made from single piece aluminum alloy suitable for attachment to pole by 16 mm galvanized steel bolt(s).

The suspension bracket shall be provided with an upper bulge to prevent the clamp from turning over on the bracket for more than 45° from the horizontal or within less than 60 mm from the pole / fixing structure.

The suspension bracket should be designed to ensure that the articulated link cannot slip out of it.

Suspension brackets shall be designed to withstand a load applied at the anchoring point of the moveable link as per table below without deformation of more than 10 mm or breakdown at 33° below horizontal (there should be no longitudinal component of load parallel to the plane of fixing).

Conductor Size		Normal rating (kg)	Load (N)
Area (sq.mm.)	Diameter (mm)		
25-35	8-11	1,500	12,000



70-95	13-17	2,000	15,000

6.1.3 Movable (Articulated) Link of Suspension Assembly (SA)

Movable links are used between the suspension bracket and suspension clamp to allow a degree of movement and flexibility between the two.

Movable links shall be made fully of insulating type of mechanical and weather resistant thermoplastic. A metallic wear resistant ring shall however be fitted at the point of contact between the suspension bracket and the movable link.

The movable link shall be unloosably fitted to the Bracket and the Clamp.

6.1.4 Suspension Clamp of Suspension Assembly (SA)

Suspension clamps are used for locking the messenger of the 100 sq. mm bundle without damaging the insulation or allowing the messenger to become dismounted from the fitting.

The suspension clamp shall accommodate messenger with cross section 20 to 95 sq. mm.

The suspension clamp shall be made fully of insulating type of mechanically strong and weather resistant plastic. There shall be no metal parts inside the clamp. Bolts shall not be used for clamping/locking the messenger in the clamp. There shall be no loosable parts in the suspension clamp. The suspension clamp shall be unloosably fitted to the rest of the suspension assembly.

6.1.5 Drawing

The bidder shall furnish complete drawing of the assemblies together with hardware fittings all complete along with the bid.

6.1.6 Marking of Suspension Assembly (SA)

Each clamp shall be legibly and indelibly marked to show the following.

- Name & Trademark of the manufacturer
- Month & Year of manufacturing
- Minimum Failing Load (in kN)
- Contract No" marking.

6.1.7 Testing Requirements of Suspension Assembly (SA)

The following tests as per NFC 33-040 are intended to establish performance characteristics of suspension assembly:

SN	Test	Type Test	Acceptance Test	Routine Test
1	Visual	☒	☒	☒
2	Dimensional	☒	☒	☒
3	Mechanical and Slip Strength Test	☒	☒	☒



4	Mechanical Strength of Bracket & SS Strap with Buckle	☑	☑	☑
5	Voltage Test	☑	☑	
6	Corrosion Test	☑		
7	Climate Ageing Test	☑		

6.2 Anchoring Assembly for Insulated Neutral wire Messenger (A3)

It is used for fitting onto a pole for anchoring the end of a length of ABC, or for a major change in direction.

It shall consist of one wedge type anchoring clamp, one aluminum alloy pole bracket, and one 16x300 mm fully galvanized steel bolt/pigtail for fixing the pole brackets.

6.2.1 Technical Requirement of Anchoring Assembly (AA)

Anchoring assemblies are used to firmly attach the messenger of ABC to a support and transmit the mechanical tension at the end of a run or to the supporting structures and at a major change in direction. The anchoring assembly shall conform to the standard NFC 33041.

The clamps should be designed to anchor LT/AB cable with insulated messenger. The clamp body shall consist of corrosion resistant aluminum alloy, ball of stainless steel and self-adjusting weather and UV resistant polymer wedges which shall anchor/hold the neutral messenger without damaging the insulation. There shall not be any losable part in the process of clamping arrangement.

Ultimate tensile strength of the clamps shall not be less than 15kN for 70-95 sq.mm insulated messenger and 10kN for 25-35 sq.mm insulated messenger wire.

Each anchoring assembly shall include one number tension bracket, one number wedge type tension clamp and flexible rope for fixing tension clamp to bracket.

Anchoring assemblies shall be supplied in sets to ensure compatibility of the materials against corrosion or wear of moving parts.

6.2.2 Tension Bracket of Anchoring Assembly (AA)

The tension bracket shall be made of a single piece of Aluminum alloy suitable for attachment to a pole by 16 mm galvanized steel bolt.

The tension bracket should be designed to ensure the flexible rope cannot slip out at any angle.

The tension bracket should be rated and tested for the loads specified in the table below. The load shall be applied at an angle of 45° from the normal to the surface of mounting of the bracket.

Conductor Size (sq.mm.)	Rating	Load for deformation <10mm (Newton)	Load for deformation <30mm & no-break (Newton)



25-35	1500 kg	12,000	15,000
70-95	2000 kg	15,000	20,000

6.2.3 Flexible Rope of Anchoring Assembly (AA)

The Anchoring assembly shall be supplied with a stainless-steel flexible rope to connect the tension clamp to the tension bracket. The rope should have sufficient flexibility to ease the torsional movement of the ABC System. The rope should be pre-fitted with compression type end fittings to secure the tension clamp.

A wear resistant moveable saddle should be unlosably fitted on the rope to prevent abrasion at the point of fitting into the tension bracket.

The rope should have sufficient mechanical strength to withstand the mechanical test for the complete assembly tests in this specification.

6.2.4 Wedge Type Tension Clamp of Anchoring Assembly (AA)

Wedge type clamps shall be used for clamping the messenger without damaging the insulation. The clamp shall be capable of clamping an insulator messenger so that it can continue without breaking to the connecting point of next span. The clamp shall be fully insulating type of mechanical and weather resisting thermoplastic.

No bolts or loose parts are allowed as part of the Clamping system. No tools shall be needed for fitting the messenger into the clamp.

The clamp shall be self-tightening and capable of holding without slippage the load specified in the table below.

Conductor Size		Weight (kg)	T start (1 minute) (Newton)	T final (1 minute) (Newton)
Area (sq mm.)	Dia. (mm)			
25-35	8	1,000	8,000	10,000
50-54	12	1,500	12,000	15,000
70-95	13-16	2,000	16,000	20,000

After fitting the insulated messenger in the clamp, load T start will be held for 1 minute and then load increased to T final at rate between 5000 $\pm$ 7,500 N/m. In each case there shall be no breakdown of any part of clamp and slippage of messenger in relation to the clamp.

6.2.5 Drawing of Anchoring Assembly (AA)

The bidder shall furnish the outline drawing of the assemblies together with hardware fittings all complete along with the bid.

6.2.6 Marking of Anchoring Assembly (AA)

Each clamp shall be legibly and indelibly marked to show the following.

- Name & Trademark of the manufacturer
- Month & Year of manufacturing
- Minimum Failing Load (in kN)



- "Contract No" marking.

6.2.7 Testing Requirements of Anchoring Assembly (AA)

The following tests as per NFC 33 041 are intended to establish performance characteristics of anchoring assembly and categorized:

SN	Test	Type Test	Acceptance Test	Routine Test
1	Visual		☒	☒
2	Dimensional	☒	☒	☒
3	Mechanical and Slip Strength Test	☒	☒	☒
4	Mechanical Strength of Bracket & SS Strap with Huckle	☒	☒	☒
5	Voltage Test	☒	☒	
6	Corrosion Test	☒		
7	Climatic Ageing Test	☒		

6.3 Insulation Piercing Connectors (IPC)

Insulation Piercing Connectors (IPC) are used for making service connections from an ABC Overhead Line.

Insulation Piercing Connectors are designed to make a connection between the uncut main conductor and a branch cable conductor without having to strip either cable to expose the conductor instead the tightening action of the IPC will first pierce the insulation, then make good electrical contact between the main end and branch conductor while simultaneously insulating and sealing the connection.

6.3.1 Constructional Features of Insulation Piercing Connector (IPC)

The housing shall be made entirely of mechanical and weather resistant plastic insulation material and no metallic part outside the housing is acceptable except for the tightening bolt.

Any metallic part that is exposed must not be capable of carrying potential during connector installation.

Screws or nuts assigned for fitting with IPC must be fitted with torque limiting shear heads to prevent over tightening or under tightening (min & max torque values to be specified by Manufacturer).

The IPC shall be waterproof, and the water tightness shall be ensured by appropriate elastomer materials and not by grease, gel or paste alone.

The design of IPC shall be such as to not cause damage to insulation of adjacent conductors due to vibration and relative movement during service.



The connector shall have a rigid removable end cap which can be slid fitted onto the main connector body on either right or left by the installer (depending on site requirement) for sealing the cut end of the branch cable. Once the connector is fitted, it should not be possible to remove the cap without removing the connector.

All the metallic parts of the connector shall be corrosion resistant and there shall not be any appreciable change in contact resistance & temperature after overloads & load cycling.

- The contact plates shall be made of tinned copper/aluminium alloy.
- Connector teeth shall be factory greased & sealed to retard water or moisture ingress & corrosion.
- The insulation material shall be made of weather & UV resistant reinforced polymer.
- The outer metallic part shall have potential free tightening bolts to allow safe installation on live lines.

6.3.2 Mechanical Tightening and Electrical Continuity of Insulation Piercing Connector (IPC)

Connectors shall be tightened up to 70% of the maximum torque indicated by the Manufacturer. At this torque electrical contact should have occurred between conductors to be joined. Then connectors shall be tightened up to the breakdown of the shear heads and lastly, up to 1.5 times the maximum torque indicated by the manufacturer.

For the connector fitted with two screws in the same core, after the breakdown of the shear heads tightening may be continued manually and alternatively using a torque meter. The test condition shall be as close as possible to those defined for the use of the test machine as per the applicable standard.

At 1.5 times the maximum torque indicated by the manufacturer, there shall be no breakdown of any part of the connector or the core conductor.

Maximum rated torque shall not exceed 20 Nm for conductor <95 sq.mm and 30 Nm for >95 sq.mm.

Tightening screws shall have hexagonal heads of 10 mm, 13 mm, or 17 mm only.

6.3.3 Drawing of Insulation Piercing Connector (IPC)

Bidder shall furnish the outline drawing of the assemblies together with hardware fittings all complete along with the bid.

6.3.4 Marking of Insulation Piercing Connector (IPC)

Each IPC shall be legibly and indelibly marked to show the following:

- Name & Trademark of the manufacturer
- Month & Year of manufacturing
- Breaking Torque
- Cable Size
- "Contract No" marking



6.3.5 Testing Requirements of Insulation Piercing Connector (IPC)

The following tests as per NFC 33 020 are intended to establish performance characteristics of anchoring assembly and categorized:

SN	Test	Type Test	Acceptance Test	Routine Test
1	Visual		☒	☒
2	Dimensional	☒	☒	☒
3	Mechanical Tightening Test	☒	☒	☒
4	Effect of Tightening on Main Core	☒	☒	☒
5	Effect of Tightening on Branch Core	☒	☒	☒
6	Dielectric and Water Tightness Test	☒	☒	
7	Electrical and Aging Test	☒		

6.4 Straight-Through Joints

The straight through joint sleeves shall be pre-insulated for phase and neutral messengers.

The sleeves shall be made of aluminum, insulated with an anti-UV black thermoplastic tube hermetically sealed two ends with two flexible wires.

Strip length, hexagonal crimping die reference and size shall be marked on the outer surface of sleeve.

The straight through joint sleeve for phase conductor shall be suitable to connect at the end of one drum of the cable/part of cable (3-phase core) to continue the drawing of the cable from other drum. It shall be end-on in-line straight through joints. The straight through joint shall be supplied with suitable mechanical connector, proper stress control, adequate insulation, and sufficient environmental sealing.

The straight through joint sleeve for neutral/Messenger shall be suitable to connect insulated neutral/Messenger wire at the end of one drum of the cable/part of cable to continue the drawing of the cable from other drum. The joint shall afford the whole load of ABC and shall be designed to have the full end breaking strength of the alloy on which they are fitted. The straight through joint shall be supplied with suitable mechanical connector, proper stress control, adequate insulation, and sufficient environmental sealing.

6.5 Cable End Cap

The insulated end cap with sealant shall be suitable for effectively sealing the end terminal of the Aerial Bunched Cable. The inner diameter range of the cap shall be such that it shall tightly fit to the covered conductors to prevent entry of moisture.

6.6 Sampling Plan for Acceptance Tests



The acceptance tests for the items above are to be carried out as per the sampling plan below. There shall be no failure/defects on the samples selected.

SN	Lot Size	Sample Size
1	Up to 100	2
2	101-500	5
3	501-1500	10
4	1501 above	2%

7. Guaranteed Technical Particulars (GTP)

7.1 GTP of Suspension Assembly (Suspension Clamp with Bracket)

SN	Description	NEA's Requirement
1	Name of Manufacturer	
2	Address of Manufacturer	
3	Country of Origin	
4	Applicable Standards	NFC 33040 or EN standard
5	Product Code	
6	Type of Clamp	Suspension Clamp with bracket
7	Parts of Clamp	1. No. Pigtail with Hexagonal Nut and Washer 1. Suspension Bracket 1. Movable (articulated) connecting link 1. Suspension Clamp
8	Materials	<u>Pigtail:</u> Fully galvanized (Heavy Duty) Pigtail 16x300 mm with Hexagonal Nut and Washer <u>Suspension Bracket:</u> Single Piece Corrosion Resistant Aluminum Alloy <u>Movable Link:</u> Fully Insulating Type mechanical and weather resistant thermoplastic <u>Suspension Clamp:</u> Fully Insulating Type weather resistant plastic
9	Range of messenger size	
10	Type of design	
11	Installation mode	Without Disassembly
12	Ultimate Tensile Strength	25-54 sq. mm 12 kN 70-95 sq. mm 15 kN
13	Minimum Breaking Load	



14	Rated load	25-35 sq. mm 1,500 kg 70-95 sq. mm 2,000 kg	
15	Fixing Method	With 16 mm Fully Galvanized Pigtail	
16	Grade and Size of Steel Bolt		
17	Weight (approx.)		
18	Dimensions		
19	Marking		

7.2 GTP of Anchoring Assembly

SN	Description	NEA's Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards	NFC 33041, NFC 33042 or or EN standards	
5	Product Code		
6	Type of Clamp	Anchoring Clamp with bracket	
7	Parts of Clamp	1 No. Pigtail with Hexagonal Nut and Washer 1 No. Tension Bracket 1 Set Flexible Rope for fixing Tension Clamp to bracket 1 No. Wedge type Tension Clamp	
8	Materials	<u>Pigtail:</u> Fully Galvanized (Heavy Duty) Pigtail 70 sq. mm with Hexagonal Nut and Washer <u>Tension Bracket:</u> Single Piece Corrosion Resistant Aluminium Alloy <u>Wedges:</u> Weather and UV resistant polymer <u>Flexible Rope:</u> Stainless Steel	
9	Range of messenger size		
10	Type of design	Wedge Type	
11	Installation mode	Without Disassembly	
12	Ultimate Tensile Strength	25-35 sq. mm 10 kN 50-70 sq. mm 15 kN	
13	Minimum Breaking Load		
14	Rated Load	25-35 sq. mm 1500 kg 70-95 sq. mm 2000 kg	
15	Fixing Method	With 16 mm Fully Galvanized Pigtail	
16	Grade and Size of Steel Bolt		



17	Weight (approx.)		
18	Dimensions		
19	Marking		

7.3 GTP of Cable Mid-Span Joint

SN	Description	SEA's Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards		
5	Product Code		
6	Range of conductor size		
7	Material		
8	Type of design		
9	Installation		
10	Weight (approx.)		
11	Dimensions		
12	Marking		
13	Voltage withstand under water		

7.4 GTP of Cable End Cap

SN	Description	SEA's Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		
3	Country of Origin		
4	Applicable Standards		
5	Product Code		
6	Range of conductor size		
7	Material		
8	Type of design		
9	Installation		
10	Weight (approx.)		
11	Dimensions		
12	Marking		
13	Voltage withstand under water		

7.5 GTP of Insulating Piercing Connectors

SN	Description	SEA's Requirement	
1	Name of Manufacturer		
2	Address of Manufacturer		



3	Country of Origin		
4	Applicable Standards	NFC 33020 or EN standards	
5	Product Code		
6	Type of Main Connection	16-150 sq.mm.	
7	Type of Branch Connection	2.5-15 sq.mm.	
8	Material of Contact Plates		
9	Material of Insulation	weather & UV resistant reinforced polyester	
10	Is any metallic part carrying potential in operation exposed during installation?	No	
11	Are torque limiting shear heads provided to tightening bolts?	Yes	
12	Min. & Max. torque defined		
13	Torque for establishing connection between main and branch		
14	Max. tensile load for no breakdown of main conductor (for each cross section)		
15	Max. tensile load on branch conductor for no break/slippage		
16	Voltage withstand under water corrosion		
17	Weight (approx.)		
18	Dimensions		
19	Marking		

8. Quality Assurance

- 8.1 The manufacturer shall possess valid ISO 9001:2015 Quality Management System Certificate with design and manufacture in scope of registration for the plant where the manufacture is done. The Bidder shall furnish a copy of the ISO certificate along with the offer.
- 8.2 The manufacturer shall ensure proper quality control for the manufacture of goods. The manufacturer shall submit Manufacture Quality Plan (MQP) along with the offer.
- 8.3 The bidder/manufacturer shall provide detailed Drawings and GTP along with the bid.





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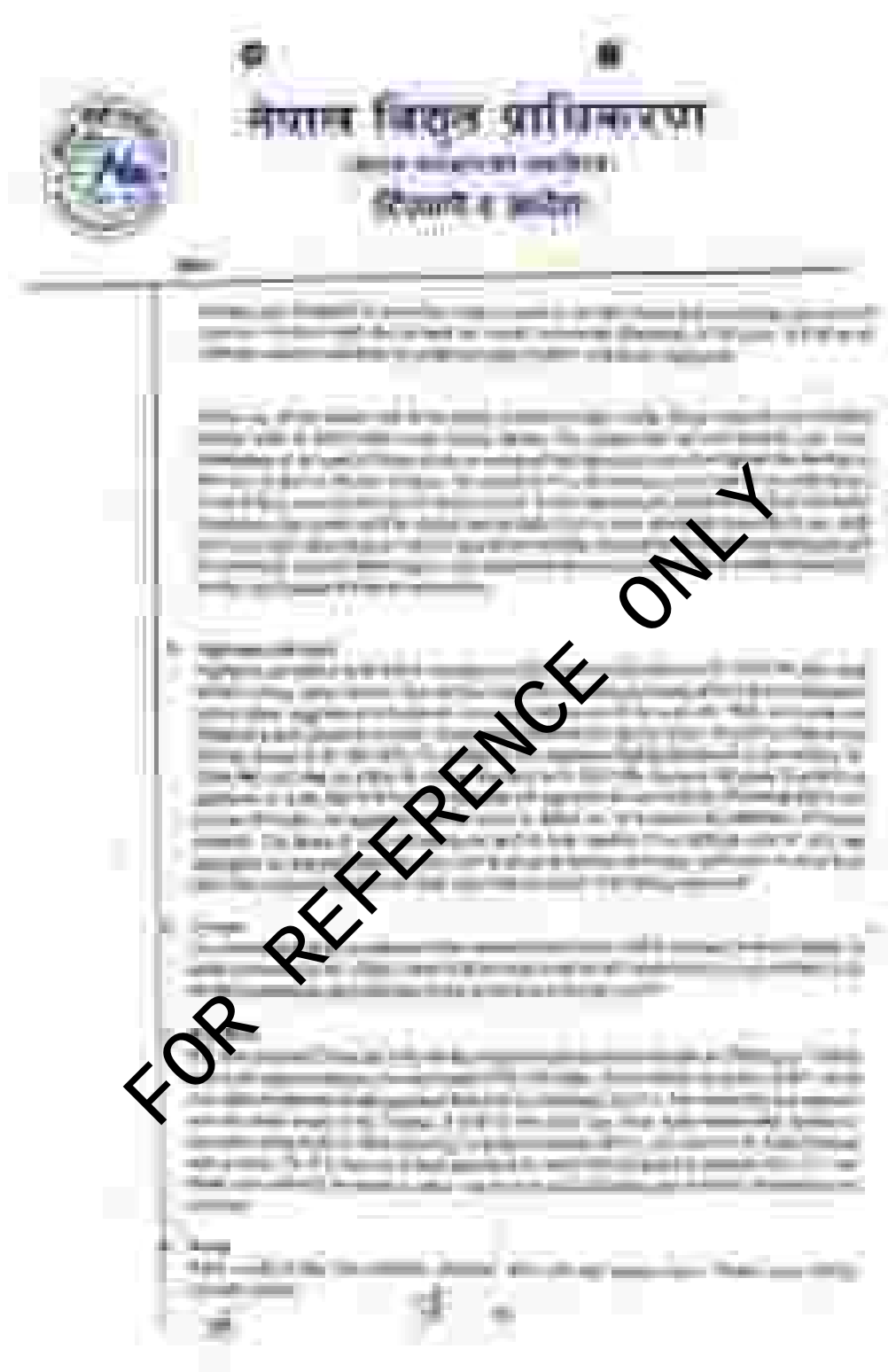
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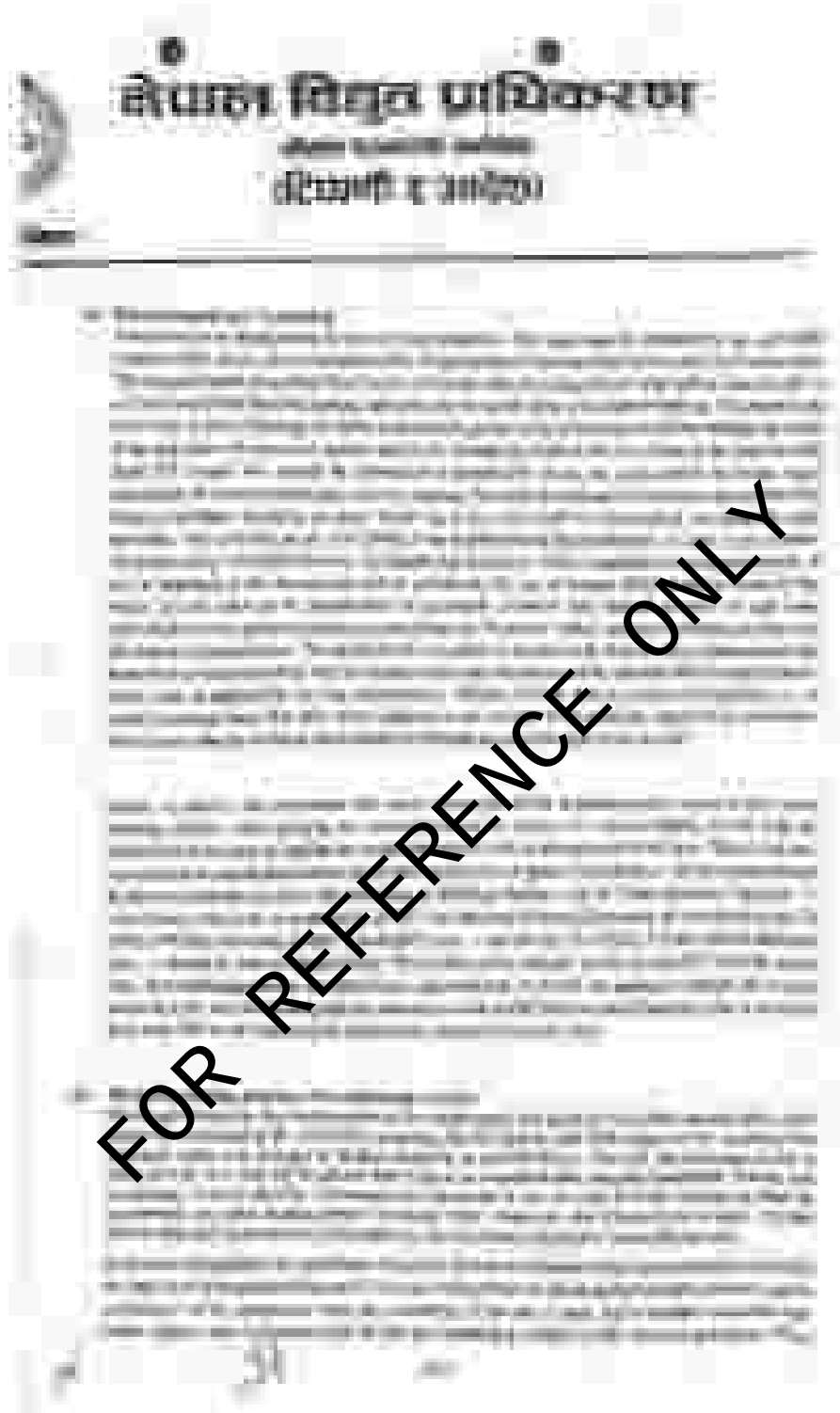


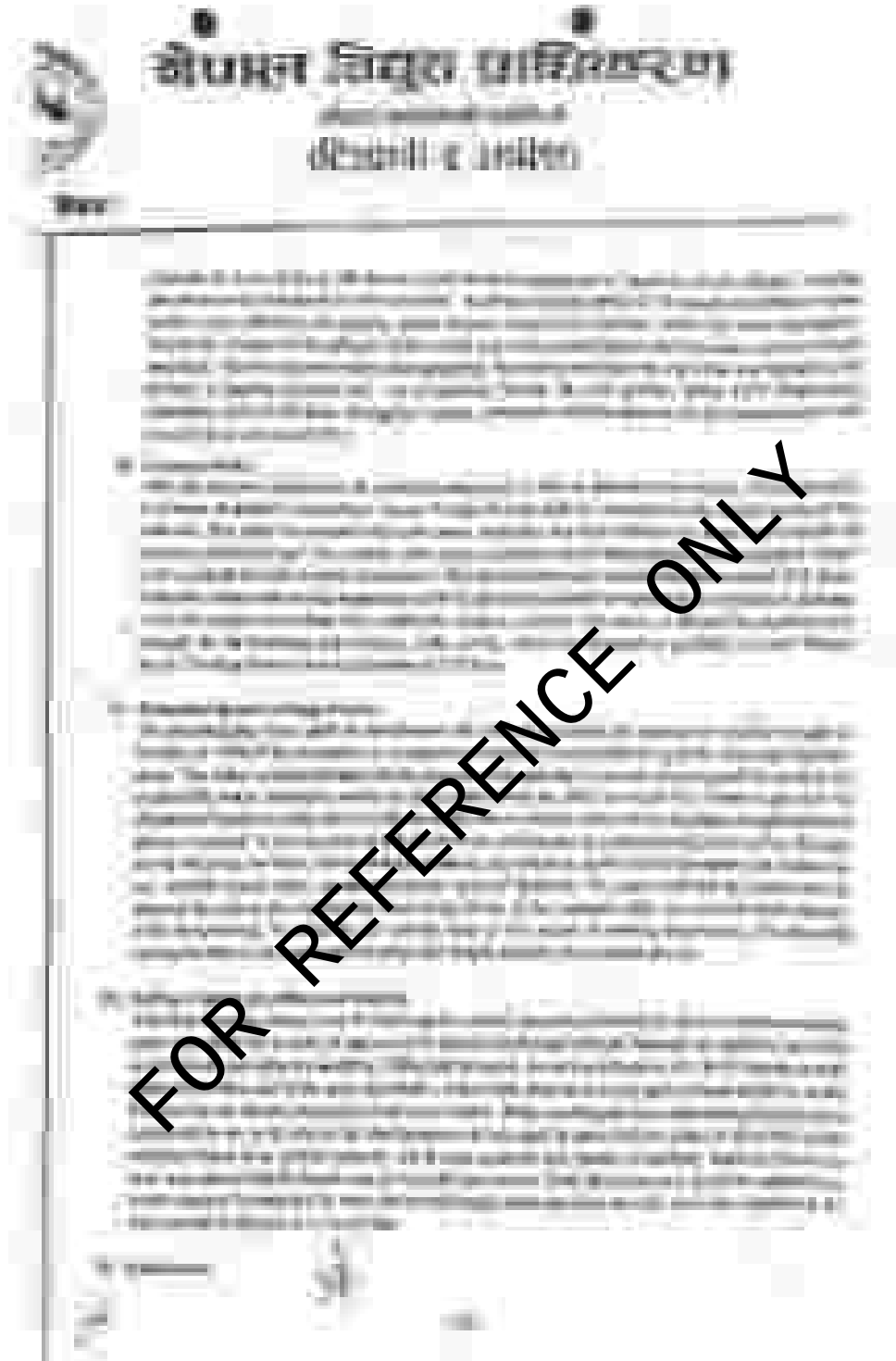


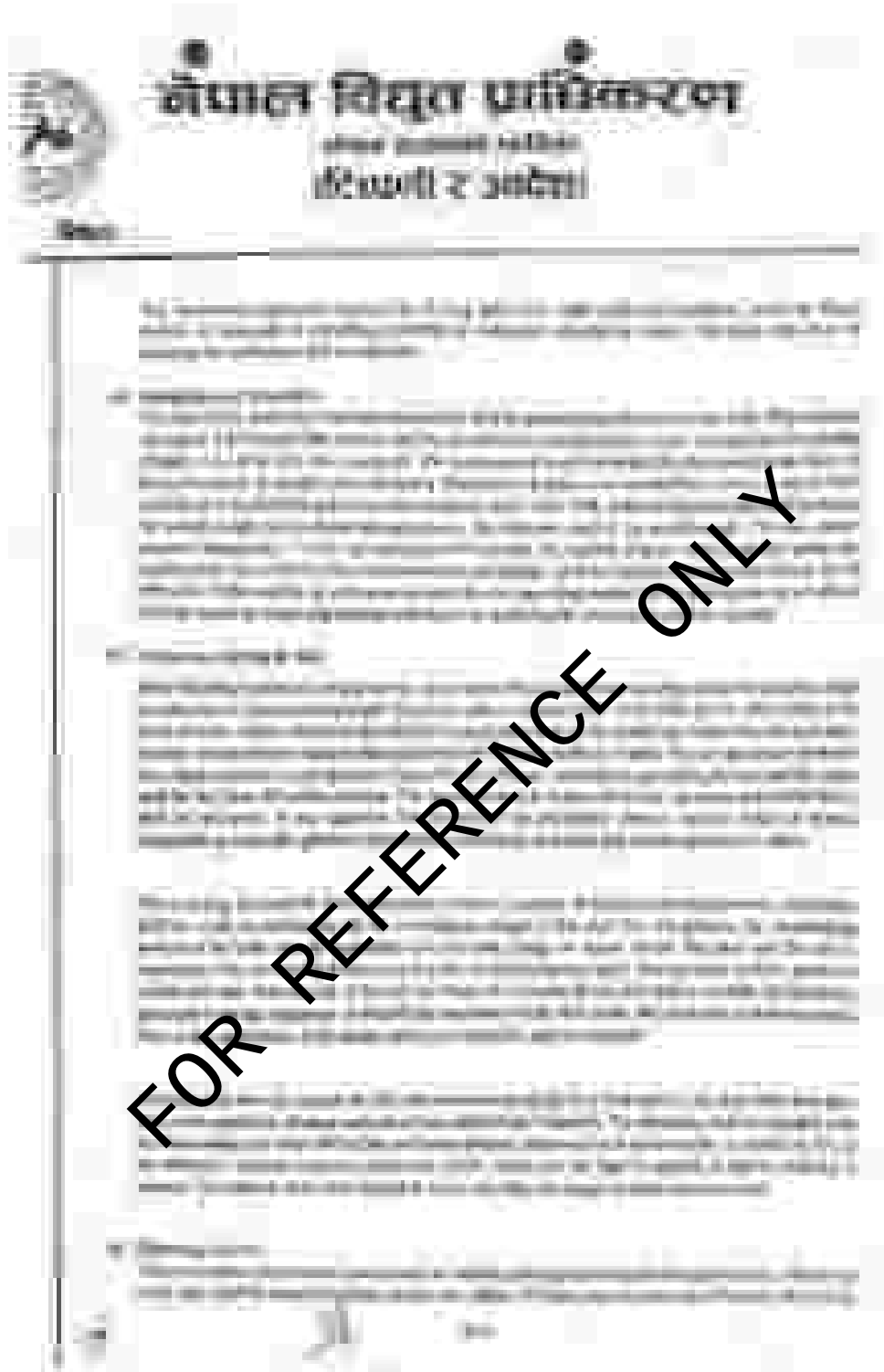
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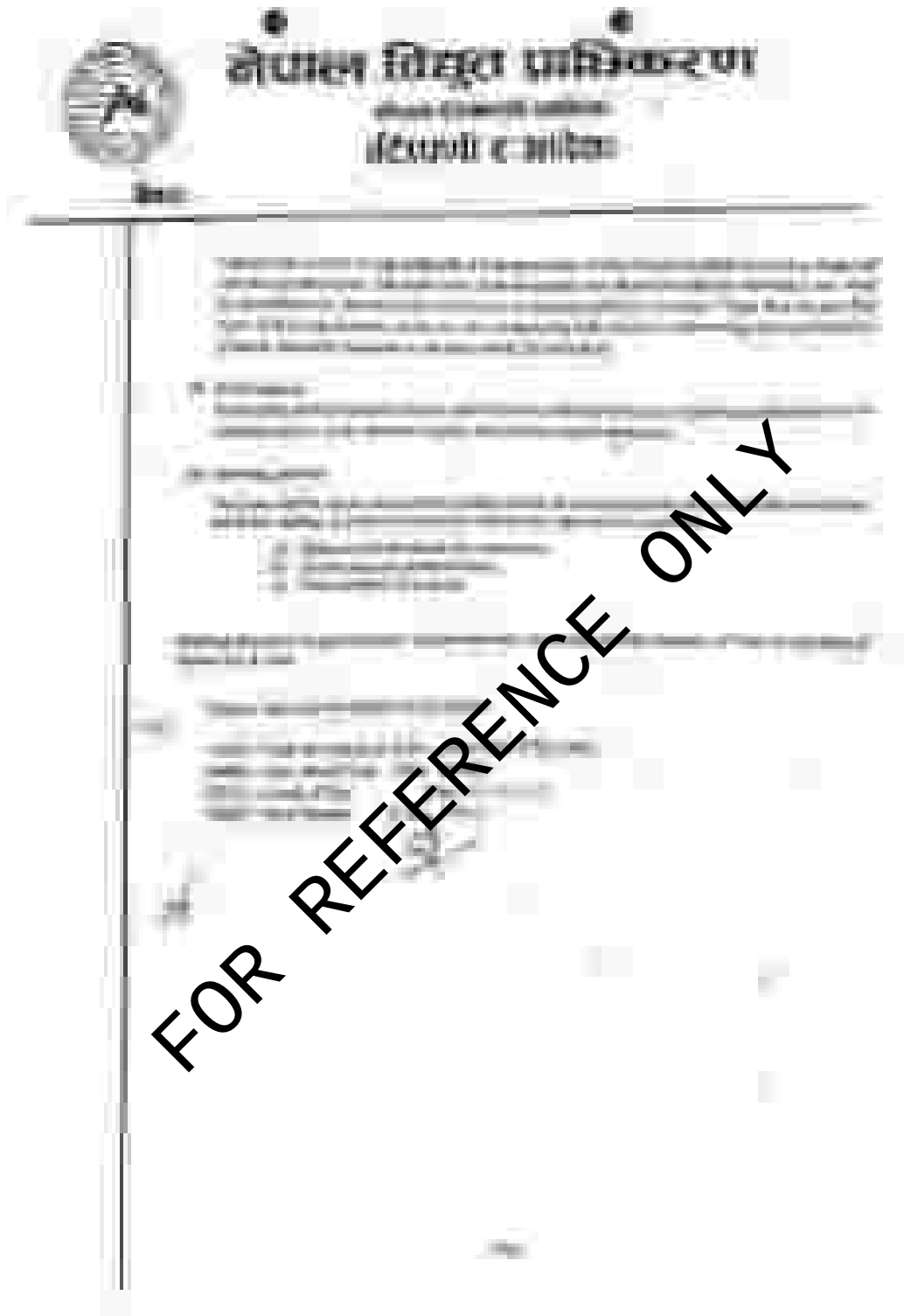
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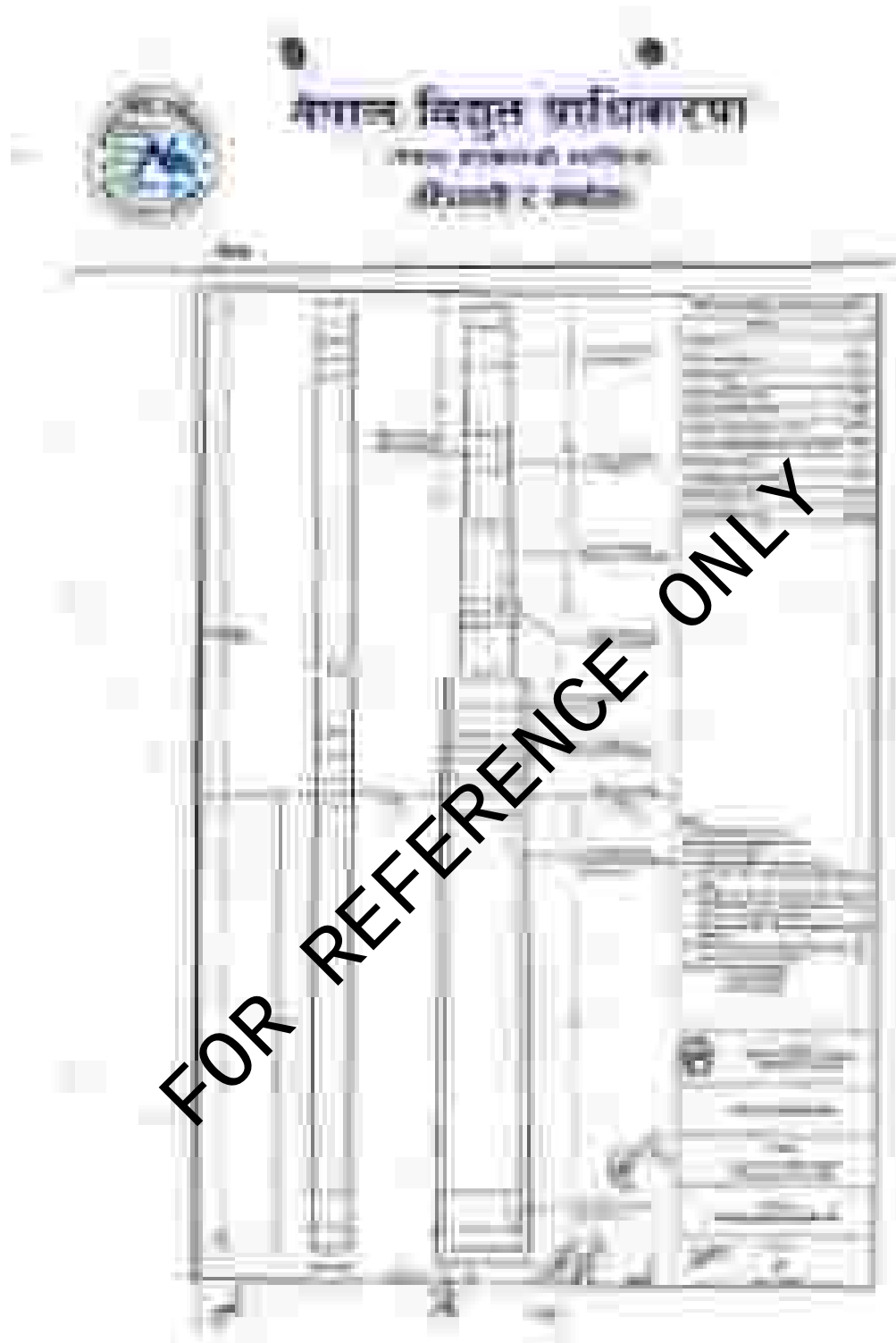


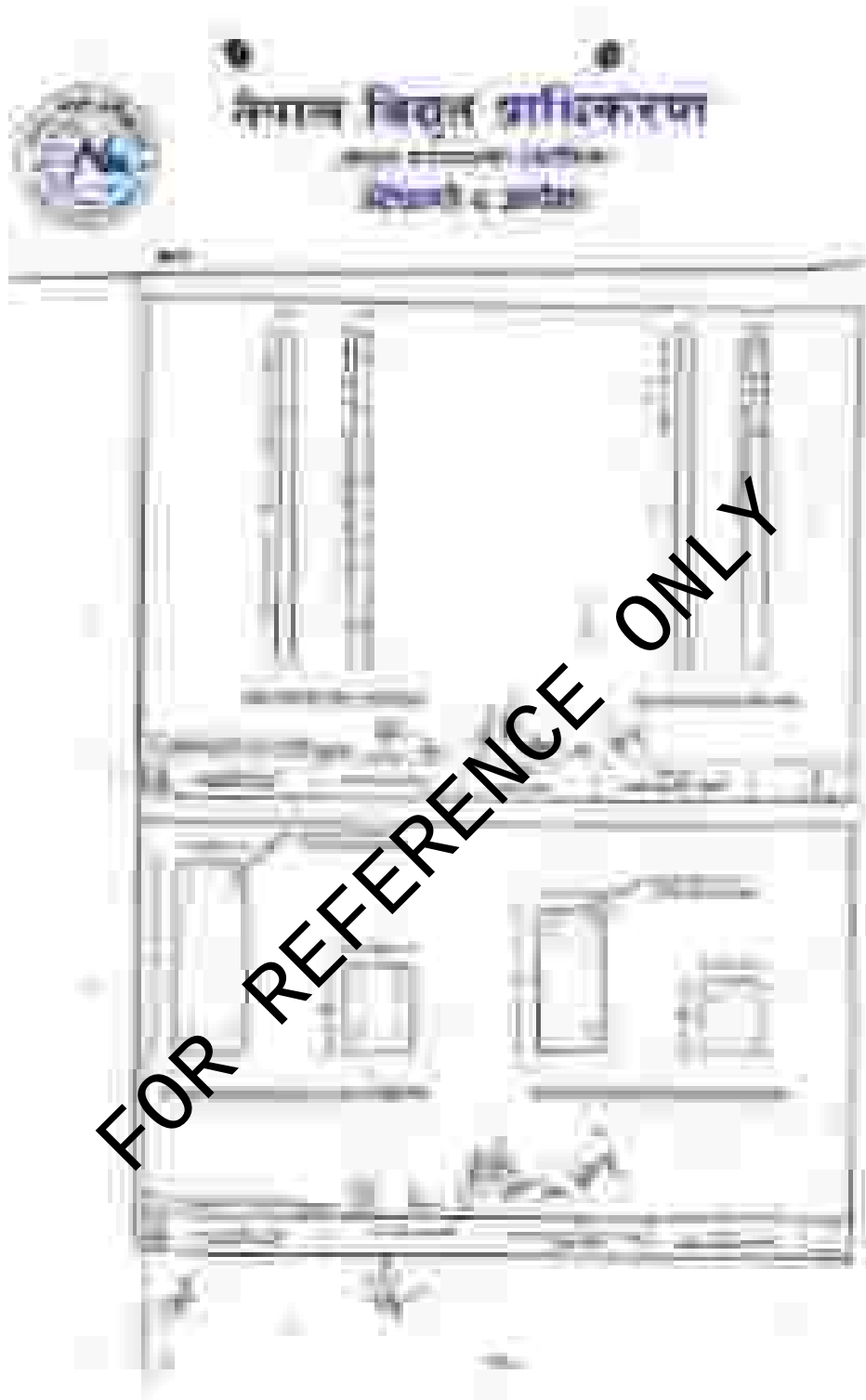












Appendix 12: Specifications for Ducting of Nepal DOORSANCHAR
COMPANY LIMITED (Nepal Telecom)

FOR REFERENCE ONLY



NEPAL INFRASTRUCTURE DEVELOPMENT COMPANY LIMITED
(NIDCL)

FOR REFERENCE ONLY

Specialization

100%

Dividing work

General Notes

1. The Employer shall be responsible for the design and construction of the project. The Contractor shall be responsible for the construction and maintenance of the project.

2. The Contractor shall be responsible for the construction and maintenance of the project.

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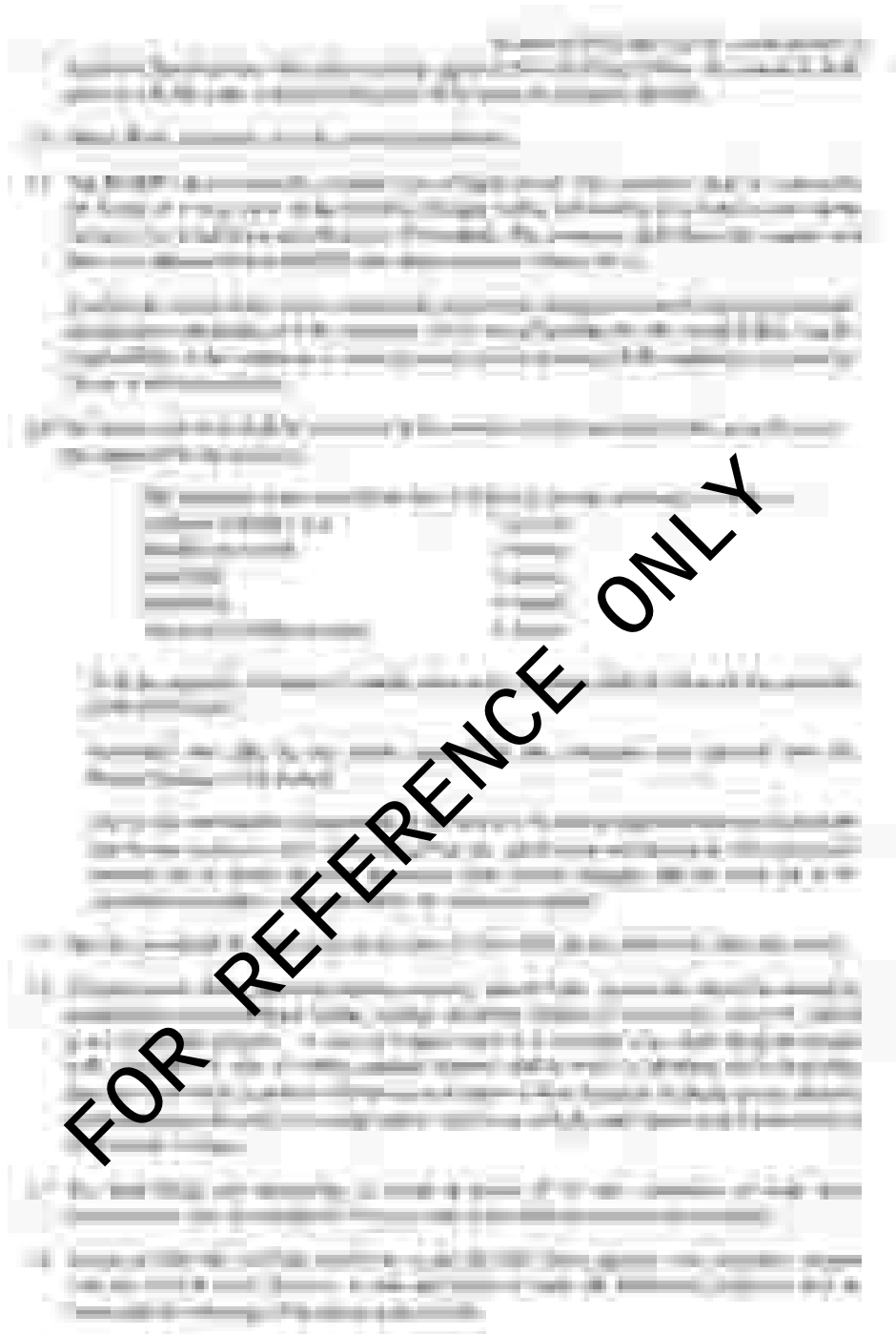
27. The Contractor shall be responsible for the construction and maintenance of the project.

28. The Contractor shall be responsible for the construction and maintenance of the project.

29. The Contractor shall be responsible for the construction and maintenance of the project.

30. The Contractor shall be responsible for the construction and maintenance of the project.

FOR REFERENCE ONLY



1. The Contractor shall be responsible for the design, construction, maintenance and repair of the road works in accordance with the specifications and standards of the Ministry of Transport and the relevant authorities.

2. The Contractor shall be responsible for the safety of the road works and the surrounding area during the construction period.

3. The Contractor shall be responsible for the traffic management and the safety of the road users during the construction period.

4. The Contractor shall be responsible for the environmental protection and the safety of the surrounding area during the construction period.

5. The Contractor shall be responsible for the quality control and the safety of the road works during the construction period.

6. The Contractor shall be responsible for the safety of the road works and the surrounding area during the construction period.

7. The Contractor shall be responsible for the traffic management and the safety of the road users during the construction period.

8. The Contractor shall be responsible for the environmental protection and the safety of the surrounding area during the construction period.

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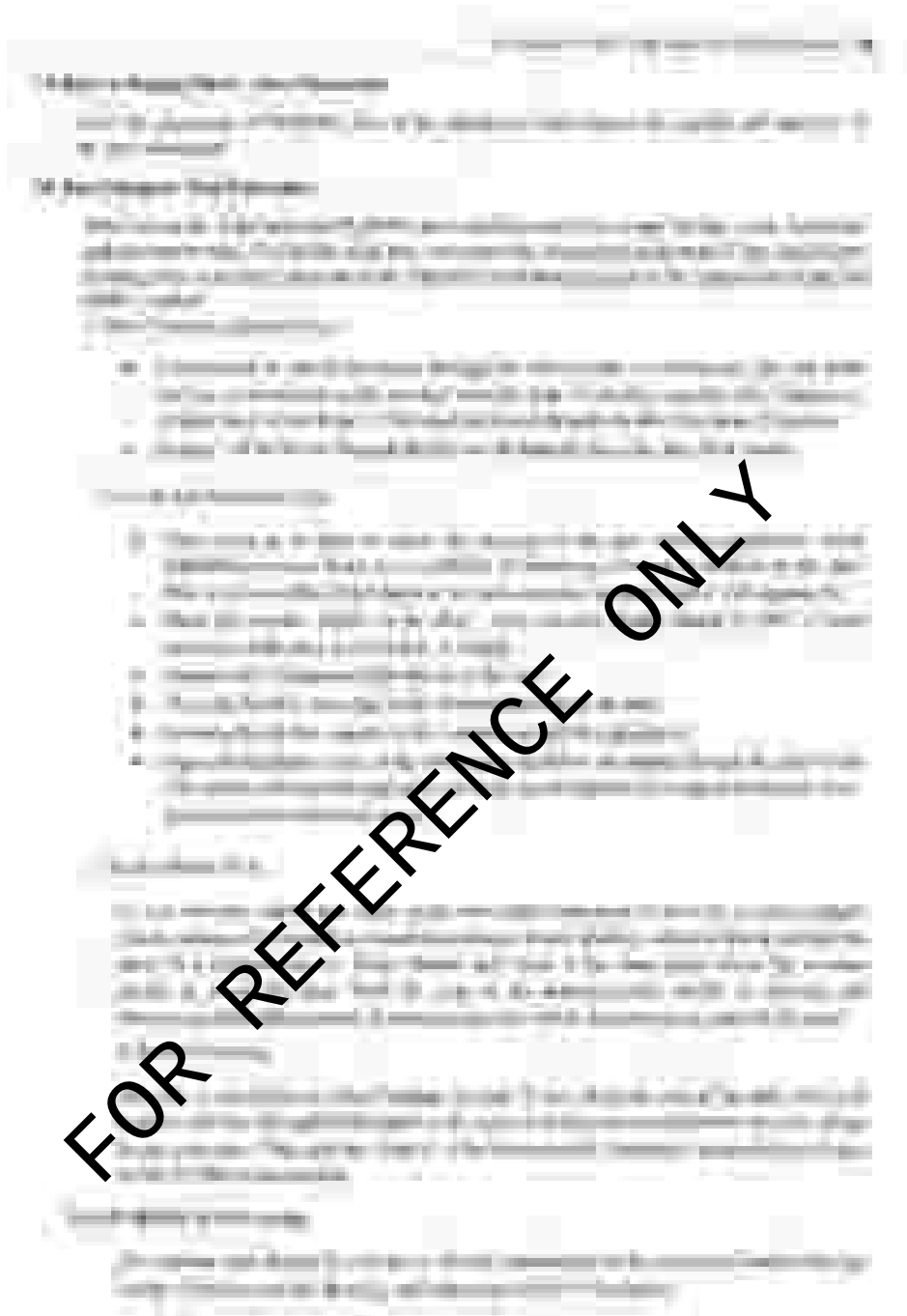
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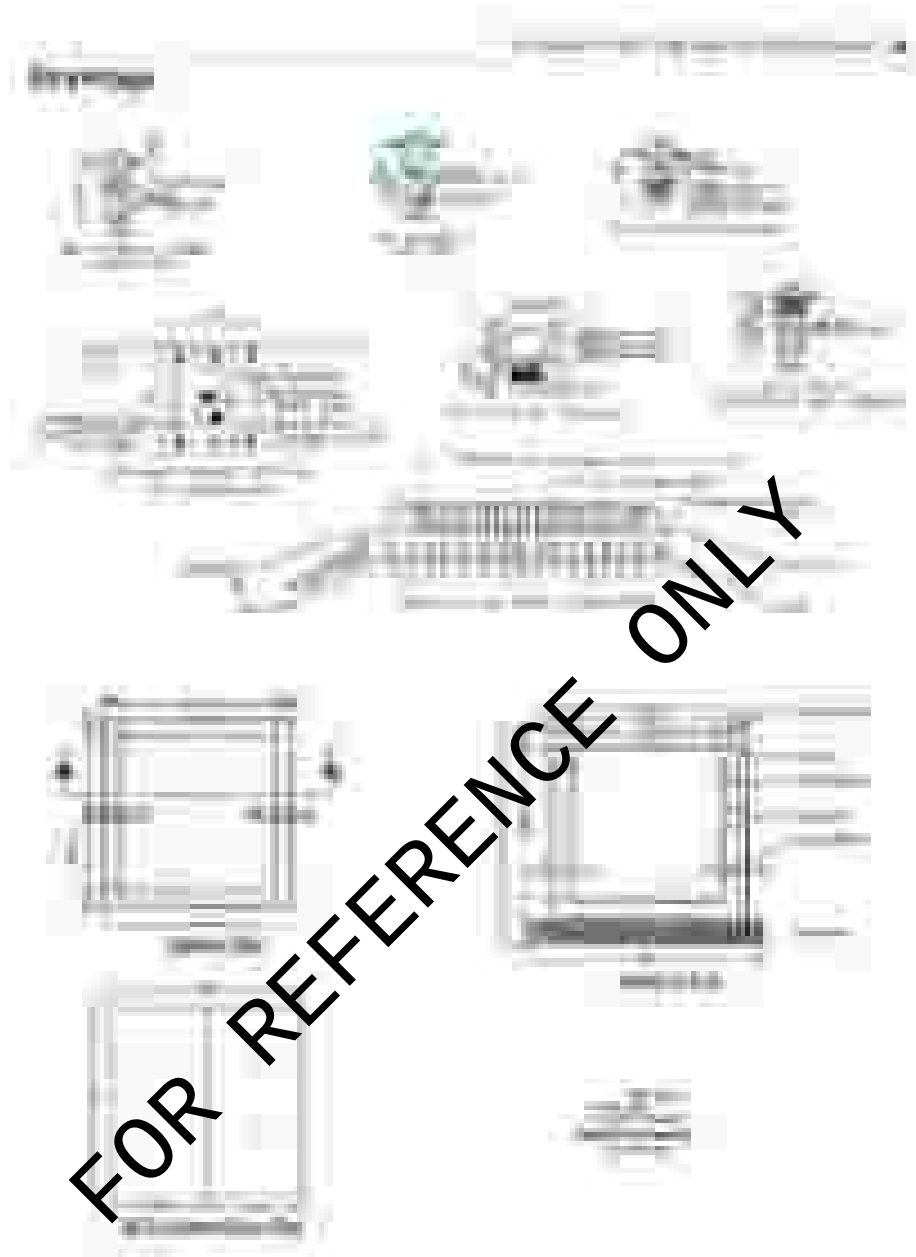
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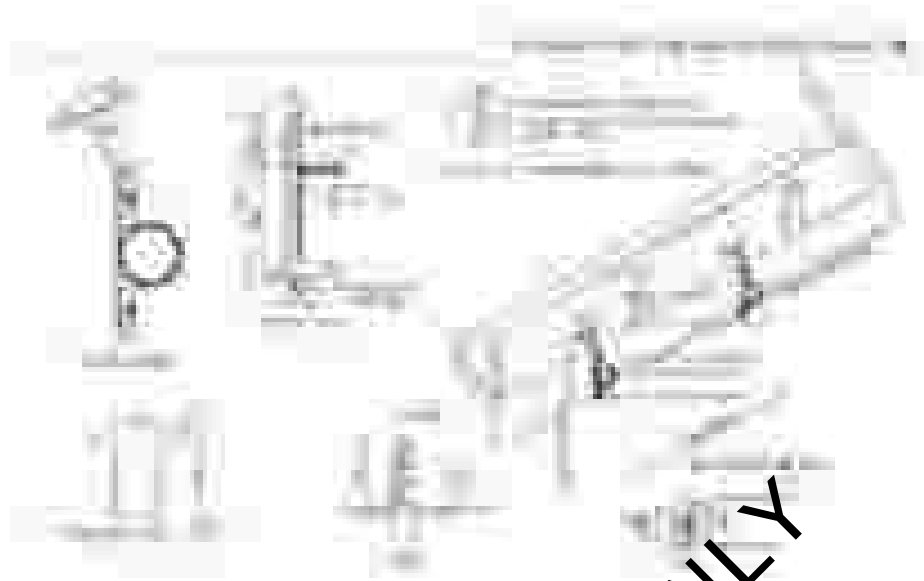
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FOR REFERENCE ONLY



FOR REFERENCE ONLY



FOR REFERENCE ONLY

Section 6C – Environmental, Health and Safety Management Requirement

A satisfactory code of conduct will contain obligations on all Contractor's Personnel (including subcontractors and day workers) that are suitable to address the following issues, as a minimum.

Additional obligations may be added to respond to particular concerns of the region, the location and the project sector or to specific project requirements. The code of conduct shall contain a statement that the term "child" / "children" means any person(s) under the age of 18 years.

The issues to be addressed include:

- (i) Compliance with applicable laws, rules, and regulations
- (ii) Compliance with applicable health and safety requirements to protect the local community (including vulnerable and disadvantaged groups), the Employer's Personnel, and the Contractor's Personnel (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment). The successful bidder shall comply with the guidelines such as applicable Environmental Acts & Regulations, ESMF, and OCCUPATIONAL AND COMMUNITY HEALTH & SAFETY GUIDELINE, etc. stated in ACC and other relevant sections of Bidding Document.
- (iii) The use of illegal substances
- (iv) Non-Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), the Employer's Personnel, and the Contractor's Personnel, (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability, (physical and mental), sexual orientation, gender identity, political conviction, social, civic, or health status).
- (v) Interactions with the local community(ies) members of the local community (ies), and any affected person(s)(for example to convey an attitude of respect, including to their culture and traditions)
- (vi) sexual harassment (for example to prohibit use of language or behavior, in particular towards women and/or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
- (vii) Violence, including sexual and/or gender-based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty)
- (viii) Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior or abuse of power)
- (ix) Protection of children (including prohibitions against sexual activity or abuse, or otherwise unacceptable behavior with children, limiting interactions towards children,

and ensuring their safety in project areas)

- (x) Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
- (xi) Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
- (xii) Respecting reasonable work instructions (including regarding environmental and social norms)
- (xiii) Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
- (xiv) Duty to report violations of this Code
- (xv) Non retaliation against workers who report violations of the Code, if that report is made in good faith.

The Code of Conduct should be written in plain language comprehensible to the workers and signed by each worker to indicate that they have:

- received a copy of the code;
- had the code explained to them;
- acknowledged that adherence to this Code of Conduct is a condition of employment; and
- understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

A copy of the code shall be displayed in a location easily accessible to the community and project affected people. It shall be provided in languages comprehensible to the local community, Contractor's Personnel, Employer's Personnel and affected persons.

Also, please refer the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports which are attached herewith as separate volumes.

AND

Clause 111 [Environmental Protection Works], Clause 117 [Contractors Establishment on Site], Clause 122 [Safety Plan and Provisions], Clause 2917 [Appendices for Phase 2].

Section 6D – Drawings

Provided as Section 6D in a separate volume.

FOR REFERENCE ONLY

Section 6E: Supplementary Information Regarding Works to Be Procured

East-West Highway, Kakarbhitta - Laukahi Road Section is a National Highway (H-01) under the strategic road networks of Nepal and lies in Jhapa, Morang, and Sunsari districts of Province no 2) of Eastern Region of the Country.

The road starts from (Km 95+000) and ends at (Km 111+500) of Kakarbhitta - Laukahi Road Section. The road has been split into one packages for procurement of works.

- (i) Package-6 from Km 95+760 to 111+500;

The Works under this Contract consist of:

Phase 1: Upgrading Works; with Upgrading of existing road from 2-Lanes to 4 Lanes and Service Lanes, Structures and Construction of Bridges, etc. including Defect Notification Period; and

Phase 2: Performance Based Maintenance Works; with Maintenance works consisting of all activities to be carried out to achieve and keep the road assets as defined in the PBM Specifications on upgraded 4-Lane Kakarbhitta- Laukahi Road Section of East West Highway.

The Detail Drawings related to the improvement works have been included as Section 6E and provided in a separate volume. The estimated quantities of individual work items are contained in the Bill of Quantities. Description of works, materials, and workmanship, methods of testing and requirement and criteria for acceptance of Works etc. are detailed in the Standard Specifications and Special Provisions to the Standard Specifications in Sections 6B and 6C respectively. The Bidders shall make their own investigations, assessment and judgment with regards to the location and quantity of suitable local construction materials. The Employer shall take no liability for any conclusion inferred by the Bidder.

The Summary Description of the main works, however, is as follows:

- i) Traffic management provisions during construction including the construction of diversion roads and bridges;
- ii) Roadway excavation and formation of embankment for widening of road section and for geometric improvement of road;
- iii) Construction of side drains, retaining structures;
- iv) Construction of cross-drainage structures;
- v) Construction of sub-base, base and bituminous pavement;
- vi) Supply, erection and installation of road safety measures,
- vii) Construction of bridges and their elements;
- viii) Construction of overpasses, underpasses and fly overs;
- ix) Dismantling of existing RCC bridges;
- x) Performance based maintenance works to achieve and keep the road assets as defined in the PBM Specifications, etc.

In addition to above following supplementary information shall apply:

Special Operation Procedure (SOP)

In response to COVID-19, countries across the globe have implemented a range of public health and social measures, including movement restrictions, partial closure or closure or closure of schools and businesses, quarantine in specific geographic areas and international travel restrictions. Alike global condition Nepal is also suffering with rapid transmission of COVID 19 cases in recent days which seems to be continuous for long run. Asian Development Bank (ADB), Nepal Government (GoN) as well as World Health Organization (WHO) has established their own measures to be followed for construction sites. Hence, there are several standard procedures by different organizations to perform construction work at controlled environment with reduced transmission capability of COVID-19 in workplace so that construction work will not be vanished. Here the bidder should offer their modality to work in COVID-19 condition ensuring safe environment in terms of its transmission. For this purpose, the bidder shall prepare detail SOP based on the best practical and effective measures considering the guideline of GoN, WHO as well as ADB without limiting to the following mentioned sectors.

Workplace risk assessment

Please categorize the working areas in to different category based on exposure risk. *Low exposure risk* - Workers in this category have minimal occupational contact with the public and other co-workers.

Medium exposure risk- In areas without community transmission of COVID-19, the scenario may include frequent contact with persons returning from areas with community transmission.

High exposure risk- jobs or work tasks with high potential for close contact with people who are known or suspected of having COVID-19 as well as contact with objects and surfaces possibly contaminated with the virus.

Measures for All Workplaces

Include your proposal for preventing transmission of COVID-19 that apply to all workplaces and all people at the workplace, such as employers, managers, workers, contractors, customers and visitors, include the following:

Broad provisions for preventing transmission through following measures.

- Hand hygiene
- Respiratory hygiene
- Physical distancing

General provision for Preventing Transmission in Office

- Reduce and manage work-related travels
- Regular environmental cleaning and disinfection
- Cleaning and disinfecting office
- Office arrangement
- Staff management
- Staff behavior

I. Physical Distancing

II. Personal Hygiene

III. Meeting Etiquette

IV. Visiting Site or Client's Office

Commencement of Work in Construction Sites

- Preparation before work
- Procedure to be followed at entry
- Measure to minimize worker and community contact
- Restriction of workers movement outside the camp
- Disinfection of plant machineries
- Batching plant site (enclosed area)
- Manage delivery Zones
- Manage storage area
- Personal protective equipment
- Manage workers accommodation (permanent and make-shift camps)

I. Camp Arrangements

II. Kitchen and Dinning

III. Toilets

IV. Changing Facilities and Showers

Emergency Handling Protocol (Covid-19)

- Emergency response team
- Preparedness for emergency
- Emergency protocol for symptomatic case
- Management of people with COVID-19 or their contacts

Specific Measures for jobs Based on Risk Level

- Workplace and jobs at medium risk
- Workplace and jobs at high risk

SOP Implementation, Internal Monitoring and Reporting Mechanism

- Organogram on SOP implementation
- Internal monitoring and reporting mechanism
- Risk communication, training, and education
- Right, duties and responsibilities of workers and employers.

Section 6F – Personnel Requirements: Phase1

Phase 1: Upgrading Works

Using Form PER-1 and PER-2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has Personnel who meet the following requirements:

S. No	Position	Required Nos.	Minimum Qualification	Total Similar Work Experience [years]	Experience in Similar Position [years]
1	Contract Manager / Contractor's Representative ¹	1	MSc in Civil Engineering/ Construction Management	10	3
2	Site Engineer	3	BE in Civil Engineering	7	3
3	Quality Control Engineer	2	BE in Civil Engineering	7	3
4	Environment Safeguard/ Safety Engineer	1	BE in Civil / Environment Engineering	5	3
5	Sub Engineers	4	Diploma in Civil Engineering or equivalent	5	3
6	Senior Laboratory Technician	1	Senior Lab Technician or Sub-engineer	5	3

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Information Forms included in Section 4 (Bidding Forms).

All submitted curriculum vitae should be duly signed by the concerned person.

1 Note:

- (i) The Contract Manager/ Contractor's Representative shall require being the Senior Employee from the Bidder (or in case of JV, the partner who meets the major requirement of experience in Contracts of Similar Size and Nature) and working with the firm for at least three year prior to the bid submission deadline; and
- (ii) The Contract Manager / Contractor's Representative shall be at the site location during the period of Upgrading Works. If the personnel is to be temporarily absent during the period, a suitable replacement shall be temporarily appointed, subject to the Engineer's prior consent. However, the temporary appointment shall not be valid if each absent period exceeds 21days with the cumulative period of more than 42 days within a one year period.

Section 6F – Personnel Requirements: Phase 2

Phase 2: Performance Based Maintenance Works

Using Form PER-1 and PER-2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has Personnel who meet the following requirements:

S. No	Position	Required Nos.	Minimum Qualification	Total Similar Work Experience [years]	Experience in Similar Position[years]
1	Contract Manager / Contractor's Representative	1	MSc in Civil Engineering / Construction Management	5	5
2	Performance Manager	1	BE in Civil Engineering	5	2
3	Maintenance Engineer	1	BE in Civil Engineering	5	2
4	Sub Engineers	2	Diploma in Civil Engineering or equivalent	3	2
5**	Performance Based Road Maintenance Expert (part time)	1			

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Information Forms included in Section 4 (Bidding Forms).

All submitted curriculum Vitae should be duly signed by the concerned person.

** The successful bidder shall deploy a Performance Based Road Maintenance Expert (part time), who has extensive experience in PBM Works to coach and train the staff of the contractor and subcontractors in the planning, execution and monitoring of the performance based maintenance works.

Section 6G – Equipment Requirements: Phase1

Phase 1: Upgrading Works

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

S. No.	Equipment Type and Characteristics	Minimum Number Required
1	Excavator (> 0.50 m3)	4
2	Loader (> 1.5 m3)	3
3	Motor Grader (> 100 HP)	3
4	Two Stage Stone Crusher Plant (production > 60 cu m per Hr)	3
5	Water Bowser (> 5,000 litres)	4
6	Bitumen Distributor (> 4,000 litres)	3
7	Pneumatic Roller (> 8 Ton)	3
8	Steel Roller (> 8 Ton)	2
9	Tipper Truck (> 5 cu m)	16
10	Vibrating Roller (> 10 Ton at static condition)	3
11	Concrete Batch Plant (> 50 m3/hour)	2
12	Concrete Mixer Truck (> 6 m3)	8
13	Asphalt Plant (> 100 tonne/hour)	2
14	Asphalt Paver with Electronic Sensor (> 3.0 m)	2
15	Tandem Roller (> 8 tonne)	2
16	Crane (> 50 tonne)	2

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section 4 (Bidding Forms).

Ownership attestation documentation for each item of equipment and, where, relevant, the original leasing agreements should be attached.

Resources committed by the Bidder should be physically mobilized at site throughout the contract period.

All equipment to be proposed for this project shall not be over 15 years from its production date.

Section 6G– Equipment Requirements: Phase2

Phase 2: Performance Based Maintenance Works

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

S. No.	Equipment Type and Characteristics	Minimum Number Required
1	Excavator (> 0.50 m3)	1
2	Loader (> 1.5 m3)	2
3	Water Bowser (> 5,000 litres)	1
4	Bitumen Distributor (> 2,000 litres)	1
5	Tipper Truck (> 5 cu m)	3
6	Vibrating Roller (> 10 Ton at static condition)	1
7	Tandem Roller (> 8 tonne)	1
8	Mini Asphalt Plant	1
9	Concrete Mixer Portable (1 bag)	1
10	Portable Air Compressor	1
11	Rammer Compactor	1
12	Generator Set	1
13	Flood Lights set	1
14	Truck Mounted Crane (> 20 tonne)	1

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section 4 (Bidding Forms).

Ownership attestation documentation for each item of equipment and, where, relevant, the original leasing agreements should be attached.

Resources committed by Bidder should be physically mobilized at site throughout the contract period.

Section 6H: Check list for OCHS including arrangement for protection against COVID-19

S.N	Description	Yes	No	N/A	Remarks
	<u>PRELIMINARIES</u>				
	<u>OCCUPATIONAL SAFETY & HEALTH</u>				
1	Part 1 General				
	1.1 Preparation and submission of safety and health plan.				
	The preparation and submission of the Safety and Health Plan comprising with but not limited to;				
	a. Description of project				
	b. Site project organization structure				
	c. Arrangements for controlling significant site risks, and;				
	d. Detail - Refer item 1.1 in Occupation Safety and Health Specification				
	1.2 Approval of Temporary Works				
	Upon request from the engineer the contractor shall submit and get approval for the following works				
	a) Formwork and support system				
	b) Scaffolding				
	c) Support for stability of structure where adjoining area to be excavated or piled				
	d) Loading platform				
	e) Material and passenger hoist				
	f) Tower crane foundation				
	1.3 Workplace Safety and Health Officer (WSHO)				
	Full time competent Workplace Site Safety and Health Officer for the entire duration of the contract for Contractor Class IV, Class V and Class VI.				
	1.4 Medical Check Up				
	Conduct health fitness by a medical officer at least on yearly basis to ensure their operator/workers are in good health before and during their engagement in the period of contract.				
	1.5 Personal Protective Equipment				
	Provide, maintain and replace any damage personal protective equipment as per specification to all employees.				

S.N	Description	Yes	No	N/A	Remarks
	Provide, maintain and replace any damage; the following personal protective equipment during the construction period (Minimum 20 Numbers/pairs for visitors only).				
	a) Eye and face protection				
	b) Fall protection (Harnesses, lanyards, lifeline, safety belt)				
	c) Foot protection (Safety shoes/boots)				
	d) Hand protection (suitable glove - pair)				
	e) Head protection (safety helmet)				
	f) Hearing protection				
	g) Respiratory protection				
	h) Protective clothing				
	i) Protection against radiant energy (filter lenses)				
	j) Others (please specify)				
	Note: The quantity of the PPE priced here is the minimum quantity provided for PWD or other visitors who enters the worksites and may varies depending on project size.				
	1.6 Safety and Health Training & Briefing				
	Conducting briefings and induction course to each worker and any related courses that required for the entire project.				
	Plan and conduct relevant safety and health training plan as per site requirement.				
	a) Site safety and health induction course for site personnel.				
	b) Site health and safety induction for approved visitors.				
	c) Fire fighting.				
	d) Emergency preparedness, respond and evacuation.				
	e) Tool box meetings briefing (once a week at site).				
	1.7 Hazards Identification Risk Assessment And Risk Control (HIRARC)				
	Prepare and undertake Hazards Identification, Risk Assessment and Risk controls (HIRARC) for all construction activities.				
	1.8 Monthly Report				
	Printing/copying, papers, inks, binding or related cost in providing the monthly report within the contract period inclusive of any investigation expertise.				
	1.9 Notification of Accidents, Dangerous Occurrences, Occupational Diseases				
	Provision for Accident / Incident Investigation Report inclusive for the cost to engage if there is any third parties involve				

S.N	Description	Yes	No	N/A	Remarks
	(competent person / specialist) to investigate any accident at workplace.				
	1.10 General Signage				
	Safety signage at workplace to ensure the workers and the public are aware about safety within the contract period. At least one (1) each for each safety signage and it is mandatory for standard MOD safety signage – refer Ministry of Development Health Safety and Environment Manual.				
	Provide, install and maintain the following approved 1.067m (3.5ft) x 1.524m (5ft) as per Ministry of Development safety warning signs. Others warning signs but not limited to :				
	a) Keep Site Clean				
	b) No Open Burning				
	c) Emergency exit routes				
	d) Any other safety signs as instructed and approved by the S.O. (please specify)				
	1.11 Site Safety and Health Information Board				
	Provide at least one (1) information board to update any HSE information to the employee at worksite.				
	Provision and maintenance of Safety and Health information board (min area 2.9 sq m) including regular updating of safety and health information.				
	1.12 First Aid Facilities.				
	A trained first-aiders for any minor accident and first aid arrangement in case of any accidents at the workplace. This includes providing complete set of first aid kit for office and quarters within the period of contract. Minimum requirement to be at site are two competent / trained First Aider and two complete first aid kits.				
	a) To provide suitable two (2) trained person to attend first-aid treatment.				
	b) To provide and maintain first aid kit.				
	1.13 Portable Fire Extinguisher.				
	Provide enough fire extinguishers at the workplace. The locations of the fire extinguishers include the site office, quarters and standby for any hot works activities within the contract period. The cost also includes the maintenance and training of the use of equipment. At least one unit for office, two units for each quarters and one unit standby for hot work area.				

S.N	Description	Yes	No	N/A	Remarks
	Provision and maintenance of approved fire extinguisher to be provided for around each 200m ² of floor space with a minimum of one per floor at designated area.				
2	Part 2 Amenities and Facilities (Construction Site and Site Accommodation)				
	2.1 Toilets				
	Provide, maintain and the dislodging of toilets for workers.				
	Toilet shall be connected to a sewer / temporary septic tank with the approval of the relevant competent authority. Contractor shall estimate the number of workers for entire project and at least 1 toilet per every 25 workers. For every 100 workers, there should be 4 numbers of toilet.				
	2.2 Temporary Structures and Sanitary conveniences at construction work sites				
	Temporary site office with adequate lighting and ventilation.				
	Living quarters with a room space of not less than 10 cubic meters shall be provided for each worker. It shall be adequately lit and ventilated. Sanitary facilities in the ratio of 1 water closet, 1 shower and 1 wash basin for every 25 workers or less shall be provided. The toilet facilities shall be connected to a sewer/temporary septic tank.				
	2.3 Temporary rest area				
	Provide and maintain rest area for the workers and site staff with safe area, ventilated and lighted.				
	2.4 Lighting				
	Provide adequate lighting in dark environment at work areas, access and egress.				
	Note: Dark environment with inadequate lighting (access to upper floor, tanks, any confined space, etc).				
	2.5 Ventilation				
	Provide mechanical ventilator in areas where natural ventilation is not possible and in accordance to the specification. Areas which requires constant air circulation which involves fumes and smoke e.g. generator, welding activities, confine space, etc.				
3	Part 3 Prevention of fall at Workplace				
	3.2 Safety nets				

S.N	Description	Yes	No	N/A	Remarks
	Install and maintain safety net as close as possible to the working level. Should it be on the outside of the structure, the outer edges should be higher than the inner edge. Contractor to calculate the area to be close/cover base on the proposed design of the building.				
	3.3 Individual fall arrest systems				
	Fall arrest systems must be provided for every workers working at height above 1.8m. Double lanyards to be equipped on the safety harness.				
	Provide, anchor /install and maintain individual fall arrest systems that includes :				
	a) Inertia reel systems;				
	b) Safety harness;				
	c) Lanyards; and				
	d) Static lines				
	3.6 Ladders				
	Supply, install and maintain suitable lockable step ladder spreader bars on both sides connected to the front and rear stiles. All ladders must be specified with its certification standards.				
	Note: Home-made ladders are forbidden and must be removed from site.				
	3.7 Scaffolding for Temporary Working Platform, Access and Egress				
	Scaffold board should not be less than 225mm wide. Working platforms for men without materials or only for passage of materials must be 500mm width. For men and materials provided there is 800mm width, provided there is 430mm left clear for the passage of men or 600mm if barrows are used. Toe-board must be fitted in conjunction with all guard rails, a minimum height of 150mm.				
	Erect, maintain and dismantle suitable scaffolding for temporary working platform including access and egress.				
	3.9 Safety Signage				
	Provide the safety signs at workplace to ensure awareness for workers and public as per MOD HSE Manual.				
	Provision for the following safety signage but not limited to:				

S.N	Description	Yes	No	N/A	Remarks
	a) Beware of falling object				
	b) Use safety harness				
	c) Use safe access and egress				
	d) Beware of openings				
	e) Use rubbish / debris chute				

S.N	Description	Yes	No	N/A	Remarks
4	Part 4 Electrical				
	4.1 Reports				
	Submission of regular safety inspection and maintenance reports on electrical distribution box, switch box, temporarily wiring and generator set both indoors and outdoors on weekly basis.				
	4.2 Electrical Safety Signage				
	Provide electrical safety signs at workplace to ensure workers and public aware about electrical safety within the contract period.				
	Provide, install and maintain the following approved 300mm x 400mm safety warning signs but not limited to :				
	a) BEWARE ELECTRICITY				
	b) USE ELECTRICITY SAFELY				
	c) USE SAFE ELECTRICAL TOOLS				
	d) BEWARE OF OVERHEAD CABLE				
	e) Others (please specify)				
	4.3 Inspection of equipment				
	Inspection of all electrical tools and equipment prior to their first use at site and throughout the contract period.				
5	Part 5 Hazardous Chemicals and Materials				
	5.1 Chemical Health Risk Assessment				
	a) Prepare a Chemical Register for all hazardous chemical to health used in the place of work inclusive of updating during the contract period.				
	b) Carry out Chemical Health Risk Assessment by a registered assessor.				
	c) Develop control measures and policies to ensure the hazardous chemical to health are handled and used safely inclusive of updating during the contract period but not limited to :				

S.N	Description	Yes	No	N/A	Remarks
	i. Handling				
	ii. Correct and safe storage				
	iii. Transportation procedure				
	iv. Disposal procedure include schedule waste				
	5.2 Labeling and Storage				
	Provision of labeling, control and safe storage area for hazardous material at site to the requirement of the authority.				
	5.3 Personal Protective Equipment				
	Suitable PPE for handling hazardous chemical at workplace as per MOD HSE Manual.				
	Provide the following PPE for visitors/inspectors and other personnel working with hazardous chemical but not limited to:				
	i. Goggles				
	ii. Mask				
	iii. Gloves				
	iv. Suitable full face mask (where necessary)				
	v. Protective clothing (where necessary)				
	5.4 Waste Disposal				
	The cost for handling any chemical waste as required including proper arrangement by the approved contractor (third party).				
	Handle, transport and disposal of schedule waste by licensed / approved contractor to the requirement of the authority.				
	5.5 Hazardous chemical training and handling				
	Provisions to provide the following:				
	a) Training of hazardous chemicals on site				
	b) Monitoring of exposure hazardous chemical on site				
	c) Health surveillance for workers expose to the hazardous chemical on site				
6	Part 6 Special Work Situations				
	6.1 Traffic movement within site				
	c) Provision of the following to be used by the worker and flagman but not limited to :				
	i. Reflective safety vest.				
	ii. Dust mask				
	iii. Traffic control baton light				
	iv. Flags (Both Green and Red flags)				

S.N	Description	Yes	No	N/A	Remarks
	v. Any other suitable PPE				
	6.2 Excavations (more than 1.5m deep)				
	The cost to ensure safety and proper arrangement for any excavation activities at workplace by providing all the following items within the contract period. Minimum one (1) no. per item when the excavation is more than 1.5m deep.				
	a) Provision for the designing of safe strutting for deep excavation work by professional.				
	b) Provision for the competent / designated person to supervise the excavation work.				
	c) Provision for the protection and barricading the excavated work.				
	d) Provide, install and maintain an approved hazard warning lights for the excavated area during the night.				
	6.3 General Demolition Works				
	j) Provision of the following personal protective equipment (PPE) to be used by visitor/inspectors on site during demolition works, but are not limited to :				
	i. Goggle				
	ii. Dust mask				
	iii. Ear protection				
	iv. Gloves				
	v. Any other PPE				

FOR REFERENCE ONLY

Government of Nepal
Ministry of Infrastructure Development
Department of Roads
Project Directorate (ADB)
Bishalnagar, Kathmandu, Nepal

SASEC Highway Enhancement Project (SHEP)
(ADB Loan No: 4316-NEP)

Kakarbhatta – Laukahi Section of East-West Highway (H01)
Ch95+760 to Ch 111+500
Contract No. SHEP/OCB/KL/06

Phase 1: Upgrading Works

(Upgrading of existing road from 2 lanes to 4 Lanes and Service Lanes, Structures, Bridges, etc., including Defect Notification Period)

Phase 2: Performance Based Maintenance Works

(Maintenance works consisting of all activities to be carried out to achieve and keep the road assets as defined in the PBM Specifications)

Bidding Document

Part III Conditions of Contract

Section7	General Conditions of Contract
Section8	Particular Conditions of Contract
Section9	Contract Forms

August, 2026

Preface

This Bidding Document for the Procurement of Works (Single Stage – Two Envelope) has been prepared by the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads, Project Directorate (ADB), and is based on the Standard Bidding Document for the **Procurement of Works (SBD Works) issued by the Asian Development Bank dated December 2021**.

ADB's SBD Works has the structure and the provisions of the Master Procurement Document entitled "Bidding Documents for the Procurement of Works", prepared by multilateral development banks and other public international financial institutions, except where ADB-specific considerations have required a change.

FOR REFERENCE ONLY

Table of Contents - Summary Description

PART I

BIDDING PROCEDURES

Section 1 - Instructions to Bidders (ITB)----- 1-1

This Section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, and evaluation of bids and on the award of the contract.

Section 2 - Bid Data Sheet (BDS) ----- 2-1

This Section consists of provisions that are specific to each procurement and supplement the information or requirements included in Section 1 - Instructions to Bidders.

Section 3 - Evaluation and Qualification Criteria(EQC)----- 3-1

This Section contains the criteria to determine the lowest evaluated bid and the qualifications of the Bidder to perform the contract.

Section 4 – Bidding Forms(BDF) ----- 4-1

This Section contains the forms that are to be completed by the Bidder and submitted as part of their bid.

Section 5 – Eligible Countries (ELC)----- 5-1

This Section contains the list of eligible countries.

PART II

REQUIREMENTS

Section 6 -Employer's Requirements (ERO) ----- 6-1

This Section contains the Specifications, Drawings, and Supplementary Information that describe the Works to be procured, Personnel Requirements, and Equipment Requirements.

Section 6A – Summary of Description of Works-----

This Section contains the summary list of main works to be executed under the contract. Specification, Special provisions, and the Drawings that describe the Works to be procured.

Section 6B – Standard Specifications-----

This document has been issued under the authority of the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads (2016, with amendments 2022). It can be purchased from the Quality, Research and Development Center, Chakupat, Lalitpur.

Section 6C – Special Provisions

This section contains amendments, supplements, etc. to the standard specifications to suit the specific requirements of the project, including sections regarding Minor Bridges and PBM works.

Section 6D – Environmental, Health and Safety Management Requirement

This section provides the Environmental, Health and Safety Management Requirement

Section 6E – Drawings

The drawings are presented in a separate volume.

Section 6F Supplementary Information Regarding Works to Be Procured

This section provides supplementary information regarding the works

Section 6G– Personnel Requirements

This section provides information on Personnel Requirements.

Section 6H – Equipment Requirements

This section provides information on Equipment Requirements.

PART III CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section 7 - General Conditions of Contract (GCC) ----- 7-1

This Section contains the general clauses that govern the Contract. These General Conditions shall be the Conditions of Contract for Construction, Multilateral Development Bank Harmonized Edition, prepared by the Fédération Internationale des Ingénieurs-Conseil (FIDIC June 2010 MDB version). These Conditions are subject to the variations and additions set out in Section 8 (Particular Conditions of Contract).

Section 8 - Particular Conditions of Contract (PCC) ----- 8-1

This Section contains provisions which are specific to each contract and which modify or supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Section 9 - Contract Forms (COF) ----- 9-1

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.

FOR REFERENCE ONLY

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Section 7 - General Conditions of Contract

Ministry of Physical Infrastructure and Transport
Department of Roads
Project Directorate (ADB)

Kakarbhitta – Laukahi Section of East-West Highway (H01)

Package – 1: Ch: 95+760 to 111+500

Contract No. SHEP/OCB/KL/06

The Conditions of Contract consists of two parts, this Section 7 (General Conditions of Contract) and the following Section 8 (Particular Conditions of Contract).

The General Conditions shall be the *Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer*, Multilateral Development Bank Harmonized Edition, prepared by the Fédération Internationale des Ingénieurs-Conseil, or FIDIC (FIDIC MDB Harmonized Construction Contract) available at FIDIC MDB June 2010. The FIDIC MDB Harmonized Construction Contract is exclusive for the use of ADB Borrowers and their project implementing agencies as provided under the License Agreement dated 9 June 2005 and its amendment to the said Agreement dated 29 June 2020, and 11 October 2021, between ADB and FIDIC, and, consequently, no part of this publication may be reproduced, translated, adapted, stored in a retrieval system or communicated, in any form or by any means, whether mechanical, electronic, magnetic, photocopying, recording or otherwise, without prior permission in writing from FIDIC, except by the Employer identified in the contract and only for the exclusive purpose of preparing bidding documents for ADB-financed contracts.

The standard text of the General Conditions chosen must be retained intact to facilitate its reading and interpretation by Bidders and its review by ADB. Any amendments and additions to the GCC, specific to the contract in hand, should be introduced in Section 8 (Particular Conditions of Contract), Part A (Contract Data) and Part B (Special Provisions). Clause numbers in the Particular Conditions of Contract (PCC) correspond to those in the General Conditions of Contract (GCC). As per GCC 1.5 (Priority of Documents), the PCC takes precedence over the GCC.

Part A (Contract Data) of the PCC includes data to complement the GCC in a manner similar to the way in which the Bid Data Sheet (BDS) complements the Instructions to Bidders (ITB).

Part B (Specific Provisions) is to be used to introduce country- or project-specific provisions, if so required. Whoever drafts the Specific Provisions should be thoroughly familiar with the provisions of the GCC and with any specific requirements of the Contract. Legal advice is recommended when amending provisions or drafting new ones.

The Conditions of Contract have been prepared for an ad measurement (unit price or unit rate) type of contract and cannot be used for other types of contracts.

Conditions of Contract for **CONSTRUCTION**

FOR BUILDING AND ENGINEERING WORKS
DESIGNED BY THE EMPLOYER

Multilateral Development Bank Harmonised Edition
June 2010

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General Conditions

1 General Provisions

1.1

Definitions

In the Conditions of Contract (“these Conditions”), which include Particular Conditions, Parts A and B, and these General Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

1.1.1

The Contract

1.1.1.1 “**Contract**” means the Contract Agreement, the Letter of Acceptance, the Letter of Tender, these Conditions, the Specification, the Drawings, the Schedules, and the further documents (if any) which are listed in the Contract Agreement or in the Letter of Acceptance.

1.1.1.2 “**Contract Agreement**” means the contract agreement referred to in Sub-Clause 1.6 [*Contract Agreement*].

1.1.1.3 “**Letter of Acceptance**” means the letter of formal acceptance, signed by the Employer, of the Letter of Tender, including any annexed memoranda comprising agreements between and signed by both Parties. If there is no such letter of acceptance, the expression “Letter of Acceptance” means the Contract Agreement and the date of issuing or receiving the Letter of Acceptance means the date of signing the Contract Agreement.

1.1.1.4 “**Letter of Tender**” means the document entitled letter of tender or letter of bid, which was completed by the Contractor and includes the signed offer to the Employer for the Works.

1.1.1.5 “**Specification**” means the document entitled specification, as included in the Contract, and any additions and modifications to the specification in accordance with the Contract. Such document specifies the Works.

1.1.1.6 “**Drawings**” means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract.

1.1.1.7 “**Schedules**” means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Tender, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices.

1.1.1.8 “**Tender**” means the Letter of Tender and all other documents which the Contractor submitted with the Letter of Tender, as included in the Contract.

“**Bill of Quantities**”, “**Daywork Schedule**” and “**Schedule of Payment Currencies**” mean the documents so named (if any) which are comprised in the Schedules.

0 “**Contract Data**” means the pages completed by the Employer entitled contract data which constitute Part A of the Particular Conditions.



**1.1.2
Parties and Persons**

- 1.1.2.1 **"Party"** means the Employer or the Contractor, as the context requires.
- 1.1.2.2 **"Employer"** means the person named as employer in the Contract Data and the legal successors in title to this person.
- 1.1.2.3 **"Contractor"** means the person(s) named as contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person(s).
- 1.1.2.4 **"Engineer"** means the person appointed by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under Sub-Clause 3.4 [*Replacement of the Engineer*].
- 1.1.2.5 **"Contractor's Representative"** means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [*Contractor's Representative*], who acts on behalf of the Contractor.
- 1.1.2.6 **"Employer's Personnel"** means the Engineer, the assistants referred to in Sub-Clause 3.2 [*Delegation by the Engineer*] and all other staff, labour and other employees of the Engineer and of the Employer; and any other personnel notified to the Contractor, by the Employer or the Engineer, as Employer's Personnel.
- 1.1.2.7 **"Contractor's Personnel"** means the Contractor's Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.
- 1.1.2.8 **"Subcontractor"** means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.
- 1.1.2.9 **"DB"** means the person or three persons appointed under Sub-Clause 20.2 [*Appointment of the Dispute Board*] or Sub-Clause 20.3 [*Failure to Agree on the Composition of the Dispute Board*].
- 1.1.2.10 **"FIDIC"** means the Fédération Internationale des Ingénieurs-Conseils, the international federation of consulting engineers.
- 1.1.2.11 **"Bank"** means the financing institution (if any) named in the Contract Data.
- 1.1.2.12 **"Borrower"** means the person (if any) named as the borrower in the Contract Data.

**1.1.3
Dates, Tests, Periods
and Completion**

- 1.1.3.1 **"Base Date"** means the date 28 days prior to the latest date for submission of the Tender.



"Commencement Date" means the date notified under Sub-Clause 8.1 [*Commencement of Works*].

"Time for Completion" means the time for completing the Works or a Section (as the case may be) under Sub-Clause 8.2 [*Time for Completion*], as stated in the Contract Data (with any extension under Sub-Clause 8.4 [*Extension of Time for Completion*]), calculated from the Commencement Date.

- 1.1.3.4 **“Tests on Completion”** means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 9 [*Tests on Completion*] before the Works or a Section (as the case may be) are taken over by the Employer.
- 1.1.3.5 **“Taking-Over Certificate”** means a certificate issued under Clause 10 [*Employer’s Taking Over*].
- 1.1.3.6 **“Tests after Completion”** means the tests (if any) which are specified in the Contract and which are carried out in accordance with the Specification after the Works or a Section (as the case may be) are taken over by the Employer.
- 1.1.3.7 **“Defects Notification Period”** means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*], which extends over 365 days except if otherwise stated in the Contract Data (with any extension under Sub-Clause 11.3 [*Extension of Defects Notification Period*]), calculated from the date on which the Works or Section is completed as certified under Sub-Clause 10.1 [*Taking Over of the Works and Sections*].
- 1.1.3.8 **“Performance Certificate”** means the certificate issued under Sub-Clause 11.9 [*Performance Certificate*].
- 1.1.3.9 **“day”** means a calendar day and **“year”** means 365 days.

1.1.4

Money and Payments

- 1.1.4.1 **“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.
- 1.1.4.2 **“Contract Price”** means the price defined in Sub-Clause 14.1 [*The Contract Price*], and includes adjustments in accordance with the Contract.
- 1.1.4.3 **“Cost”** means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.
- 1.1.4.4 **“Final Payment Certificate”** means the payment certificate issued under Sub-Clause 14.13 [*Issue of Final Payment Certificate*].
- 1.1.4.5 **“Final Statement”** means the statement defined in Sub-Clause 14.11 [*Application for Final Payment Certificate*].
- 1.1.4.6 **“Foreign Currency”** means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.
- 1.1.4.7 **“Interim Payment Certificate”** means a payment certificate issued under Clause 14 [*Contract Price and Payment*], other than the Final Payment Certificate.

“Local Currency” means the currency of the Country.

“Payment Certificate” means a payment certificate issued under Clause 14 [*Contract Price and Payment*].

“Provisional Sum” means a sum (if any) which is specified in the Contract as



a provisional sum, for the execution of any part of the Works or for the supply of Plant, Materials or services under Sub-Clause 13.5 [*Provisional Sums*].

1.1.4.11 “**Retention Money**” means the accumulated retention moneys which the Employer retains under Sub-Clause 14.3 [*Application for Interim Payment Certificates*] and pays under Sub-Clause 14.9 [*Payment of Retention Money*].

1.1.4.12 “**Statement**” means a statement submitted by the Contractor as part of an application, under Clause 14 [*Contract Price and Payment*], for a payment certificate.

1.1.5

Works and Goods

1.1.5.1 “**Contractor’s Equipment**” means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor’s Equipment excludes Temporary Works, Employer’s Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.

1.1.5.2 “**Goods**” means Contractor’s Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.

1.1.5.3 “**Materials**” means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.

1.1.5.4 “**Permanent Works**” means the permanent works to be executed by the Contractor under the Contract.

1.1.5.5 “**Plant**” means the apparatus, machinery and vehicles intended to form or forming part of the Permanent Works, including vehicles purchased for the Employer and relating to the construction or operation of the Works.

1.1.5.6 “**Section**” means a part of the Works specified in the Contract Data as a Section (if any).

1.1.5.7 “**Temporary Works**” means all temporary works of every kind (other than Contractor’s Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.

1.1.5.8 “**Works**” mean the Permanent Works and the Temporary Works, or either of them as appropriate.

1.1.6

Other Definitions

1.1.6.1 “**Contractor’s Documents**” means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature (if any) supplied by the Contractor under the Contract.

1.1.6.2 “**Country**” means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.

“**Employer’s Equipment**” means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Specification; but does not include Plant which has not been taken over by the Employer.

“**Force Majeure**” is defined in Clause 19 [*Force Majeure*].



- 1.1.6.5 “**Laws**” means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.
- 1.1.6.6 “**Performance Security**” means the security (or securities, if any) under Sub-Clause 4.2 [*Performance Security*].
- 1.1.6.7 “**Site**” means the places where the Permanent Works are to be executed, including storage and working areas, and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.
- 1.1.6.8 “**Unforeseeable**” means not reasonably foreseeable by an experienced contractor by the Base Date.
- 1.1.6.9 “**Variation**” means any change to the Works, which is instructed or approved as a variation under Clause 13 [*Variations and Adjustments*].
- 1.1.6.10 “**Notice of Dissatisfaction**” means the notice given by either Party to the other under Sub-Clause 20.4 [*Obtaining Dispute Board’s Decision*] indicating its dissatisfaction and intention to commence arbitration.

1.2

Interpretation

In the Contract, except where the context requires otherwise:

- (a) words indicating one gender include all genders;
- (b) words indicating the singular also include the plural and words indicating the plural also include the singular;
- (c) provisions including the word “agree”, “agreed” or “agreement” require the agreement to be record in writing;
- (d) “written” or “in writing” means hand-written, type-written, printed or electronically made, and resulting in a permanent record; and
- (e) the word “tender” is synonymous with “bid”, and “tenderer” with “bidder” and the words “tender documents” with “bidding documents”.

The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

In these Conditions, provisions including the expression “Cost plus profit” require this profit to be one-twentieth (5%) of this Cost unless otherwise indicated in the Contract Data.

1.3

Communications

Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices, requests and discharges, these communications shall be:

- (a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Contract Data; and
- (b) delivered, sent or transmitted to the address for the recipient’s communications as stated in the Contract Data. However:



- (i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and
- (ii) if the recipient has not stated otherwise when requesting an approval or

consent, it may be sent to the address from which the request was issued.

Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed. When a certificate is issued to a Party, the certifier shall send a copy to the other Party. When a notice is issued to a Party, by the other Party or the Engineer, a copy shall be sent to the Engineer or the other Party, as the case may be.

1.4

Law and Language

The Contract shall be governed by the law of the country or other jurisdiction stated in the Contract Data.

The ruling language of the Contract shall be that stated in the Contract Data.

The language for communications shall be that stated in the Contract Data. If no language is stated there, the language for communications shall be the ruling language of the Contract.

1.5

Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

- (a) the Contract Agreement (if any),
- (b) the Letter of Acceptance,
- (c) the Letter of Tender,
- (d) the Particular Conditions - Part A,
- (e) the Particular Conditions - Part B,
- (f) these General Conditions,
- (g) the Specification,
- (h) the Drawings, and
- (i) the Schedules and any other documents forming part of the Contract.

If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.

1.6

Contract Agreement

The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance, unless the Particular Conditions establish otherwise. The Contract Agreement shall be based upon the form annexed to the Particular Conditions. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.

1.7

Assignment

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 favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.

1.8

Care and Supply of Documents

The Specification and Drawings shall be in the custody and care of the Employer. Otherwise stated in the Contract, two copies 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.

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.

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.

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.

1.9

Delayed Drawings or Instructions

The Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted if any necessary drawing or instruction is not issued to the Contractor within a particular time, which shall be reasonable. The notice shall include details of the necessary drawing or instruction, details of why and by when it should be issued, and the nature and amount of the delay or disruption likely to be suffered if it is late.

If the Contractor suffers delay and/or incurs Cost as a result of a failure of the Engineer to issue the notified drawing or instruction within a time which is reasonable and is specified in the notice with supporting details, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

However, if and to the extent that the Engineer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

1.10

Employer's Use of Contractor's Documents

As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.



Contractor shall be deemed (by signing the Contract) to give to the Employer a terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,

- (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and
- (c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor.

The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

1.11

Contractor's Use of Employer's Documents

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Specification, the Drawings and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

1.12

Confidential Details

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 compliance with the Contract and allow its proper implementation.

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.

1.13

Compliance with Laws

The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Particular Conditions:

- (a) the Employer shall have obtained (or shall obtain) the planning, zoning, building permit or similar permission for the Permanent Works, and any other permissions described in the Specification as having been (or to be) obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and
- (b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so, unless the Contractor is impeded to accomplish these actions and shows evidence of its diligence.

1.14

Joint and Several Liability

The Contractor constitutes (under applicable Laws) a joint venture, consortium or unincorporated grouping of two or more persons:



- (a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;
- (b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and
- (c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

1.15

Inspections and Audit by the Bank

The Contractor shall permit the Bank and/or persons appointed by the Bank to inspect the Site and/or the Contractor's accounts and records relating to the performance of the Contract and to have such accounts and records audited by auditors appointed by the Bank if required by the Bank.

2 The Employer

2.1

Right of Access to the Site

The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Contract Data. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Specification. However, the Employer may withhold any such right or possession until the Performance Security has been received.

If no such time is stated in the Contract Data, the Employer shall give the Contractor right of access to, and possession of, the Site within such times as required to enable the Contractor to proceed without disruption in accordance with the programme submitted under Sub-Clause 8.3 [*Programme*].

If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

2.2

Permits, Licences or Approvals



The Employer shall provide, at the request of the Contractor, such reasonable assistance as to allow the Contractor to obtain properly:

- (a) copies of the Laws of the Country which are relevant to the Contract but are not readily available, and
- (b) any permits, licences or approvals required by the Laws of the Country:

- (i) which the Contractor is required to obtain under Sub-Clause 1.13 [*Compliance with Laws*],
- (ii) for the delivery of Goods, including clearance through customs, and
- (iii) for the export of Contractor's Equipment when it is removed from the Site.

2.3

Employer's Personnel

The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:

- (a) co-operate with the Contractor's efforts under Sub-Clause 4.6 [*Co-operation*], and
- (b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 [*Safety Procedures*] and under Sub-Clause 4.18 [*Protection of the Environment*].

2.4

Employer's Financial Arrangements

The Employer shall submit, before the Commencement Date and thereafter within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price punctually (as estimated at that time) in accordance with Clause 14 [*Contract Price and Payment*]. Before the Employer makes any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars.

In addition, if the Bank has notified to the Borrower that the Bank has suspended disbursements under its loan which finances in whole or in part the execution of the Works, the Employer shall give notice of such suspension to the Contractor with detailed particulars, including the date of such notification, with a copy to the Engineer, within 7 days of the Borrower having received the suspension notification from the Bank. If alternative funds will be available in appropriate currencies to the Employer to continue making payments to the Contractor beyond a date 60 days after the date of Bank notification of the suspension, the Employer shall provide reasonable evidence in his notice of the extent to which such funds will be available.

2.5

Employer's Claims

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, the Employer or the Engineer shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 [*Electricity, Water and Gas*], under Sub-Clause 4.20 [*Employer's Equipment and Free-Issue Materials*], or for other services requested by the Contractor.

The notice shall be given as soon as practicable and no longer than 28 days after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.



Particulars shall specify the Clause or other basis of the claim, and shall include indication of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Engineer shall then proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 4.21 [*Extension of Defects Notification Period*].

This amount may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, or to otherwise claim against the Contractor, in accordance with this Sub-Clause.

3 The Engineer

3.1

Engineer's Duties and Authority

The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.

The Engineer shall have no authority to amend the Contract.

The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. The Employer shall promptly inform the Contractor of any change to the authority attributable to the Engineer.

However, whenever the Engineer exercises a specified authority for which the Employer's approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.

Except as otherwise stated in these Conditions:

- (a) whenever carrying out duties or exercising authority, specified in or implied by the Contract, the Engineer shall be deemed to act for the Employer;
- (b) the Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract;
- (c) any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by the Engineer (including absence of disapproval) shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances; and
- (d) any act by the Engineer in response to a Contractor's request except as otherwise expressly specified shall be notified in writing to the Contractor within 28 days of receipt.

The following provisions shall apply:

The Engineer shall obtain the specific approval of the Employer before taking action under the following Sub-Clauses of these Conditions:

- (A) Sub-Clause 4.12: agreeing or determining an extension of time and/or additional cost.
- (B) Sub-Clause 13.1: instructing a Variation, except;
 - (i) in an emergency situation as determined by the Engineer, or
 - (ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.



Sub-Clause 13.3: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.1 or 13.2.

- (D) Sub-Clause 13.4: specifying the amount payable in each of the applicable currencies.

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

3.2

Delegation by the Engineer

The Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties. However, unless otherwise agreed by both Parties, the Engineer shall not delegate the authority to determine any matter in accordance with Sub-Clause 3.5 [*Determinations*].

Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Engineer. However:

- (a) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Engineer to reject the work, Plant or Materials;
- (b) if the Contractor questions any determination or instruction of an assistant, the Contractor may refer the matter to the Engineer, who shall promptly confirm, reverse or vary the determination or instruction.

3.3

Instructions of the Engineer

The Engineer may issue to the Contractor (at any time) instructions and additional or modified Drawings which may be necessary for the execution of the Works and the remedying of any defects, all in accordance with the Contract. The Contractor shall only take instructions from the Engineer, or from an assistant to whom the appropriate authority has been delegated under this Clause. If an instruction constitutes a Variation, Clause 13 [*Variations and Adjustments*] shall apply.



Contractor shall comply with the instructions given by the Engineer or delegated assistant, on any matter related to the Contract. Whenever practicable, their instructions shall be given in writing. If the Engineer or a delegated assistant:

- (a) gives an oral instruction,
- (b) receives a written confirmation of the instruction, from (or on behalf of) the Contractor, within two working days after giving the instruction, and

- (c) does not reply by issuing a written rejection and/or instruction within two working days after receiving the confirmation,

then the confirmation shall constitute the written instruction of the Engineer or delegated assistant (as the case may be).

3.4

Replacement of the Engineer

If the Employer intends to replace the Engineer, the Employer shall, not less than 21 days before the intended date of replacement, give notice to the Contractor of the name, address and relevant experience of the intended replacement Engineer. If the Contractor considers the intended replacement Engineer to be unsuitable, he has the right to raise objection against him by notice to the Employer, with supporting particulars, and the Employer shall give full and fair consideration to this objection.

3.5

Determinations

Whenever these Conditions provide that the Engineer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Engineer shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

The Engineer shall give notice to both Parties of each agreement or determination, with supporting particulars, within 28 days from the receipt of the corresponding claim or request except when otherwise specified. Each Party shall give effect to each agreement or determination unless and until revised under Clause 20 [*Claims, Disputes and Arbitration*].

4 The Contractor

4.1

Contractor's General Obligations

The Contractor shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

All equipment, material, and services to be incorporated in or required for the Works shall have their origin in any eligible source country as defined by the Bank.

The Contractor shall be responsible for the adequacy, stability and safety of all Site operations and of all methods of construction. Except to the extent specified in the Contract, the Contractor (i) shall be responsible for all Contractor's Documents, Temporary Works, and such design of each item of Plant and Materials as is required to be in accordance with the Contract, and (ii) shall not otherwise be responsible for the design or specification of the Permanent Works.

The Contractor shall, whenever required by the Engineer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Engineer.



If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall submit to the Engineer the Contractor's Documents for this part in accordance with the procedures specified in the Contract;
- (b) these Contractor's Documents shall be in accordance with the Specification and Drawings, shall be written in the language for communications defined in Sub-Clause 1.4 [*Law and Language*], and shall include additional information required by the Engineer to add to the Drawings for co-ordination of each Party's designs;
- (c) the Contractor shall be responsible for this part and it shall, when the Works are completed, be fit for such purposes for which the part is intended as are specified in the Contract; and
- (d) prior to the commencement of the Tests on Completion, the Contractor shall submit to the Engineer the "as-built" documents and, if applicable, operation and maintenance manuals in accordance with the Specification and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair this part of the Works. Such part shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until these documents and manuals have been submitted to the Engineer.

4.2

Performance Security

The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount stated in the Contract Data and denominated in the currency(ies) of the Contract or in a freely convertible currency acceptable to the Employer. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.

The Contractor shall deliver the Performance Security to the Employer within 28 days after receiving the Letter of Acceptance, and shall send a copy to the Engineer. The Performance Security shall be issued by a reputable bank or financial institution selected by the Contractor, and shall be in the form annexed to the Particular Conditions as stipulated by the Employer in the Contract Data, or in another form approved by the Employer.

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.

The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract.

The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not indemnified to make the claim.

The Employer shall return the Performance Security to the Contractor within 21 days after receiving a copy of the Performance Certificate.

Notwithstanding any limitation to the provisions of the rest of this Sub-Clause, whenever the Engineer makes an addition or a reduction to the Contract Price as a result of a change in



cost and/or legislation, or as a result of a Variation amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor shall at the Engineer's request promptly increase, or may decrease, as the case may be, the value of the Performance Security in that currency by an equal percentage.

4.3

Contractor's Representative

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract.

Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Engineer for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked in terms of Sub-Clause 6.9 [*Contractor's Personnel*], or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Engineer, revoke the appointment of the Contractor's Representative or appoint a replacement.

The whole time of the Contractor's Representative shall be given to directing the Contractor's performance of the Contract. If the Contractor's Representative is to be temporarily absent from the Site during the execution of the Works, a suitable replacement person shall be appointed, subject to the Engineer's prior consent, and the Engineer shall be notified accordingly.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.3 [*Instructions of the Engineer*].

The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Engineer has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

The Contractor's Representative shall be fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*]. If the Contractor's Representative's delegates are not fluent in the said language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.

4.4

Subcontractors

The Contractor shall not subcontract the whole of the Works.

The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall not be required to obtain consent to suppliers solely of Materials, or to a subcontract for which the Subcontractor is named in the Contract;
- (b) the prior consent of the Engineer shall be obtained to other proposed Subcontractors;
- (c) the Contractor shall give the Engineer not less than 28 days' notice of the intended date of the commencement of each Subcontractor's work, and of the commencement of such work on the Site; and



- (d) each subcontract shall include provisions which would entitle the Employer to require the subcontract to be assigned to the Employer under Sub-Clause 4.5 [*Assignment of Benefit of Subcontract*] (if or when applicable) or in the event of termination under Sub-Clause 15.2 [*Termination by Employer*].

The Contractor shall ensure that the requirements imposed on the Contractor by Sub-Clause 1.12 [*Confidential Details*] apply equally to each Subcontractor.

Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Country to be appointed as Subcontractors.

4.5

Assignment of Benefit of Subcontract

If a Subcontractor's obligations extend beyond the expiry date of the relevant Defects Notification Period and the Engineer, prior to this date, instructs the Contractor to assign the benefit of such obligations to the Employer, then the Contractor shall do so. Unless otherwise stated in the assignment, the Contractor shall have no liability to the Employer for the work carried out by the Subcontractor after the assignment takes effect.

4.6

Co-operation

The Contractor shall, as specified in the Contract, as instructed by the Engineer, allow appropriate opportunities for carrying out work to:

- (a) the Employer's Personnel,
- (b) any other contractors employed by the Employer, and
- (c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to suffer delays and/or to incur Unforeseeable Cost. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.

Under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Engineer in the time and manner stated in the Specification.

4.7

Setting Out

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract or notified by the Engineer. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

The Employer shall be responsible for any errors in these specified or notified items of reference, but the Contractor shall use reasonable efforts to verify their accuracy they are used.



If the Contractor suffers delay and/or incurs Cost from executing work which was initiated by an error in these items of reference, and an experienced contractor not reasonably have discovered such error and avoided this delay and/or Cost, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) whether and (if so) to what extent the error could not reasonably have been discovered, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.

4.8

Safety Procedures

The Contractor shall:

- (a) comply with all applicable safety regulations,
- (b) take care for the safety of all persons entitled to be on the Site,
- (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,
- (d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [*Employer's Taking Over*], and
- (e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

4.9

Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Engineer shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Engineer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Engineer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.

Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

4.10

Site Data

The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on sub-surface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date. The Contractor shall be responsible for interpreting all such data.

To the extent which was practicable (taking account of cost and time), the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Tender or Works. To the same extent, the Contractor shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information, and to have satisfied before submitting the Tender as to all relevant matters, including (without limitation):



- (a) the form and nature of the Site, including sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) the extent and nature of the work and Goods necessary for the execution and completion of the Works and the remedying of any defects,

- (d) the Laws, procedures and labour practices of the Country, and
- (e) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services.

4.11

Sufficiency of the Accepted Contract Amount

The Contractor shall be deemed to:

- (a) have satisfied himself as to the correctness and sufficiency of the Accepted Contract Amount, and
- (b) have based the Accepted Contract Amount on the data, interpretations, necessary information, inspections, examinations and satisfaction as to all relevant matters referred to in Sub-Clause 4.10 [*Site Data*].

Unless otherwise stated in the Contract, the Accepted Contract Amount covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper execution and completion of the Works and the remedying of any defects.

4.12

Unforeseeable Physical Conditions

In this Sub-Clause, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Contractor encounters at the Site when executing the Works, including sub-surface and hydrological conditions but excluding climatic conditions.

If the Contractor encounters adverse physical conditions which he considers to have been Unforeseeable, the Contractor shall give notice to the Engineer as soon as practicable.

This notice shall describe the physical conditions, so that they can be inspected by the Engineer, and shall set out the reasons why the Contractor considers them to be Unforeseeable. The Contractor shall continue executing the Works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Engineer may give. If an instruction constitutes a Variation, Clause 13 [*Variations and Adjustments*] shall apply.

If and to the extent that the Contractor encounters physical conditions which are Unforeseeable, gives such a notice, and suffers delay and/or incurs Cost due to these conditions, the Contractor shall be entitled subject to notice under Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

Upon receiving such notice and inspecting and/or investigating these physical conditions, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.



After, before additional Cost is finally agreed or determined under sub-paragraph (b) above, the Engineer may also review whether other physical conditions in similar parts of the Works (if any) were more favourable than could reasonably have been foreseen by the Contractor submitted the Tender. If and to the extent that these more favourable conditions were encountered, the Engineer may proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine the reductions in Cost.

which were due to these conditions, which may be included (as deductions) in the Contract Price and Payment Certificates. However, the net effect of all adjustments under sub-paragraph (b) and all these reductions, for all the physical conditions encountered in similar parts of the Works, shall not result in a net reduction in the Contract Price.

The Engineer shall take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Tender, which shall be made available by the Contractor, but shall not be bound by the Contractor's interpretation of any such evidence.

4.13

Rights of Way and Facilities

Unless otherwise specified in the Contract the Employer shall provide effective access to and possession of the Site including special and/or temporary rights-of-way which are necessary for the Works. The Contractor shall obtain, at his risk and cost, any additional rights of way or facilities outside the Site which he may require for the purposes of the Works.

4.14

Avoidance of Interference

The Contractor shall not interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

4.15

Access Route

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site at Base Date. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

Except as otherwise stated in these Conditions:

- (a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;
- (b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;
- (c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route;
- (d) the Employer does not guarantee the suitability or availability of particular access routes; and
- (e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.

4.16

Transport of Goods

otherwise stated in the Particular Conditions:

- (a) the Contractor shall give the Engineer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
- (b) the Contractor shall be responsible for packing, loading, transporting, receiving,



- unloading, storing and protecting all Goods and other things required for the Works; and
- (c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

4.17

Contractor's Equipment

The Contractor shall be responsible for all Contractor's Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works. The Contractor shall not remove from the Site any major items of Contractor's Equipment without the consent of the Engineer. However, consent shall not be required for vehicles transporting Goods or Contractor's Personnel off Site.

4.18

Protection of the Environment

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values stated in the Specification or prescribed by applicable Laws.

4.19

Electricity, Water and Gas

The Contractor shall, except as stated below, be responsible for the provision of all power, water and other services he may require for his construction activities and to the extent defined in the Specifications, for the tests.

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details and prices are given in the Specification. The Contractor shall, at his risk and cost, provide any apparatus necessary for his use of these services and for measuring the quantities consumed.

The quantities consumed and the amounts due (at these prices) for such services shall be agreed or determined by the Engineer in accordance with Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*]. The Contractor shall pay these amounts to the Employer.

4.20

Employer's Equipment and Free-Issue Materials

The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Specification. Unless otherwise stated in the Specification:

- (a) the Employer shall be responsible for the Employer's Equipment, except that
- (b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.



appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined by the Engineer in accordance with Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*]. The Contractor shall pay these amounts to the Employer.

The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Specification. The Employer shall, at his risk

and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them, and shall promptly give notice to the Engineer of any shortage, defect or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect or default.

After this visual inspection, the free-issue materials shall come under the care, custody and control of the Contractor. The Contractor's obligations of inspection, care, custody and control shall not relieve the Employer of liability for any shortage, defect or default not apparent from a visual inspection.

4.21

Progress Reports

Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Engineer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.

Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

Each report shall include:

- (a) charts and detailed descriptions of progress, including each stage of design (if any), Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection and testing; and including these stages for work by each nominated Subcontractor (as defined in Clause 5 [*Nominated Subcontractors*]);
- (b) photographs showing the status of manufacture and of progress on the Site;
- (c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:
 - (i) commencement of manufacture,
 - (ii) Contractor's inspections,
 - (iii) tests, and
 - (iv) shipment and arrival at the Site;
- (d) the details described in Sub-Clause 6.10 [*Records of Contractor's Personnel and Equipment*];
- (e) copies of quality assurance documents, test results and certificates of Materials;
- (f) list of notices given under Sub-Clause 2.5 [*Employer's Claims*] and notices given under Sub-Clause 20.1 [*Contractor's Claims*];
- (g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
- (h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardise the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

4.22

Security of the Site

Unless otherwise stated in the Particular Conditions:

the Contractor shall be responsible for keeping unauthorised persons off the Site, and



- (b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by the Employer or the Engineer, as authorised personnel of the Employer's other contractors on the Site.

4.23

Contractor's Operations on Site

The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

Upon the issue of a Taking-Over Certificate, the Contractor shall clear away and remove, from that part of the Site and Works to which the Taking-Over Certificate refers, all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave that part of the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.

4.24

Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.

The Contractor shall, upon discovery of any such finding, promptly give notice to the Engineer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

5 Nominated Subcontractors

5.1

Definition of "nominated Subcontractor"

Contract, "nominated Subcontractor" means a Subcontractor:

who is stated in the Contract as being a nominated Subcontractor, or whom the Engineer, under Clause 13 [Variations and Adjustments], instructs the Contractor to employ as a Subcontractor subject to Sub-Clause 5.2 [Objection to Notification].



5.2

Objection to Nomination

The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Engineer as soon as practicable, with supporting particulars. An objection shall be deemed reasonable if it arises from (among other things) any of the following matters, unless the Employer agrees in writing to indemnify the Contractor against and from the consequences of the matter:

- (a) there are reasons to believe that the Subcontractor does not have sufficient competence, resources or financial strength;
- (b) the nominated Subcontractor does not accept to indemnify the Contractor against and from any negligence or misuse of Goods by the nominated Subcontractor, his agents and employees; or
- (c) the nominated Subcontractor does not accept to enter into a subcontract which specifies that, for the subcontracted work (including design, if any), the nominated Subcontractor shall:
 - (i) undertake to the Contractor such obligations and liabilities as will enable the Contractor to discharge his obligations and liabilities under the Contract,
 - (ii) indemnify the Contractor against and from all obligations and liabilities arising under or in connection with the Contract and from the consequences of any failure by the Subcontractor to perform these obligations or to fulfil these liabilities, and
 - (iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.3 [*Payment to nominated Subcontractors*].

5.3

Payments to nominated Subcontractors

The Contractor shall pay to the nominated Subcontractor the amounts shown on the nominated Subcontractor's invoices approved by the Contractor which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with sub-paragraph (b) of Sub-clause 3.5 [*Provisional Sums*], except as stated in Sub-Clause 5.4 [*Evidence of Payment*].

5.4

Evidence of Payments

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

- (a) submits this reasonable evidence to the Engineer, or
- (b)
 - (i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and
 - (ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,



The Employer may (at his sole discretion) pay, direct to the nominated Contractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has submitted the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

6

Staff and Labour

6.1

Engagement of Staff and Labour

Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, feeding, transport and, when appropriate, housing.

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour with appropriate qualifications and experience from sources within the Country.

6.2

Rates of Wages and Conditions of Labour

The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the Laws of the Country for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

6.3

Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.

6.4

Labour Laws

The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.

6.5

Working Hours

No work shall be carried out on the Site on locally recognised days of rest, or outside the normal working hours stated in the Contract Data, unless:

- (a) otherwise stated in the Contract,
- (b) the Engineer gives consent, or
- (c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer.

6.6

Facilities for Staff and Labour

Except as otherwise stated in the Specification, the Contractor shall provide and in all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as in the Specification.

The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the permanent Works.



6.7

Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.

HIV-AIDS Prevention. The Contractor shall conduct an HIV-AIDS awareness programme via an approved service provider and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local community, to promote early diagnosis and to assist affected individuals.

The Contractor shall throughout the contract (including the Defects Notification Period): (i) conduct Information, Education and Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labour (including all the Contractor's employees, all Subcontractors and any other Contractor's or Employer's personnel, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behaviour with respect to, of Sexually Transmitted Diseases (STD), or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labour as appropriate; and (iii) provide for STI and HIV/AIDS screening, diagnosis, counselling and referral to a dedicated national STI and HIV/AIDS programme, (unless otherwise agreed) of all Site staff and labour.

The Contractor shall include in the programme to be submitted for the execution of the Works under Sub-Clause 8.3 an alleviation programme for Site staff and labour and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation programme shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the programme shall detail the resources to be provided or utilised and any related sub-contracting proposed. The programme shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this programme shall not exceed the Provisional Sum dedicated for this purpose.

6.8

Contractor's Superintendence

Throughout the execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary Superintendence to plan, arrange, direct, manage, inspect and test the work.

Superintendence shall be given by a sufficient number of persons having adequate



knowledge of the language for communications (defined in Sub-Clause 1.4 [*Law and Language*]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.

6.9

**Contractor's
Personnel**

The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:

- (a) persists in any misconduct or lack of care,
- (b) carries out duties incompetently or negligently,
- (c) fails to conform with any provisions of the Contract, or
- (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

6.10

**Records of Contractor's
Personnel and
Equipment**

The Contractor shall submit, to the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Engineer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

6.11

Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.

6.12

Foreign Personnel

The Contractor may bring in to the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use his best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.

The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

6.13

Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as stated in the Specification at reasonable prices for the Contractor's Personnel for purposes of or in connection with the Contract.

6.14

Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.



6.15 Measures against Insect and Pest Nuisance	The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.
6.16 Alcoholic Liquor or Drugs	The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.
6.17 Arms and Ammunition	The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
6.18 Festivals and Religious Customs	The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.
6.19 Funeral Arrangements	The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of his Personnel employees who may die while engaged upon the Works.
6.20 Forced Labour	The Contractor shall not employ forced labour, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.
6.21 Child Labour	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 the relevant labour laws of the Country 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.
6.22 Employment Records of Workers	The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarised on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [<i>Records of Contractor's Personnel and Equipment</i>].
6.23 Workers' Organisations	In countries where the relevant labour laws recognise workers' rights to form and to join workers' organisations of their choosing without interference and to bargain collectively, the Contractor shall comply with such laws. Where the relevant labour laws substantially restrict workers' organisations, the Contractor shall enable effective means for the Contractor's Personnel to express their grievances and exercise their rights regarding working conditions and terms of employment. In either case described above, and where the relevant labour laws are silent, the Contractor shall not discourage the Contractor's Personnel from forming or joining workers' organisations of their choosing or from bargaining collectively, and shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to



participate, in such organisations and bargain collectively. The Contractor shall engage with such workers' representatives. Workers' organisations are expected to fairly represent the workers in the workforce.

6.24

Non-Discrimination and Equal Opportunity

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 the relevant labour laws provide for non-discrimination in employment, the Contractor shall comply with such laws. When the relevant labour laws are silent on non-discrimination 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.

7 Plant, Materials and Workmanship

7.1

Manner of Execution

The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

- (a) in the manner (if any) specified in the Contract,
- (b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
- (c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.

7.2

Samples

The Contractor shall submit the following samples of Materials, and relevant information, to the Engineer for consent prior to using the Materials in or for the Works:

- (a) manufacturer's standard samples of Materials and samples specified in the Contract, all at the Contractor's cost, and
- (b) additional samples instructed by the Engineer as a Variation.

Each sample shall be labelled as to origin and intended use in the Works.

7.3

Inspection

The Employer's Personnel shall at all reasonable times:

- (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
- (b) during production, manufacture and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.



The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No activity shall relieve the Contractor from any obligation or responsibility.

The Contractor shall give notice to the Engineer whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Engineer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

7.4

Testing

This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).

Except as otherwise specified in the Contract, the Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Engineer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.

The Engineer may, under Clause 13 [*Variations and Adjustments*], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Engineer shall give the Contractor not less than 24 hours' notice of the Engineer's intention to attend the tests. If the Engineer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, and the tests shall then be deemed to have been made in the Engineer's presence.

If the Contractor suffers delay and/or incurs Cost from complying with these instructions, or as a result of a delay for which the Employer is responsible, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

The Contractor shall promptly forward to the Engineer duly certified reports of the tests. When the specified tests have been passed, the Engineer shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Engineer has not attended the tests, he shall be deemed to have accepted the readings as accurate.

7.5

Rejection



If, as a result of an examination, inspection, measurement or testing, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the Contract, the Engineer may reject the Plant, Materials or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good and ensure that the rejected item complies with the Contract.

If the Engineer requires this Plant, Materials or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer.

7.6

Remedial Work

Notwithstanding any previous test or certification, the Engineer may instruct the Contractor to:

- (a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
- (b) remove and re-execute any other work which is not in accordance with the Contract, and
- (c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified under sub-paragraph (c).

If the Contractor fails to comply with the instruction, the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer all costs arising from this failure.

7.7

Ownership of Plant and Materials

Except as otherwise provided in the Contract, each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:

- (a) when it is incorporated in the Works;
- (b) when the Contractor is paid the corresponding value of the Plant and Materials under Sub-Clause 8.10 [*Payment for Plant and Materials in Event of Suspension*].

7.8

Royalties

Unless otherwise stated in the Specification, the Contractor shall pay all royalties, rents and other payments for:

- (a) natural Materials obtained from outside the Site, and
- (b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.

8 Commencement, Delays and Suspension

8.1

Commencement of Works Except as otherwise specified in the Particular Conditions of Contract, the Commencement Date shall be the date at which the following precedent conditions have all been fulfilled and the Engineer's notification recording the agreement of both parties on such fulfilment and instructing to commence the Work is received by the Contractor:



- (a) signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities of the Country;
- (b) delivery to the Contractor of reasonable evidence of the Employer's Financial arrangements (under Sub-Clause 2.4 [*Employer's Financial Arrangements*]);
- (c) except if otherwise specified in the Contract Data, effective access to and possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.13 [*Compliance with Laws*] as required for the commencement of the Works;
- (d) receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 [*Advance Payment*] provided that the corresponding bank guarantee has been delivered by the Contractor.

If the said Engineer's instruction is not received by the Contractor within 180 days from his receipt of the Letter of Acceptance, the Contractor shall be entitled to terminate the Contract under Sub-Clause 16.2 [*Termination by Contractor*].

The Contractor shall commence the execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay.

8.2

Time for Completion

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:

- (a) achieving the passing of the Tests on Completion, and
- (b) completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*].

8.3

Programme

The Contractor shall submit a detailed time programme to the Engineer within 28 days after receiving the notice under Sub-Clause 8.1 [*Commencement of Works*]. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:

- (a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing,
- (b) each of these stages for work by each nominated Subcontractor (as defined in Clause 5 [*Nominated Subcontractors*],
- (c) the sequence and timing of inspections and tests specified in the Contract, and
- (d) a supporting report which includes:
 - (i) a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and
 - (ii) details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage.



the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.

The Contractor shall promptly give notice to the Engineer of specific probable future events or circumstances which may adversely affect the work, increase the Contract Price or delay the execution of the Works. The Engineer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances, and/or a proposal under Sub-Clause 13.3 [*Variation Procedure*].

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer in accordance with this Sub-Clause.

8.4

Extension of Time for Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [*Taking-Over of the Works and Sections*] is or will be delayed by any of the following causes:

- (a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [*Variation Procedure*]) or other substantial change in the quantity of an item of work included in the Contract,
- (b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions,
- (c) exceptionally adverse climatic conditions,
- (d) Unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions, or
- (e) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel or the Employer's other contractors.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer in accordance with Sub-Clause 20.1 [*Contractor's Claims*]. When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

8.5

Delays Caused by Authorities

If the following conditions apply, namely:

- (a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
- (b) these authorities delay or disrupt the Contractor's work, and
- (c) the delay or disruption was Unforeseeable,

then this delay or disruption will be considered as a cause of delay under subparagraph (b) of Sub-Clause 8.4 [*Extension of Time for Completion*].

8.6

Rate of Progress

If, at any time:

- (a) actual progress is too slow to complete within the Time for Completion, and/or
- (b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [*Programme*],

then as a result of a cause listed in Sub-Clause 8.4 [*Extension of Time for Completion*], then the Engineer may instruct the Contractor to submit, under Sub-Clause 8.3 [*Programme*], a revised programme and supporting report describing the



revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

Unless the Engineer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to notice under Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 below.

Additional costs of revised methods including acceleration measures, instructed by the Engineer to reduce delays resulting from causes listed under Sub-Clause 8.4 [*Extension of Time for Completion*] shall be paid by the Employer, without generating, however, any other additional payment benefit to the Contractor.

8.7

Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 [*Time for Completion*], the Contractor shall subject to notice under Sub-Clause 2.5 [*Employer's Claims*] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data.

These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [*Termination by Employer*] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

8.8

Suspension of Work

The Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.

The Engineer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10 and 8.11 shall not apply.

8.9

Consequences of Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions under Sub-Clause 8.8 [*Suspension of Work*] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost, which shall be included in the Contract Price.



Receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 15.2 [*Termination by Employer*] to agree or determine these matters.

The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, faulty workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [*Suspension of Work*].

**8.10
Payment for Plant and
Materials in Event of
Suspension**

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

- (a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days, and
- (b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Engineer's instructions.

8.11

Prolonged Suspension

If the suspension under Sub-Clause 8.8 [*Suspension of Work*] has continued for more than 84 days, the Contractor may request the Engineer's permission to proceed. If the Engineer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Engineer, treat the suspension as an omission under Clause 13 [*Variations and Adjustments*] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [*Termination by Contractor*].

8.12

Resumption of Work

After the permission or instruction to proceed is given, the Contractor and the Engineer shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension after receiving from the Engineer an instruction to this effect under Clause 13 [*Variations and Adjustments*].

9 Tests on Completion

9.1

Contractor's Obligations

The Contractor shall carry out the Tests on Completion in accordance with this Clause and Sub-Clause 7.4 [*Testing*], after providing the documents in accordance with subparagraph (g) of Sub-Clause 4.1 [*Contractor's General Obligations*].

The Contractor shall give to the Engineer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Engineer shall instruct.

In considering the results of the Tests on Completion, the Engineer shall make allowances for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed any Tests on Completion, the Contractor shall submit a certified report of the results of these Tests to the Engineer.

9.2

Delayed Tests

If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [*Testing*] (fifth paragraph) and/or Sub-Clause 10.3 [*Interference with Tests on Completion*] shall be applicable.



If the Tests on Completion are being unduly delayed by the Contractor, the Engineer may by notice require the Contractor to carry out the Tests within 21 days after giving the notice. The Contractor shall carry out the Tests on such day or days of that period as the Contractor may fix and of which he shall give notice to the Employer.

If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. The Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

9.3

Retesting

If the Works, or a Section, fail to pass the Tests on Completion, Sub-Clause 7.5 [*Rejection*] shall apply, and the Engineer or the Contractor may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.

9.4

Failure to Pass Tests on Completion

If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [*Retesting*], the Engineer shall be entitled to:

- (a) order further repetition of Tests on Completion under Sub-Clause 9.3;
- (b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of Sub-Clause 11.4 [*Failure to Remedy Defects*]; or
- (c) issue a Taking-Over Certificate, if the Employer so requests.

In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under Sub-Clause 2.5 [*Employer's Claims*] and Sub-Clause 3.5 [*Determinations*].

10 Employer's Taking Over

10.1

Taking Over of the Works and Sections

Except as stated in Sub-Clause 9.4 [*Failure to Pass Tests on Completion*], the Works shall be taken over by the Employer when (i) the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 8.2 [*Time for Completion*] and except as allowed in sub-paragraph (a) below, and (ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.

The Contractor may apply by notice to the Engineer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.

The Engineer shall, within 28 days after receiving the Contractor's application:

- (a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects 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.

If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.

10.2

Taking Over of Parts of the Works

The Engineer may, at the sole discretion of the Employer, issue a Taking-Over Certificate for any part of the Permanent Works.

The Employer shall not use any part of the Works (other than as a temporary measure which is either specified in the Contract or agreed by both Parties) unless and until the Engineer has issued a Taking-Over Certificate for this part. However, if the Employer does use any part of the Works before the Taking-Over Certificate is issued:

- (a) the part which is used shall be deemed to have been taken over as from the date on which it is used,
- (b) the Contractor shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the Employer, and
- (c) if requested by the Contractor, the Engineer shall issue a Taking-Over Certificate for this part.

After the Engineer has issued a Taking-Over Certificate for a part of the Works, the Contractor shall be given the earliest opportunity to take such steps as may be necessary to carry out any outstanding Tests on Completion. The Contractor shall carry out these Tests on Completion as soon as practicable before the expiry date of the relevant Defects Notification Period.

If the Contractor incurs Cost as a result of the Employer taking over and/or using a part of the Works, other than such use as is specified in the Contract or agreed by the Contractor, the Contractor shall (i) give notice to the Engineer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus profit, which shall be included in the Contract Price. After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

If a Taking-Over Certificate has been issued for a part of the Works (other than a Section), the delay damages thereafter for completion of the remainder of the Works shall be reduced. Similarly, the delay damages for the remainder of the Section (if any) in which this part is included shall also be reduced. For any period of delay after the date stated in this Taking-Over Certificate, the proportional reduction in these delay damages shall be calculated as the proportion which the value of the part so certified bears to the value of the Works or Section (as the case may be) as a whole. The Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these proportions. The provisions of this paragraph shall only apply to the rate of delay damages under Sub-Clause 8.7 [*Delay Damages*], and shall not affect the maximum amount of these damages.

10.3

Interference with Tests on Completion



If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer is responsible, the Employer shall be

deemed to have taken over the Works or Section (as the case may be) on the date when the Tests on Completion would otherwise have been completed.

The Engineer shall then issue a Taking-Over Certificate accordingly, and the Contractor shall carry out the Tests on Completion as soon as practicable, before the expiry date of the Defects Notification Period. The Engineer shall require the Tests on Completion to be carried out by giving 14 days' notice and in accordance with the relevant provisions of the Contract.

If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

10.4

Surfaces Requiring Reinstatement

Except as otherwise stated in a Taking-Over Certificate, a certificate for a Section or part of the Works shall not be deemed to certify completion of any ground or other surfaces requiring reinstatement.

11 Defects Liability

11.1

Completion of Outstanding Work and Remedying Defects

In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

- (a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, within such reasonable time as is instructed by the Engineer, and
- (b) execute all work required to remedy defects or damage, as may be notified by (or on behalf of) the Employer on or before the expiry date of the Defects Notification Period for the Works or Section (as the case may be).

If a defect appears or damage occurs, the Contractor shall be notified accordingly, by (or on behalf of) the Employer.

11.2

Cost of Remedying Defects

All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*] shall be executed at the risk and cost of the Contractor, if and to the extent that the work is attributable to:



any design for which the Contractor is responsible, Plant, Materials or workmanship not being in accordance with the Contract, or failure by the Contractor to comply with any other obligation.

to the extent that such work is attributable to any other cause, the Contractor shall be notified promptly by (or on behalf of) the Employer, and Sub-Clause 13.3 [*Dispute Resolution Procedure*] shall apply.

11.3 Extension of Defects Notification Period

The Employer shall be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to an extension of the Defects Notification Period for the Works or a Section if and to the extent that the Works, Section or a major item of Plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or by reason of damage attributable to the Contractor. However, a Defects Notification Period shall not be extended by more than two years.

If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [*Suspension of Work*] or Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the Defects Notification Period for the Plant and/or Materials would otherwise have expired.

11.4 Failure to Remedy Defects

If the Contractor fails to remedy any defect or damage within a reasonable time, a date may be fixed by (or on behalf of) the Employer, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable notice of this date.

If the Contractor fails to remedy the defect or damage by this notified date and this remedial work was to be executed at the cost of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Employer may (at his option):

- (a) carry out the work himself or by others, in a reasonable manner and at the Contractor's cost, but the Contractor shall have no responsibility for this work; and the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer the costs reasonably incurred by the Employer in remedying the defect or damage;
- (b) require the Engineer to agree or determine a reasonable reduction in the Contract Price in accordance with Sub-Clause 3.5 [*Determinations*]; or
- (c) if the defect or damage deprives the Employer of substantially the whole benefit of the Works or any major part of the Works, terminate the Contract as a whole, or in respect of such major part which cannot be put to the intended use. Without prejudice to any other rights, under the Contract or otherwise, the Employer shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), plus financing costs and the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor.

11.5 Removal of Defective Work

If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.

11.6 Further Tests

If the work of remedying of any defect or damage may affect the performance of the Works, the Engineer may require the repetition of any of the tests described in the Contract. The requirement shall be made by notice within 28 days after the defect or damage is remedied.



tests shall be carried out in accordance with the terms applicable to the tests, except that they shall be carried out at the risk and cost of the Party under Sub-Clause 11.2 [*Cost of Remedying Defects*], for the cost of the work.

11.7
Right of Access

Until the Performance Certificate has been issued, the Contractor shall have such right of access to the Works as is reasonably required in order to comply with this Clause, except as may be inconsistent with the Employer's reasonable security restrictions.

11.8

Contractor to Search

The Contractor shall, if required by the Engineer, search for the cause of any defect, under the direction of the Engineer. Unless the defect is to be remedied at the cost of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Cost of the search plus profit shall be agreed or determined by the Engineer in accordance with Sub-Clause 3.5 [*Determinations*] and shall be included in the Contract Price.

11.9

Performance Certificate

Performance of the Contractor's obligations shall not be considered to have been completed until the Engineer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Engineer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. A copy of the Performance Certificate shall be issued to the Employer.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

11.10

Unfulfilled Obligations

After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.

11.11

Clearance of Site

Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works from the Site.

If all these items have not been removed within 28 days after receipt by the Contractor of the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.

Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

12 Measurement and Evaluation

12.1

Works to be Measured

The Works shall be measured, and valued for payment, in accordance with this Clause. The Contractor shall show in each application under Sub-Clauses 14.3 [*Application for Interim Payment Certificates*], 14.10 [*Statement on Completion*] and 14.14 [*Application for Final Payment Certificate*] the quantities and other particulars of the amounts which he considers to be entitled under the Contract.



Whenever the Engineer requires any part of the Works to be measured, reasonable notice shall be given to the Contractor's Representative, who shall:

- (a) promptly either attend or send another qualified representative to assist the Engineer in making the measurement, and
- (b) supply any particulars requested by the Engineer.

If the Contractor fails to attend or send a representative, the measurement made by (or on behalf of) the Engineer shall be accepted as accurate.

Except as otherwise stated in the Contract, wherever any Permanent Works are to be measured from records, these shall be prepared by the Engineer. The Contractor shall, as and when requested, attend to examine and agree the records with the Engineer, and shall sign the same when agreed. If the Contractor does not attend, the records shall be accepted as accurate.

If the Contractor examines and disagrees the records, and/or does not sign them as agreed, then the Contractor shall give notice to the Engineer of the respects in which the records are asserted to be inaccurate. After receiving this notice, the Engineer shall review the records and either confirm or vary them and certify the payment of the undisputed part. If the Contractor does not so give notice to the Engineer within 14 days after being requested to examine the records, they shall be accepted as accurate.

12.2

Method of Measurement Except as otherwise stated in the Contract and notwithstanding local practice:

- (a) measurement shall be made of the net actual quantity of each item of the Permanent Works, and
- (b) the method of measurement shall be in accordance with the Bill of Quantities or other applicable Schedules.

12.3

Evaluation

Except as otherwise stated in the Contract, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine the Contract Price by evaluating each item of work, applying the measurement agreed or determined in accordance with the above Sub-Clauses 12.1 and 12.2 and the appropriate rate or price for the item.

For each item of work, the appropriate rate or price for the item shall be the rate or price specified for such item in the Contract or, if there is no such item, specified for similar work.

Any item of work included in the Bill of Quantities for which no rate or price was specified shall be considered as included in other rates and prices in the Bill of Quantities and will not be paid for separately.

However, a new rate or price shall be appropriate for an item of work if:



- (i) the measured quantity of the item is changed by more than 25% from the quantity of this item in the Bill of Quantities or other Schedule,
- (ii) this change in quantity multiplied by such specified rate for this item exceeds 0.25% of the Accepted Contract Amount,
- (iii) this change in quantity directly changes the Cost per unit quantity of this item by more than 1%, and
- (iv) this item is not specified in the Contract as a "fixed rate item";

or

- (b)
 - (i) the work is instructed under Clause 13 [*Variations and Adjustments*],
 - (ii) no rate or price is specified in the Contract for this item, and
 - (iii) no specified rate or price is appropriate because the item of work is not of similar character, or is not executed under similar conditions, as any item in the Contract.

Each new rate or price shall be derived from any relevant rates or prices in the Contract, with reasonable adjustments to take account of the matters described in sub-paragraph (a) and/or (b), as applicable. If no rates or prices are relevant for the derivation of a new rate or price, it shall be derived from the reasonable Cost of executing the work, together with profit, taking account of any other relevant matters.

Until such time as an appropriate rate or price is agreed or determined, the Engineer shall determine a provisional rate or price for the purposes of Interim Payment Certificates as soon as the concerned work commences.

12.4

Omissions

Whenever the omission of any work forms part (or all) of a Variation, the value of which has not been agreed, if:

- (a) the Contractor will incur (or has incurred) cost which, if the work had not been omitted, would have been deemed to be covered by a sum forming part of the Accepted Contract Amount;
- (b) the omission of the work will result (or has resulted) in this sum not forming part of the Contract Price; and
- (c) this cost is not deemed to be included in the evaluation of any substituted work;

then the Contractor shall give notice to the Engineer accordingly, with supporting particulars. Upon receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this cost, which shall be included in the Contract Price.

Variations and Adjustments

13.1

Right to Vary

Variations may be initiated by the Engineer at any time prior to issuing the Taking-Over Certificate for the Works, either by an instruction or by a request for the Contractor to submit a proposal.

The Contractor shall execute and be bound by each Variation, unless the Contractor promptly gives notice to the Engineer stating (with supporting particulars) that (i) the Contractor cannot readily obtain the Goods required for the Variation, or (ii) such Variation triggers a substantial change in the sequence or progress of the Works. Upon receiving this notice, the Engineer shall cancel, confirm or vary the instruction.

A variation may include:

- (a) changes to the quantities of any item of work included in the Contract (however, such changes do not necessarily constitute a Variation),
- (b) changes to the quality and other characteristics of any item of work,
- (c) changes to the levels, positions and/or dimensions of any part of the Works,
- (d) omission of any work unless it is to be carried out by others,



- (e) any additional work, Plant, Materials or services necessary for the Permanent Works, including any associated Tests on Completion, boreholes and other testing and exploratory work, or
- (f) changes to the sequence or timing of the execution of the Works.

The Contractor shall not make any alteration and/or modification of the Permanent Works, unless and until the Engineer instructs or approves a Variation.

13.2

Value Engineering

The Contractor may, at any time, submit to the Engineer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [*Variation Procedure*].

If a proposal, which is approved by the Engineer, includes a change in the design of part of the Permanent Works, then unless otherwise agreed by both Parties:

- (a) the Contractor shall design this part,
- (b) sub-paragraphs (a) to (d) of Sub-Clause 4.1 [*Contractor's General Obligations*] shall apply, and
- (c) if this change results in a reduction in the contract value of this part, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine a fee, which shall be included in the Contract Price. This fee shall be half (50%) of the difference between the following amounts:
 - (i) such reduction in contract value, resulting from the change, excluding adjustments under Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] and Sub-Clause 13.8 [*Adjustments for Changes in Cost*], and
 - (ii) the reduction (if any) in the value to the Employer of the varied works, taking account of any reductions in quality, anticipated life or operational efficiencies.

However, if amount (i) is less than amount (ii), there shall not be a fee.

13.3

Variation Procedure

If the Engineer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:

- (a) a description of the proposed work to be performed and a programme for its execution,
- (b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [*Programme*] and to the Time for Completion, and
- (c) the Contractor's proposal for evaluation of the Variation.

The Engineer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [*Value Engineering*] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.

For instruction to execute a Variation, with any requirements for the recording of Costs, the Engineer shall issue an instruction to the Contractor, who shall acknowledge receipt.



Each Variation shall be evaluated in accordance with Clause 12 [*Measurement and Evaluation*], unless the Engineer instructs or approves otherwise in accordance with this Clause.

13.4

Payment in Applicable Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.

13.5

Provisional Sums

Each Provisional Sum shall only be used, in whole or in part, in accordance with the Engineer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Engineer shall have instructed. For each Provisional Sum, the Engineer may instruct:

- (a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.4 [*Variation Procedure*]; and/or
- (b) Plant, Materials or services to be purchased by the Contractor, from a nominated Subcontractor (as defined in Clause 5 [*Nominated Subcontractors*] or otherwise; and for which there shall be included in the Contract Price:
 - (i) the actual amounts paid (or due to be paid) by the Contractor, and
 - (ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the appropriate Schedule. If there is no such rate, the percentage rate stated in the Contract Data shall be applied.

The Contractor shall, when required by the Engineer, produce quotations, invoices, vouchers and accounts or receipts in substantiation.

13.6

Daywork

For work of a minor or incidental nature, the Engineer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the Daywork Schedule included in the Contract, and the following procedure shall apply. If a Daywork Schedule is not included in the Contract, this Sub-Clause shall not apply.

Before ordering Goods for the work, the Contractor shall submit quotations to the Engineer. When applying for payment, the Contractor shall submit invoices, vouchers and accounts or receipts for any Goods.

Except for any items for which the Daywork Schedule specifies that payment is not due, the Contractor shall deliver each day to the Engineer accurate statements in duplicate which shall include the following details of the resources used in executing the previous day's work:



the names, occupations and time of Contractor's Personnel,
the identification, type and time of Contractor's Equipment and Temporary Works, and
the quantities and types of Plant and Materials used.

Copy of each statement will, if correct, or when agreed, be signed by the Engineer and returned to the Contractor. The Contractor shall then submit priced statements of

these resources to the Engineer, prior to their inclusion in the next Statement under Sub-Clause 14.3 [*Application for Interim Payment Certificates*].

13.7

Adjustments for Changes in Legislation

The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.

If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the table of adjustment data in accordance with the provisions of Sub-Clause 13.8 [*Adjustments for Changes in Cost*].

13.8

Adjustments for Changes in Cost

In this Sub-Clause, "table of adjustment data" means the completed table of adjustment data for local and foreign currencies included in the Schedules. If there is no such table of adjustment data, this Sub-Clause shall not apply.

If this Sub-Clause applies, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in Costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs.

The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the appropriate Schedule and certified in Payment Certificates, shall be determined from formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be of the following general type:

$$P_n = a + b \frac{L_n}{L_o} + c \frac{E_n}{E_o} + d \frac{M_n}{M_o} + \dots$$



"P_n" is the adjustment multiplier to be applied to the estimated contract value in the relevant currency of the work carried out in period "n", this period being a month unless otherwise stated in the Contract Data;

“a” is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

“b”, “c”, “d”, ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

“Ln”, “En”, “Mn”, ... are the current cost indices or reference prices for period “n”, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates); and

“Lo”, “Eo”, “Mo”, ... are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date.

The cost indices or reference prices stated in the table of adjustment data shall be used. If their source is in doubt, it shall be determined by the Engineer. For this purpose, reference shall be made to the values of the indices at stated dates for the purposes of clarification of the source; although these dates (and thus these values) may not correspond to the base cost indices.

In cases where the “currency of index” is not the relevant currency of payment, each index shall be converted into the relevant currency of payment at the selling rate, established by the central bank of the country, of this relevant currency on the above date for which the index is required to be applicable.

Until such time as each current cost index is available, the Engineer shall determine a provisional index for the issue of Interim Payment Certificates. When a current cost index is available, the adjustment shall be recalculated accordingly.

If the Contractor fails to complete the Works within the Time for Completion, adjustment of prices thereafter shall be made using either (i) each index or price applicable on the date 49 days prior to the expiry of the Time for Completion of the Works or (ii) the current index or price, whichever is more favourable to the Employer.

The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.

14 Contract Price and Payment

14.1

The Contract Price

Unless otherwise stated in the Particular Conditions:

- (a) the Contract Price shall be agreed or determined under Sub-Clause 12.3 [Evaluation] and be subject to adjustments in accordance with the Contract; the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs except as stated in Sub-Clause 13.7 [Adjustments for Changes in Legislation];
- any quantities which may be set out in the Bill of Quantities or other Schedule are estimated quantities and are not to be taken as the actual and correct quantities:



- (i) of the Works which the Contractor is required to execute, or
 - (ii) for the purposes of Clause 12 [*Measurement and Evaluation*]; and
- (d) the Contractor shall submit to the Engineer, within 28 days after the Commencement Date, a proposed breakdown of each lump sum price in the Schedules. The Engineer may take account of the breakdown when preparing Payment Certificates, but shall not be bound by it.

Notwithstanding the provisions of subparagraph (b), Contractor's Equipment, including essential spare parts therefor, imported by the Contractor for the sole purpose of executing the Contract shall be exempt from the payment of import duties and taxes upon importation.

14.2

Advance Payment

The Employer shall make an advance payment, as an interest-free loan for mobilisation and cash flow support, when the Contractor submits a guarantee in accordance with this Sub-Clause. The total advance payment, the number and timing of instalments (if more than one), and the applicable currencies and proportions, shall be as stated in the Contract Data.

Unless and until the Employer receives this guarantee, or if the total advance payment is not stated in the Contract Data, this Sub-Clause shall not apply.

The Engineer shall deliver to the Employer and to the Contractor an Interim Payment Certificate for the advance payment or its first instalment after receiving a Statement (under Sub-Clause 14.3 [*Application for Interim Payment Certificates*]) and after the Employer receives (i) the Performance Security in accordance with Sub-Clause 4.2 [*Performance Security*] and (ii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by a reputable bank or financial institution selected by the Contractor, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount shall be progressively reduced by the amount repaid by the Contractor as indicated in the Payment Certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.

Unless stated otherwise in the Contract Data, the advance payment shall be repaid through percentage deductions from the interim payments determined by the Engineer in accordance with Sub-Clause 14.6 [*Issue of Interim Payment Certificates*], as follows:

- (a) deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds 30 percent (30%) of the Accepted Contract Amount less Provisional Sums; and
- (b) deductions shall be made at the amortisation rate stated in the Contract Data of the amount of each Interim Payment Certificate (excluding the advance payment and deductions for its repayments as well as deductions for retention money) in the currencies and proportions of the advance payment until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the time when 90 percent (90%) of the Accepted Contract Amount less Provisional Sums has been certified for payment.



If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [*Termination by Employer*], Clause 16 [*Suspension and Termination by Contractor*] or Clause 19.6 [*Force Majeure*] (as the case may be), the whole of the balance then outstanding shall immediately become due and in case of termination under Clause 15 [*Termination by Employer*], except for Sub-Clause 15.5 [*Employer's Entitlement to Termination for Convenience*], payable by the Contractor to the Employer.

14.3

Application for Interim Payment Certificates

The Contractor shall submit a Statement in six copies to the Engineer after the end of each month, in a form approved by the Engineer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the report on the progress during this month in accordance with Sub-Clause 4.21 [*Progress Reports*].

The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:

- (a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (g) below);
- (b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] and Sub-Clause 13.8 [*Adjustments for Changes in Cost*];
- (c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Contract Data to the total of the above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Contract Data;
- (d) any amounts to be added for the advance payment (if more than one instalment) and to be deducted for its repayments in accordance with Sub-Clause 14.2 [*Advance Payment*];
- (e) any amounts to be added and deducted for Plant and Materials in accordance with Sub-Clause 14.5 [*Plant and Materials intended for the Works*];
- (f) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 [*Claims, Disputes and Arbitration*]; and
- (g) the deduction of amounts certified in all previous Payment Certificates.

14.4

Schedule of Payments

If the Contract includes a schedule of payments specifying the instalments in which the Contract Price will be paid, then unless otherwise stated in this schedule:

- (a) the instalments quoted in this schedule of payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 14.3 [*Application for Interim Payment Certificates*];
- (b) Sub-Clause 14.5 [*Plant and Materials intended for the Works*] shall not apply; and
- (c) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less or more than that on which this schedule of payments was based, then the Engineer may proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine revised instalments, which shall take account of the extent to which progress is less or more than that on which the instalments were previously based.



If the contract does not include a schedule of payments, the Contractor shall submit monthly estimates of the payments which he expects to become due during each

quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.

14.5

Plant and Materials intended for the Works

If this Sub-Clause applies, Interim Payment Certificates shall include, under sub-paragraph (e) of Sub-Clause 14.3, (i) an amount for Plant and Materials which have been sent to the Site for incorporation in the Permanent Works, and (ii) a reduction when the contract value of such Plant and Materials is included as part of the Permanent Works under sub-paragraph (a) of Sub-Clause 14.3 [*Application for Interim Payment Certificates*].

If the lists referred to in sub-paragraphs (b)(i) or (c)(i) below are not included in the Schedules this Sub-Clause shall not apply.

The Engineer shall determine and certify each addition if the following conditions are satisfied:

(a) the Contractor has:

- (i) kept satisfactory records (including the orders, receipts, Costs and use of Plant and Materials) which are available for inspection, and
- (ii) submitted a statement of the Cost of acquiring and delivering the Plant and Materials to the Site supported by satisfactory evidence;

and either:

(b) the relevant Plant and Materials:

- (i) are those listed in the Schedules for payment when shipped,
- (ii) have been shipped to the Country, en route to the Site, in accordance with the Contract; and
- (iii) are described in a clean shipped bill of lading or other evidence of shipment, which has been submitted to the Engineer together with evidence of payment of freight and insurance, any other documents reasonably required, and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to the amount due under this Sub-Clause: this guarantee may be in a similar form to the form referred to in Sub-Clause 14.2 [*Advance Payment*] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration;

or

(c) the relevant Plant and Materials:

- (i) are those listed in the Schedules for payment when delivered to the Site, and
- (ii) have been delivered to and are properly stored on the Site, are protected against loss, damage or deterioration, and appear to be in accordance with the Contract.

Additional amount to be certified shall be the equivalent of eighty percent (80%) of the Engineer's determination of the cost of the Plant and Materials (including delivery to Site), taking account of the documents mentioned in this Sub-Clause and the contract value of the Plant and Materials.



The currencies for this additional amount shall be the same as those in which payment will become due when the contract value is included under sub-paragraph (a) of Sub-Clause 14.3 [*Application for Interim Payment Certificates*]. At that time, the Payment Certificate shall include the applicable reduction which shall be equivalent to, and in the same currencies and proportions as, this additional amount for the relevant Plant and Materials.

14.6

Issue of Interim Payment Certificates

No amount will be certified or paid until the Employer has received and approved the Performance Security. Thereafter, the Engineer shall, within 28 days after receiving a Statement and supporting documents, deliver to the Employer and to the Contractor an Interim Payment Certificate which shall state the amount which the Engineer fairly determines to be due, with all supporting particulars for any reduction or withholding made by the Engineer on the Statement if any.

However, prior to issuing the Taking-Over Certificate for the Works, the Engineer shall not be bound to issue an Interim Payment Certificate in an amount which would (after retention and other deductions) be less than the minimum amount of Interim Payment Certificates (if any) stated in the Contract Data. In this event, the Engineer shall give notice to the Contractor accordingly.

An Interim Payment Certificate shall not be withheld for any other reason, although:

- (a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or
- (b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Engineer, the value of this work or obligation may be withheld until the work or obligation has been performed.

The Engineer may in any Payment Certificate make any correction or modification that should properly be made to any previous Payment Certificate. A Payment Certificate shall not be deemed to indicate the Engineer's acceptance, approval, consent or satisfaction.

14.7

Payment

The Employer shall pay to the Contractor:

- (a) the first instalment of the advance payment within 42 days after issuing the Letter of Acceptance or within 21 days after receiving the documents in accordance with Sub-Clause 4.2 [*Performance Security*] and Sub-Clause 14.2 [*Advance Payment*], whichever is later;
- (b) the amount certified in each Interim Payment Certificate within 56 days after the Engineer receives the Statement and supporting documents; or, at a time when the Bank's loan or credit (from which part of the payments to the Contractor is being made) is suspended, the amount shown on any statement submitted by the Contractor within 14 days after such statement is submitted, any discrepancy being rectified in the next payment to the Contractor; and
- (c) the amount certified in the Final Payment Certificate within 56 days after the Employer receives this Payment Certificate; or, at a time when the Bank's loan or credit (from which part of the payments to the Contractor is being made) is suspended, the undisputed amount shown in the Final Statement within 56 days after the date of notification of the suspension in accordance with Sub-Clause 16.2 [*Termination by Contractor*].



Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.

14.8

Delayed Payment

If the Contractor does not receive payment in accordance with Sub-Clause 14.7 [Payment], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay. This period shall be deemed to commence on the date for payment specified in Sub-Clause 14.7 [Payment], irrespective (in the case of its sub-paragraph (b)) of the date on which any Interim Payment Certificate is issued.

Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, or if not available, the interbank offered rate, and shall be paid in such currency.

The Contractor shall be entitled to this payment without formal notice or certification, and without prejudice to any other right or remedy.

14.9

Payment of Retention Money

When the Taking-Over Certificate has been issued for the Works, the first half of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate is issued for a Section or part of the Works, a proportion of the Retention Money shall be certified and paid. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section or part, by the estimated final Contract Price.

Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate was issued for a Section, a proportion of the second half of the Retention Money shall be certified and paid promptly after the expiry date of the Defects Notification Period for the Section. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section by the estimated final Contract Price.

However, if any work remains to be executed under Clause 11 [Defects Liability], the Engineer shall be entitled to withhold certification of the estimated cost of this work until it has been executed.

When calculating these proportions, no account shall be taken of any adjustments under Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost].

Unless otherwise stated in the Particular Conditions, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and issued by a reputable bank or financial institution, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the first half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for Performance Security in Sub-Clause 4.2. On receipt by the Employer of the guarantee, the Engineer shall certify and the Employer shall pay the second half of the Retention Money. The release of the second half of the Retention Money



against a guarantee shall then be in lieu of the release under the second paragraph of this Sub-Clause. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate.

If the Performance Security required under Sub-Clause 4.2 is in the form of a demand guarantee, and the amount guaranteed under it when the Taking-Over Certificate is issued is more than half of the Retention Money, then the Retention Money guarantee will not be required. If the amount guaranteed under the Performance Security when the Taking-Over Certificate is issued is less than half of the Retention Money, the Retention Money guarantee will only be required for the difference between half of the Retention Money and the amount guaranteed under the Performance Security.

14.10

Statement at Completion Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Engineer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 14.3 [*Application for Interim Payment Certificates*], showing:

- (a) the value of all work done in accordance with the Contract up to the date stated in the Taking-Over Certificate for the Works;
- (b) any further sums which the Contractor considers to be due, and
- (c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

The Engineer shall then certify in accordance with Sub-Clause 14.6 [*Issue of Interim Payment Certificates*].

14.11

Application for Final Payment Certificate

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Engineer, six copies of a draft final statement with supporting documents showing in detail in a form approved by the Engineer:

- (a) the value of all work done in accordance with the Contract, and
- (b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer may reasonably require within 28 days from receipt of said draft and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".

However if, following discussions between the Engineer and the Contractor and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer (with a copy to the Contractor) an Interim Payment Certificate for the agreed parts of the draft final statement. Thereafter, if the dispute is finally resolved under Sub-Clause 20.4 [*Obtaining Dispute Board's Decision*] or Sub-Clause 20.5 [*Amicable Settlement*], the Contractor shall then prepare and submit to the Employer (with a copy to the Engineer) a Final Statement.

14.12

Discharge



On submitting the Final Statement, the Contractor shall submit a discharge which states that the total of the Final Statement represents full and final settlement of all sums due to the Contractor under or in connection with the Contract. This

discharge may state that it becomes effective when the Contractor has received the Performance Security and the outstanding balance of this total, in which event the discharge shall be effective on such date.

14.13

Issue of Final Payment Certificate

Within 28 days after receiving the Final Statement and discharge in accordance with Sub-Clause 14.11 [*Application for Final Payment Certificate*] and Sub-Clause 14.12 [*Discharge*], the Engineer shall deliver, to the Employer and to the Contractor, the Final Payment Certificate which shall state:

- (a) the amount which he fairly determines is finally due, and
- (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled, the balance (if any) due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be.

If the Contractor has not applied for a Final Payment Certificate in accordance with Sub-Clause 14.11 [*Application for Final Payment Certificate*] and Sub-Clause 14.12 [*Discharge*], the Engineer shall request the Contractor to do so. If the Contractor fails to submit an application within a period of 28 days, the Engineer shall issue the Final Payment Certificate for such amount as he fairly determines to be due.

14.14

Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:

- (a) in the Final Statement; and also
- (b) (except for matters or things arising after the issue of the Taking-Over Certificate for the Works) in the Statement at completion described in Sub-Clause 14.10 [*Statement at Completion*].

However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer.

14.15

Currencies of Payment

The Contract Price shall be paid in the currency or currencies named in the Schedule of Payment Currencies. If more than one currency is so named, payments shall be made as follows:

- (a) if the Accepted Contract Amount was expressed in Local Currency only:
 - (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Schedule of Payment Currencies, except as otherwise agreed by both Parties;
 - (ii) payments and deductions under Sub-Clause 13.5 [*Provisional Sums*] and Sub-Clause 13.7 [*Adjustments for Changes in Legislation*] shall be made in the applicable currencies and proportions; and
 - (iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 [*Application for Interim Payment Certificates*] shall be made in the currencies and proportions specified in sub-paragraph (a)(i) above;



payment of the damages specified in the Contract Data shall be made in the currencies and proportions specified in the Schedule of Payment currencies;

- (c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;
- (d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and
- (e) if no rates of exchange are stated in the Schedule of Payment Currencies, they shall be those prevailing on the Base Date and determined by the central bank of the Country.

15 Termination by Employer

15.1

Notice to Correct

If the Contractor fails to carry out any obligation under the Contract, the Engineer may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.

15.2

Termination by Employer

The Employer shall be entitled to terminate the Contract if the Contractor:

- (a) fails to comply with Sub-Clause 4.2 [*Performance Security*] or with a notice under Sub-Clause 15.1 [*Notice to Correct*],
- (b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
- (c) without reasonable excuse fails:
 - (i) to proceed with the Works in accordance with Clause 8 [*Commencement, Delays and Suspension*], or
 - (ii) to comply with a notice issued under Sub-Clause 7.5 [*Rejection*] or Sub-Clause 7.6 [*Remedial Work*], within 28 days after receiving it,
- (d) subcontracts the whole of the Works or assigns the Contract without the required agreement,
- (e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or
- (f) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:
 - (i) for doing or forbearing to do any action in relation to the Contract, or
 - (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract,

or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

if any of these events or circumstances, the Employer may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the



Site. However, in the case of sub-paragraph (e) or (f), the Employer may by notice terminate the Contract immediately.

The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.

The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Engineer. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice (i) for the assignment of any subcontract, and (ii) for the protection of life or property or for the safety of the Works.

After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.

The Employer shall then give notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.

15.3

Valuation at Date of Termination

As soon as practicable after a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.

15.4

Payment after Termination

After a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer may:

- (a) proceed in accordance with Sub-Clause 2.5 [*Employer's Claims*],
- (b) withhold further payments to the Contractor until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established, and/or
- (c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [*Valuation at Date of Termination*]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

15.5

Employer's Entitlement to Termination for Convenience

The Employer shall be entitled to terminate the Contract, at any time for the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for works to be executed by another contractor or to avoid a termination of the Contract by the Contractor under Clause 16.2 [*Termination by Contractor*].

On termination, the Contractor shall proceed in accordance with Sub-Clause 16.1 [*Cessation of Work and Removal of Contractor's Equipment*] and shall be paid in accordance with Sub-Clause 16.4 [*Payment on Termination*].



15.6 Corrupt or Fraudulent Practices

If the Employer determines, based on reasonable evidence, that the Contractor has engaged in corrupt, fraudulent, collusive or coercive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contract and expel him from the Site, and the provisions of Clause 15 shall apply as if such termination had been made under Sub-Clause 15.2 [*Termination by Employer*].

Should any employee of the Contractor be determined, based on reasonable evidence, to have engaged in corrupt, fraudulent or coercive practice during the execution of the work then that employee shall be removed in accordance with Sub-Clause 6.9 [*Contractor's Personnel*].

[*For contracts financed by the Asian Development Bank:*]

For the purposes of this Sub-Clause:

- (a) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
- (b) "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;
- (c) "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;
- (d) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party.

16 Suspension and Termination by Contractor

16.1 Contractor's Entitlement to Suspend Work

If the Employer fails to certify in accordance with Sub-Clause 14.6 [*Issue of Interim Payment Certificates*] or the Employer fails to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*] or Sub-Clause 14.7 [*Payment*], the Contractor may, after giving not less than 21 days' notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the Payment Certificate, reasonable evidence or payment, as the case may be and as described in the notice.

Notwithstanding the above, if the Bank has suspended disbursements under the loan or credit from which payments to the Contractor are being made, in whole or in part, for the execution of the Works, and no alternative funds are available as provided for in Sub-Clause 2.4 [*Employer's Financial Arrangements*], the Contractor may by notice suspend work or reduce the rate of work at any time, but not less than 7 days after the Borrower having received the suspension notification from the Bank.

The Contractor's action shall not prejudice his entitlements to financing charges under Clause 14.8 [*Delayed Payment*] and to termination under Sub-Clause 16.2 [*Termination by Contractor*].

If the Contractor subsequently receives such Payment Certificate, evidence or payment (as described in the relevant Sub-Clause and in the above notice) before a notice of termination, the Contractor shall resume normal working as soon as reasonably practicable.



If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

16.2

Termination by Contractor

The Contractor shall be entitled to terminate the Contract if:

- (a) the Contractor does not receive the reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*] in respect of a failure to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*],
- (b) the Engineer fails, within 56 days after receiving a Statement and supporting documents, to issue the relevant Payment Certificate,
- (c) the Contractor does not receive the amount due under an Interim Payment Certificate within 42 days after the expiry of the time stated in Sub-Clause 14.7 [*Payment*] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.6 [*Employer's Claims*]),
- (d) the Employer substantially fails to perform his obligations under the Contract in such manner as to materially and adversely affect the economic balance of the Contract and/or the ability of the Contractor to perform the Contract,
- (e) the Employer fails to comply with Sub-Clause 1.6 [*Contract Agreement*] or Sub-Clause 1.7 [*Assignment*],
- (f) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.12 [*Prolonged Suspension*],
- (g) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events,
- (h) the Contractor does not receive the Engineer's instruction recording the agreement of both Parties on the fulfilment of the conditions for the Commencement of Works under Sub-Clause 8.1 [*Commencement of Works*].

In any of these events or circumstances, the Contractor may, upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of subparagraph (f) or (g), the Contractor may by notice terminate the Contract immediately.

In the event the Bank suspends the loan or credit from which part or whole of the payments to the Contractor are being made, if the Contractor has not received the sums due to him upon expiration of the 14 days referred to in Sub-Clause 14.7 [*Payment*] for payments under Interim Payment Certificates, the Contractor may, without prejudice to the Contractor's entitlement to financing charges under Sub-Clause 14.8 [*Delayed Payment*], take one of the following actions, namely (i) suspend or reduce the rate of work under Sub-Clause 16.1 above, or (ii) terminate the Contract by giving notice to the Employer, with a copy to the Engineer, such termination to take effect 14 days after the giving of the notice.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.



16.3
Cessation of Work and
Removal of Contractor's
Equipment

After a notice of termination under Sub-Clause 15.5 [*Employer's Entitlement to Termination for Convenience*], Sub-Clause 16.2 [*Termination by Contractor*] or Sub-Clause 19.6 [*Optional Termination, Payment and Release*] has taken effect, the Contractor shall promptly:

- (a) cease all further work, except for such work as may have been instructed by the Engineer for the protection of life or property or for the safety of the Works,
- (b) hand over Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment, and
- (c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.

16.4

Payment on Termination

After a notice of termination under Sub-Clause 16.2 [*Termination by Contractor*] has taken effect, the Employer shall promptly:

- (a) return the Performance Security to the Contractor,
- (b) pay the Contractor in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*], and
- (c) pay to the Contractor the amount of any loss or damage sustained by the Contractor as a result of this termination.

17 Risk and Responsibility

17.1

Indemnities

The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:

- (a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and
- (b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss arises out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless and to the extent that any such damage or loss is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them.

The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of (1) bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in sub-paragraphs (d)(i), (ii) and (iii) of Sub-Clause 18.3 [*Insurance against Injury to Persons and Damage to Property*].

17.2

Contractor's Care
of the Works

The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued).



issued under Sub-Clause 10.1 [*Taking Over of the Works and Sections*]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section or part of the Works, responsibility for the care of the Section or part shall then pass to the Employer.

After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a Taking-Over Certificate, until this outstanding work has been completed.

If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.

The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.

17.3

Employer's Risks

The risks referred to in Sub-Clause 17.4 [*Consequences of Employer's Risks*] below, insofar as they directly affect the execution of the Works in the Country, are:

- (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, within the Country,
- (c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel,
- (d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity,
- (e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (f) use or occupation by the Employer of any part of the Permanent Works, except as may be specified in the Contract,
- (g) design of any part of the Works by the Employer's Personnel or by others for whom the Employer is responsible, and
- (h) any operation of the forces of nature which is Unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventive precautions.

17.4

Consequences of Employer's Risks

If and to the extent that any of the risks listed in Sub-Clause 17.3 above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Engineer and shall rectify this loss or damage to the extent required by the Engineer.



If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

obtain an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and

- (b) payment of any such Cost, which shall be included in the Contract Price. In the case of sub-paragraphs (f) and (g) of Sub-Clause 17.3 [*Employer's Risks*], Cost plus profit shall be payable.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

17.5

Intellectual and Industrial Property Rights

In this Sub-Clause, "infringement" means an infringement (or alleged infringement) of any patent, registered design, copyright, trade mark, trade name, trade secret or other intellectual or industrial property right relating to the Works; and "claim" means a claim (or proceedings pursuing a claim) alleging an infringement.

Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to indemnity under this Sub-Clause.

The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:

- (a) an unavoidable result of the Contractor's compliance with the Contract, or
- (b) a result of any Works being used by the Employer:
 - (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
 - (ii) in conjunction with anything not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract.

The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the manufacture, use, sale or import of any Goods or (ii) any design for which the Contractor is responsible.

If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.

17.6

Limitation of Liability

Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than as specifically provided in Sub-Clause 8.7 [*Delay Damages*]; Sub-Clause 11.2 [*Cost of Remedying Defects*]; Sub-Clause 15.4 [*Payment after Termination*]; Sub-Clause 16.4 [*Payment on Termination*]; Sub-Clause 17.1 [*Indemnities*]; Sub-Clause 17.4(b) [*Consequences of Employer's Risks*] and Sub-Clause 17.5 [*Intellectual and Industrial Property Rights*].



The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 [*Electricity, Water and Gas*], Sub-Clause 4.20 [*Employer's Equipment and Free-Issue Materials*], Sub-Clause 17.1 [*Indemnities*] and Sub-Clause 17.5 [*Intellectual and Industrial Property Rights*], shall exceed the sum resulting from the application of a multiplier (less or greater than

one) to the Accepted Contract Amount, as stated in the Contract Data, or (if such multiplier or other sum is not so stated), the Accepted Contract Amount.

This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

17.7

Use of Employer's Accommodation/Facilities

The Contractor shall take full responsibility for the care of the Employer-provided accommodation and facilities, if any, as detailed in the Specification, from the respective dates of hand-over to the Contractor until cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works).

If any loss or damage happens to any of the above items while the Contractor is responsible for their care arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at his own cost, rectify the loss or damage to the satisfaction of the Engineer.

18 Insurance

18.1

General Requirements for Insurances

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.

Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms approved by the Employer. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.

Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms acceptable to the Contractor. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.

If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

The relevant insuring Party shall, within the respective periods stated in the Contract (calculated from the Commencement Date), submit to the other Party:

(a) evidence that the insurances described in this Clause have been effected, and
(b) copies of the policies for the insurances described in Sub-Clause 18.2



[*Insurance for Works and Contractor's Equipment*] and Sub-Clause 18.3 [*Insurance against Injury to Persons and Damage to Property*].

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party. Whenever evidence or policies are submitted, the insuring Party shall also give notice to the Engineer.

Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.

Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [*Employer's Claims*] or Sub-Clause 20.1 [*Contractor's Claims*], as applicable.

The Contractor shall be entitled to place all insurances relating to the Contract (including, but not limited to the insurance referred to Clause 18) with insurers from any eligible source country.

18.2

Insurance for Works and Contractor's Equipment

The insuring Party shall insure the Works, Plant, Materials and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 18.1 [*General Requirements for Insurances*], until the date of issue of the Taking-Over Certificate for the Works.

The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable from a cause occurring prior to the issue of the Taking-Over Certificate, and for damage caused by the Contractor in the course of any other operations including those under Clause 11 [*Defects Liability*].

The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment,



the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated to the Party actually bearing the costs of rectifying the loss or damage,
- (c) shall cover all loss and damage from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*],
- (d) shall also cover, to the extent specifically required in the bidding documents of the Contract, loss or damage to a part of the Works which is attributable to the use or occupation by the Employer of another part of the Works, and loss or damage from the risks listed in sub-paragraphs (c), (g) and (h) of Sub-Clause 17.3 [*Employer's Risks*], excluding (in each case) risks which are not insurable at commercially reasonable terms, with deductibles per occurrence of not more than the amount stated in the Contract Data (if an amount is not so stated, this sub-paragraph (d) shall not apply), and
- (e) may however exclude loss of, damage to, and reinstatement of:
 - (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below),
 - (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship,
 - (iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and
 - (iv) Goods while they are not in the Country, subject to Sub-Clause 14.5 [*Plant and Materials intended for the Works*].

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 18.1 [*General Requirements for Insurances*].

18.3

Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2 [*Insurance for Works and Contractor's Equipment*]) or to any person (except persons insured under Sub-Clause 18.4 [*Insurance for Contractor's Personnel*]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.



Insurance shall be for a limit per occurrence of not less than the amount stated in the Contract Data, with no limit on the number of occurrences. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties,
- (c) shall be extended to cover liability for all loss and damage to the Employer's property (except things insured under Sub-Clause 18.2) arising out of the Contractor's performance of the Contract, and
- (d) may however exclude liability to the extent that it arises from:
 - (i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works,
 - (ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and
 - (iii) a cause listed in Sub-Clause 17.3 [*Employer's Risks*], except to the extent that cover is available at commercially reasonable terms.

18.4

Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The insurance shall cover the Employer and the Engineer against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

19 Force Majeure

19.1

Definition of Force Majeure

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.

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:



- (i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (ii) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war,
- (iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel,

- (iv) munitions of war, explosive materials, ionising 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
- (v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

19.2

Notice of Force Majeure

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.

The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.

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.

19.3

Duty to Minimise Delay

Each Party shall at all times use all reasonable endeavours to minimise any delay in the performance of the Contract as a result of Force Majeure.

A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

19.4

Consequences of Force Majeure

If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 [*Notice of Force Majeure*], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) if the event or circumstance is of the kind described in sub-paragraphs (i) to (iv) of Sub-Clause 19.1 [*Definition of Force Majeure*] and, in the case of sub-paragraphs (ii) to (iv), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 18.2 [*Insurance for Works and Contractor's Equipment*].

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

19.5

Force Majeure Affecting Subcontractor

If any Subcontractor is entitled under any contract or agreement relating to the Works 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 non-performance or entitle him to relief under this Clause.

19.6

Optional Termination Payment and Release

If execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under



Sub-Clause 19.2 [*Notice of Force Majeure*], or for multiple periods which total more than 140 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 Sub-Clause 16.3 [*Cessation of Work and Removal of Contractor's Equipment*].

Upon such termination, the Engineer 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 labour employed wholly in connection with the Works at the date of termination.

19.7

Release from Performance

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 fulfil 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 Sub-Clause 19.6 [*Optional Termination, Payment and Release*] if the Contract had been terminated under Sub-Clause 19.6.

20 Claims, Disputes and Arbitration

20.1

Contractor's Claims

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor becomes aware, or should have become aware, of the event or circumstance.



If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Engineer. Without admitting the Employer's liability, the Engineer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Engineer to inspect all these records, and shall (if instructed) submit copies to the Engineer.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Engineer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Engineer may reasonably require; and
- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Engineer.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Engineer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within the above defined time period.

Within the above defined period of 42 days, the Engineer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 5.4 [*Extension of Time for Completion*], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

Each Payment Certificate shall include such additional payment for any claim as has been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

If the Engineer does not respond within the timeframe defined in this Clause, either Party may consider that the claim is rejected by the Engineer and any of the Parties may refer to the Dispute Board in accordance with Sub-Clause 20.4 [*Obtaining Dispute Board's Decision*].



Requirements of this Sub-Clause are in addition to those of any other Sub-Clause that may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall be in account of the extent (if any) to which the failure has prevented or prejudiced the investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

20.2
Appointment of the
Dispute Board

Disputes shall be referred to a DB for decision in accordance with Sub-Clause 20.4 [*Obtaining Dispute Board's Decision*]. The Parties shall appoint a DB by the date stated in the Contract Data.

The DB shall comprise, as stated in the Contract Data, either one or three suitably qualified persons ("the members"), each of whom shall be fluent in the language for communication defined in the Contract and shall be a professional experienced in the type of construction involved in the Works and with the interpretation of contractual documents. If the number is not so stated and the Parties do not agree otherwise, the DB shall comprise three persons.

If the Parties have not jointly appointed the DB 21 days before the date stated in the Contract Data and the DB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The first two members shall recommend and the Parties shall agree upon the third member, who shall act as chairman.

However, if a list of potential members has been agreed by the Parties and is included in the Contract, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DB.

The agreement between the Parties and either the sole member or each of the three members shall incorporate by reference the General Conditions of Dispute Board Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.

The terms of the remuneration of either the sole member or each of the three members, including the remuneration of any expert whom the DB consults, shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may jointly refer a matter to the DB for it to give its opinion. Neither Party shall consult the DB on any matter without the agreement of the other Party.

If a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment, a replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DB (including each member) shall expire when the discharge referred to in Sub-Clause 14.12 [*Discharge*] shall have become effective.

20.3

Failure to Agree on the
Composition of the
Dispute Board

If any of the following conditions apply, namely:

- (a) the Parties fail to agree upon the appointment of the sole member of the DB by the date stated in the first paragraph of Sub-Clause 20.2 [*Appointment of the Dispute Board*],
- (b) either Party fails to nominate a member (for approval by the other Party), or fails to approve a member nominated by the other Party, of a DB of three persons by such date,
- (c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DB by such date, or



- (d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official named in the Contract Data shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

20.4

Obtaining Dispute Board's Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Engineer, either Party may refer the dispute in writing to the DB for its decision, with copies to the other Party and the Engineer. Such reference shall state that it is given under this Sub-Clause.

For a DB of three persons, the DB shall be deemed to have received such reference on the date when it is received by the chairman of the DB.

Both Parties shall promptly make available to the DB all such additional information, further access to the Site, and appropriate facilities, as the DB may require for the purposes of making a decision on such dispute. The DB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or within such other period as may be proposed by the DB and approved by both Parties, the DB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.

If either Party is dissatisfied with the DB's decision, then either Party may, within 28 days after receiving the decision, give a Notice of Dissatisfaction to the other Party indicating its dissatisfaction and intention to commence arbitration. If the DB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference, then either Party may, within 28 days after this period has expired, give a Notice of Dissatisfaction to the other Party.

In either event, this Notice of Dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.7 [*Failure to Comply with Dispute Board's Decision*] and Sub-Clause 20.8 [*Expiry of Dispute Board's Appointment*], neither Party shall be entitled to commence arbitration of a dispute unless a Notice of Dissatisfaction has been given in accordance with this Sub-Clause.

If the DB has given its decision as to a matter in dispute to both Parties, and no Notice of Dissatisfaction has been given by either Party within 28 days after it received the decision, then the decision shall become final and binding upon both Parties.

20.5

Amicable Settlement

If a Notice of Dissatisfaction has been given under Sub-Clause 20.4 above, both Parties shall attempt to settle the dispute amicably before the commencement of



arbitration. However, unless both Parties agree otherwise, the Party giving a Notice of Dissatisfaction in accordance with Sub-Clause 20.4 above should move to commence arbitration after the fifty-sixth day from the day on which a Notice of Dissatisfaction was given, even if no attempt at an amicable settlement has been made.

20.6

Arbitration

Any dispute between the Parties arising out of or in connection with the Contract not settled amicably in accordance with Sub-Clause 20.5 above and in respect of which the DB's decision (if any) has not become final and binding shall be finally settled by arbitration. Arbitration shall be conducted as follows:

- (a) if the Contract is with foreign contractors,
 - (i) for contracts financed by all participating Banks except under subparagraph (a)(ii) below:

international arbitration (1) with proceedings administered by the arbitration institution designated in the Contract Data, and conducted under the rules of arbitration of such institution; or, if so specified in the Contract Data, (2) international arbitration in accordance with the arbitration rules of the United Nations Commission on International Trade Law (UNCITRAL); or (3) if neither an arbitration institution nor UNCITRAL arbitration rules are specified in the Contract Data, with proceedings administered by the International Chamber of Commerce (ICC) and conducted under the ICC Rules of Arbitration; by one or more arbitrators appointed in accordance with said arbitration rules.

- (ii) for contracts financed by the Asian Development Bank:

international arbitration (1) with proceedings administered by the arbitration institution specified in the Contract Data and conducted under the rules of arbitration of such institution unless it is specified in the Contract Data that the arbitration shall be conducted under the rules of the United Nations Commission on International Trade Law (UNCITRAL) and if UNCITRAL Rules are so specified then the named arbitration institution shall be the appointing authority and shall administer the arbitration); or (2) if an arbitration institution is not specified in the Contract Data, with proceedings administered by the Singapore International Arbitration Centre (SIAC) and conducted under the SIAC Rules, by one or more arbitrators appointed in accordance with the said arbitration rules.

- (b) if the Contract is with domestic contractors, arbitration with proceedings conducted in accordance with the laws of the Employer's country.

The place of arbitration shall be the neutral location specified in the Contract Data; and the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

The arbitrators shall have full power to open up, review and revise any certificate, nomination, instruction, opinion or valuation of the Engineer, and any decision of the Engineer relevant to the dispute. Nothing shall disqualify representatives of the Parties and the Engineer from being called as a witness and giving evidence before the arbitrators on any matter whatsoever relevant to the dispute.

The Party shall be limited in the proceedings before the arbitrators to the evidence and documents previously put before the DB to obtain its decision, or to the reasons for



dissatisfaction given in its Notice of Dissatisfaction. Any decision of the DB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Engineer and the DB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

20.7

Failure to Comply with Dispute Board's Decision

In the event that a Party fails to comply with a final and binding DB decision, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [*Arbitration*]. Sub-Clause 20.4 [*Obtaining Dispute Board's Decision*] and Sub-Clause 20.5 [*Amicable Settlement*] shall not apply to this reference.

20.8

Expiry of Dispute Board's Appointment

If a dispute arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works and there is no DB in place, whether by reason of the expiry of the DB's appointment or otherwise:

- (a) Sub-Clause 20.4 [*Obtaining Dispute Board's Decision*] and Sub-Clause 20.5 [*Amicable Settlement*] shall not apply, and
 - (b) the dispute may be referred directly to arbitration under Sub-Clause 20.6 [*Arbitration*].
-

FOR REFERENCE ONLY



APPENDIX

General Conditions of Dispute Board Agreement

1

Definitions

Each "Dispute Board Agreement" is a tripartite agreement by and between:

- (a) the "Employer";
- (b) the "Contractor"; and
- (c) the "Member" who is defined in the Dispute Board Agreement as being:
 - (i) the sole member of the "DB" and, where this is the case, all references to the "Other Members" do not apply, or
 - (ii) one of the three persons who are jointly called the "DB" (or "Dispute Board") and, where this is the case, the other two persons are called the "Other Members".

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2

General Provisions

Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:

- (a) the Commencement Date defined in the Contract,
- (b) when the Employer, the Contractor and the Member have each signed the Dispute Board Agreement, or
- (c) when the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Agreement shall terminate upon the expiry of this period.

3

Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Engineer. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:

- (a) experienced in the work which the Contractor is to carry out under the Contract,
- (b) experienced in the interpretation of contract documentation, and
- (c) fluent in the language for communications defined in the Contract.

4

General Obligations of the Member

The Member shall:



- (a) have no interest financial or otherwise in the Employer, the Contractor or Engineer, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
- (e) comply with the annexed procedural rules and with Sub-Clause 20.4 of the Conditions of Contract;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- (h) ensure his/her availability for all site visits and hearings as are necessary;
- (i) become conversant with the Contract and with the progress of the Works (and of any other parts of the project of which the Contract forms part) by studying all documents received which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the DB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any); and
- (k) be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5

General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DB's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):



- be appointed as an arbitrator in any arbitration under the Contract;
- be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the DB under Sub-Clause 20.4 of the Conditions of Contract, which will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6

Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for:
 - (i) being available on 28 days' notice for all site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in subparagraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee which shall be considered as payment in full for:
 - (i) each day or part of a day up to a maximum of two days' travel time in each direction for the journey between the Member's home and the site, or another location of a meeting with the Other Members (if any);
 - (ii) each working day on Site visits, hearings or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.
- (c) all reasonable expenses including necessary travel expenses (air fare in less than first class, hotel and subsistence and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, faxes and telexes: a receipt shall be required for each item in excess of five percent of the daily fee referred to in subparagraph (b) of this Clause; any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.



Retainer and daily fees shall be as specified in the Dispute Board Agreement. If it specifies otherwise, these fees shall remain fixed for the first 24 calendar

months, and shall thereafter be adjusted by agreement between the Employer, the Contractor and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Sub-Clause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7

Termination

At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

8

Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 (a) - (d) above, he shall not be entitled to any fees or expenses hereunder and shall, without prejudice to his other rights, reimburse each of the Employer and the Contractor for any fees or expenses received by the Member and the Other Members (if any), for



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proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

If the Member fails to comply with any of his obligations under Clause 4 (e) - (k) above, he shall not be entitled to any fees or expenses hereunder from the date and to the extent of the non-compliance and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses already received by the Member, for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

9

Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

FOR REFERENCE ONLY



Annex PROCEDURAL RULES

- 1 Unless otherwise agreed by the Employer and the Contractor, the DB shall visit the Site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
- 2 The timing of and agenda for each Site visit shall be as agreed jointly by the DB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DB. The purpose of Site visits is to enable the DB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to endeavour to prevent potential problems or claims from becoming disputes.
- 3 Site visits shall be attended by the Employer, the Contractor and the Engineer and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each Site visit and before leaving the site, the DB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
- 4 The Employer and the Contractor shall furnish to the DB one copy of all documents which the DB may request including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the DB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.
- 5 If any dispute is referred to the DB in accordance with Sub-Clause 20.4 of the Conditions of Contract, the DB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DB shall:
 - (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
 - (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.
- 6 The DB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
- 7 As otherwise agreed in writing by the Employer and the Contractor, the DB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or attendance at hearings to any persons other than representatives of the Employer, the Contractor and the Engineer, and to proceed in the absence of any party who the DB has notified received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.



8 The Employer and the Contractor empower the DB, among other things, to:

- (a) establish the procedure to be applied in deciding a dispute,
- (b) decide upon the DB's own jurisdiction, and as to the scope of any dispute referred to it,
- (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules,
- (d) take the initiative in ascertaining the facts and matters required for a decision,
- (e) make use of its own specialist knowledge, if any,
- (f) decide upon the payment of financing charges in accordance with the Contract,
- (g) decide upon any provisional relief such as interim or conservatory measures, and
- (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.

9 The DB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DB shall make and give its decision in accordance with Sub-Clause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the DB comprises three persons:

- (a) it shall convene in private after a hearing in order to have discussions and prepare its decision;
- (b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
- (c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members not to make a decision.



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FOR REFERENCE ONLY



Section 8 - Particular Conditions of Contract

The following Particular Conditions of Contract (PCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Part A – Contract Data

Subject	Ref. GCC	Data
Employer's name and address	1.1.2.2 & 1.3	Project Director, Project Directorate (ADB) of the Department of Roads under the Ministry of Physical Infrastructure and Transport, Kathmandu, Nepal.
Engineer's name and address	1.1.2.4 & 1.3	To be notified later.
Bank's name	1.1.2.11	Asian Development Bank (ADB)
Borrower's name	1.1.2.12	Nepal
Time for Completion	1.1.3.3	Phase 1: Upgrading Works 730 days from commencement date plus 365 days of Defect Notification Period Phase 2: Performance Based Maintenance Works 1,825 days (This Phase will start at the end of the Defects Notification Period for Phase 1).
Defects Notification Period	1.1.3.7	Phase 1: Upgrading Works 365 days Phase 2: Performance Based Maintenance Works Not applicable
Sections	1.1.5.6	Not Applicable
Electronic transmission systems	1.3	Email, fax supplemented by original hard copy through post, courier or hand delivered.
Governing Law	1.4	The Law of Nepal
Ruling language	1.4	English
Language for communications	1.4	English
Inspection and Audit by the Bank	1.15	<i>Replace GCC 1.15 with the following paragraphs:</i> "The Contractor shall permit ADB or its representative to inspect the Contractor's site, assets, accounts, and records, and other documents relating to the bid submission and contract performance of the Contractor and to have them audited by auditors appointed by ADB, if so required by ADB. <i>To add the following paragraph at the end of GCC 1.15:</i> ADB's right to inspect the Site and/or the Contractor's accounts and records relating to the performance of the Contract stated in Sub-Clause 1.15 and 15.6 (e) shall survive termination and/ or expiration of this Contract."

Time for access to the site

2.1

The right of access to the site: **14 days after the Commencement Date.**

However, the possession of the site shall be given in stages as follows:

i. The sites within the following chainages shall be given 14 days after the commencement date:

S. No.	Chainage		Length, m	Remarks
	From	To		
1	95+760	105+760	10000	
Total			10000.00	

ii. The sites within the following chainages shall be given fully no later than 6 months after the Commencement Date:

S. No.	Chainage		Length, m	Remarks
	From	To		
1	105+760	111+500	5740	
Total			5740.00	

There shall be no work or construction activities at the Site or any part thereof (as the case may be) unless the Employer has granted access to the Site or part thereof (as the case may be) in accordance with this Sub-Clause 2.1.

The Employer shall be responsible for acquiring and providing legal and physical possession of the Site or any part thereof (as the case may be) and access thereto, and for providing possession of, and access to, all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way.

Before, and as a condition of, granting the Contractor access to the Site or a relevant part thereof (as the case may be), for commencing work or any construction activities on the Site or part thereof, the Employer shall issue a notice to the Contractor (with a copy to ADB) confirming in writing ("Notice") all of the following with respect to the Site or part thereof:

i. The corresponding final Resettlement Plan ("RP") and/ or the Due Diligence Report based on the detailed design of the Site or part thereof (as the case may be) have been submitted to, and accepted by, ADB; due consultation, compensation payments, and other entitlements have been provided to affected people fully in accordance with the RP for the Site or part thereof (as the case may be), and ADB has been duly notified of such provision in the Resettlement Plan Compliance Report accepted by ADB for the Site or part thereof; completion of any other actions as required by the Employer;

		and ii. as a result of the confirmations contained above, the Employer accordingly grants the Contractor access to the Site or part thereof.”
Engineer’s Duties and Authority	3.1	GCC 3.1, the third paragraph shall be replaced with the following paragraph: The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. There will be no requirement for the Engineer to obtain the Employer’s consent before the Engineer exercises his/her authority under Sub-Clause 3.5 [Determinations]. The Employer shall promptly inform the Contractor of any change to the authority attributed to the Engineer.
Engineer’s Duties and Authority	3.1(B)(ii)	Variations resulting in an increase of the Accepted Contract Amount in excess of 0.1 % shall require approval of the Employer. Similarly, when the cumulative sum of Variations results in an increase of the Accepted Contract Amount by more than 2 %, any Variation thereafter shall require approval of the Employer.
Determination	3.5	GCC 3.5 first paragraph shall be replaced with the following paragraph: When carrying out his/her duties under this Sub-Clause, the Engineer shall act neutrally between the Parties and shall not be deemed to act for the Employer. Whenever these Conditions provide that the Engineer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Engineer shall consult with each Party in an endeavor to reach an agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.
Contractor’s General Obligations	4.1	The following two paragraphs shall be added at the end of GCC 4.1: The Contractor has the obligation to notify the Employer of any changes in connection with the matters described in paragraphs (i), (k), (l), (m), (n), (o), (p), and (t) of the Letter of Bid. If the Contractor is debarred or temporarily suspended by ADB, it shall inform the Employer of such debarment or suspension, and that the endorsement of ADB’s Office of Anticorruption and Integrity is required for any variations, extensions or modifications to the Contract.

Performance Security	4.2	The performance security will be in the form of an unconditional bank guarantee in the amount(s) of 10% (Ten percent) of the Accepted Contract Amount, issued by a reputable bank located in Nepal, acceptable to the Employer, in the format included in Section 9 (Contract Forms). In the event of an abnormally low bid, the Employer may require an increased Performance Security within the limits specified in ITB 38, [BDS, ITB 38.4 (b)].
Safety Procedure	4.8	After bullet point (b), add the following: “In particular, the Contractor is responsible for providing site workers with safe and healthy working conditions and establishing an operating system to prevent accidents, injuries, and disease.” <i>At the end of this Sub-Clause, add the following paragraph:</i> “Within twenty-eight (28) days of the Commencement Date unless otherwise instructed by the Engineer, and before commencing any construction on Site, the Contractor shall provide a Site Safety Manual, which shall be subject to the Engineer's consent, specifically for the Site which shall establish all of the requirements for effecting and maintaining a safe working environment for Contractor's and Employer's Personnel and any other authorized personnel entering the Site in accordance with the Contractor's obligations. The Site Safety Manual shall include all of safety obligations of the Contractor including safe traffic management for all Site activities and personal protective equipment required for each working area. The Manual shall be revised as deemed necessary to suit with the changed site situation by the Contractor with the consent of the Engineer.”

Subject	Ref. GCC	Data
Protection of the Environment	4.18	<i>Add the following paragraphs at the end of the sub-clause in 4.18 Protection of the Environment:</i> “The Contractor shall comply with all applicable national, provincial, and local environmental laws and regulations. The Contractor shall also comply with all reasonable requests of the national and local authorities responsible for enforcing environmental controls. Within 28 days of the Commencement Date unless otherwise instructed by Engineer the Contractor shall submit a detailed Site Specific Environmental Management Plan (SSEMP), based on the Environmental Health and Safety Management Plan submitted in the technical proposal, for the Engineer’s no objection showing how the Contractor intends to comply with environmental laws and regulations and other specific requirements prescribed in the Contract, addressing all the monitoring and mitigation measures outlined in the Environmental Impact Assessment (“EIA”) and the Environmental Management Plan (“EMP”) of the project attached in Section 6-Employer’s Requirements. Work shall not commence on the Site until the no objection of SSEMP has been obtained from the Engineer and is being implemented. The Contractor shall (a) establish an operational system for managing environmental impacts, (b) comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSEMP, (c) allocate the budget required to ensure that such measures, requirements and actions are carried out, (d) submit semi-annual reports on the compliance of such measures to the Employer. Where unanticipated environmental risks or impacts become apparent during the Contract, the Contractor is required to update the SSEMP to outline the potential impacts to site works and associated mitigation measures for the Engineer’s approval.”
Normal working hours	6.5	Phase 1: Upgrading Works 7:00 AM to 7:00 PM. Phase 2: Performance Based Maintenance Works Normal working hours shall not be applicable. Daily Inspections and emergency response need to be done on Saturdays and Public Holidays as well.

Subject	Ref. GCC	Data
Health and Safety	6.7	<i>Before the first paragraph of 6.7 Health and Safety, insert the following:</i> The Contractor shall disseminate, or engage appropriate service providers to disseminate, information on the risks of sexually transmitted diseases, including HIV/AIDS, to the employees of contractors engaged under the Project and to members of local communities surrounding the Project areas, particularly women. <i>Add the following after the first paragraph:</i> "The Contractor is responsible for the establishment of preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize adverse impacts and risks of the construction site work to the health and safety of local communities. Within 28 days of the Commencement Date unless otherwise instructed by the Engineer, the Contractor shall submit a detailed Site Specific Health and Safety Management Plan (SSHSM), based on the Environmental Health and Safety Management Plan submitted in the technical proposal, for the Engineer's no objection showing how he/she intends to comply with the local Health and Safety laws and regulations and other specific requirements prescribed in the Contract, taking into account the Supplementary Information in Section 6-Employer's Requirements. Work shall not commence on the Site until the confirmation of no objection of the SSHSM has been obtained from the Engineer and is being implemented. Where unanticipated health and safety hazards or risks become apparent during the Contract, the Contractor is required to update the SSHSM to outline the potential impacts to site works and associated mitigation measures for the Engineer's no objection. The Contractor shall comply with the approved SSHSM and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSHSM. In particular, the Contractor is required to provide all personnel on site, including Employer's Personnel and visitors, with personal protective equipment, including protection for feet (safety boots), head, eyes, ears (safety helmets), and hands, etc., in accordance with the Contractor's SSHSM. The Contractor should ensure that his Subcontractors comply with the SSHSM and provide all such necessary equipment to their personnel. The Contractor shall bear the costs to ensure that such measures, requirements, and actions are carried out.

Subject	Ref. GCC	Data
		The Contractor shall submit semi-annual reports on the compliance of such measures to the Employer.” <i>Add after the third paragraph the following:</i> “In the event of a significant injury involving medical treatment or hospitalization, and a fatal accident, the Contractor shall notify the Engineer immediately by verbal communication and submit a formal report as soon as practicable after its occurrence. For all accidents, whether fatal or not, the Contractor shall also notify the appropriate local authorities in accordance with the Laws of the Country.”
Delay damages for the Works	8.7 & 14.15(b)	Phase 1: Upgrading Works 0.05 % of the Accepted Contract Amount per day, in the currencies and proportions in which the Contract Price is payable. Phase 2: Performance-Based Maintenance Works Not Applicable
Maximum amount of delay damages	8.7	Ten (10) percent of the Accepted Contract Amount.
Provisional Sums	13.5(b)(ii)	Five (5) percent
Adjustments for Changes in Cost	13.8	The Contract Price shall be adjustable during Contract Execution.
The Contract Price	14.1	<i>The following sentence under Clause 14.1 shall <u>not</u> apply:</i> “Notwithstanding the provisions of sub-paragraph (b), Contractor’s Equipment, including essential spare parts therefor, imported by the Contractor for the sole purpose of executing the Contract shall be exempt from the payment of import duties and taxes upon importation.”
Total advance payment	14.2	Ten (10) Percentage of the Accepted Contract Amount, less Provisional sum and VAT payable in the currencies and proportions in which the Accepted Contract Amount is payable. The total advance payment shall be made in two (2) installments as follows: First (1st) installment of 5% within 28 days after the submission of the advance payment guarantee.

Subject	Ref. GCC	Data
		Second (2 nd) installment of 5% after (a) the completion of the Contractor's mobilization of all required resources to the Site, (b) submission by the Contractor of a statement of utilization with supporting documents of the first instalment of the advance paid to the Contractor along with a certificate from the Engineer that such amounts were utilized in a purposeful manner in relation to the Works, and (c) submission of bank guarantee as required by the Contract. The Advance Payment Guarantee shall be valid until the time for Completion of the Works of Phase 1. If the Advance Payment Guarantee is issued by a bank located outside Nepal, it shall be counter-guaranteed by a commercial bank established in Nepal.
Repayment of advance payment	14.2(a)	Delete "exceeds thirty percent (30%) of the Accepted Contract Amount less Provisional Sums" in the third line and replace with: "exceeds thirty percent (30%) of the Accepted Contract Amount less Provisional sum and VAT".
Repayment amortization of advance payment	14.2(b)	Amortization Rate shall be: 20% for both phases <i>Delete "when 90 percent (90%) of the Accepted Contract Amount less Provisional Sums" in the fifth and sixth lines and replace with:</i> "when 80 percent (80%) of the Accepted Contract Amount less Provisional Sum and VAT." <i>Add at the end of 14.2 (b) the following text:</i> "Whatsoever written above, if the Contractor fails to fully reimburse the advance payment within the 90% of the time for Completion stated in the Contract Data (within 657 days from the Commencement Date, unless extended otherwise), the Employer shall be entitled to get full reimbursement of all the outstanding advance payment from the Contract or from subsequent Interim Payment certificate(s), under Sub-Clause 14.3(d).
Percentage of Retention	14.3(c)	Phase 1: Upgrading Works Ten percent (10%) Phase 2: Performance Based Maintenance Works Not applicable
Limit of Retention Money	14.3 (c)	Phase 1: Upgrading Works Five Percent (5%) of the Accepted Contract Amount Phase 2: Performance Based Maintenance Works Not applicable
Plant and Materials	14.5(b)(i)	Not Applicable

Subject	Ref. GCC	Data
	14.5(c)(i)	Applicable for the following materials: • Reinforcement bar, • Structural Steel
Minimum Amount of Interim Payment Certificates	14.6	Phase 1: Upgrading Works One-half of a percent (0.5%) of the Accepted Contract Amount Phase 2: Performance Based Maintenance Works Not Applicable
Termination by Employer	15.2	This sentence will apply as Sub-clause 15.2(g): (g) The Engineer gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with Sub-clause 8.2 (Time for Completion) and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Engineer;
Corrupt and Fraudulent Practices	15.6	Revise the two-entry paragraph of GCC 15.6 as: If the Employer determines, based on reasonable evidence, that the Contractor has engaged in corrupt, fraudulent, collusive or coercive practices, or other integrity violations, including the failure to disclose any required information which constitutes a fraudulent practice, in competing for or in executing the Contract, then the Employer may, after giving 14 days' notice to the Contractor, terminate the Contract and expel him from the Site, and the provisions of Clause 15 shall apply as if such termination had been made under Sub-Clause 15.2 [Termination by Employer]. Should any employee of the Contractor be determined, based on reasonable evidence, to have engaged in corrupt, fraudulent, or coercive practice or other integrity violations during the execution of the work then that employee shall be removed in accordance with Sub-Clause 6.9 [Contractor's Personnel] The following sentence shall apply: For the purposes of this Subclause: ADB requires Borrowers (including beneficiaries of ADB-financed activity) and their personnel, as well as firms and individuals participating in an ADB-financed activity, including but not limited to, Bidders, Suppliers, Contractors, agents, subcontractors, subconsultants, service providers, sub suppliers, manufacturers (including their respective officers, directors, employees and personnel) under ADB-financed contracts to observe the highest standard of ethics during the procurement and execution of such contracts in accordance

Subject	Ref. GCC	Data
		with ADB's Anticorruption Policy (1998, as amended from time to time). In pursuance of this policy, ADB (a) defines, for the purposes of this provision, the terms set forth below as follows: (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) "abuse" means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard. (vi) "conflict of interest" means any situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations; and (vii) "integrity violation" is any act, as defined under ADB's Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB's Anticorruption Policy, including (i) to (vi) above and the following: obstructive practice, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard. (b) will reject a proposal for award if it determines that the Bidder recommended for award or any of its officers, directors, employees, personnel, subconsultants, subcontractors, service providers, suppliers or manufacturers 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) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to

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		remedy the situation, including by failing to inform ADB in a timely manner at the time they knew of the integrity violations; (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in ADB-financed, -administered, or -supported activities or to benefit from an ADB-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) will have the right to require that a provision be included in bidding documents and in contracts financed, administered, or supported by ADB, requiring Bidders, suppliers and contractors, consultants, manufacturers, service providers and other third parties engaged or involved in ADB-related activities, and their respective officers, directors, employees and personnel, to permit ADB or its representative to inspect the site and their assets, accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB. All Bidders, consultants, contractors, suppliers, manufacturers, service providers, and other third parties engaged or involved in ADB-related activities and their respective officers, directors, employees, and personnel, are obliged to cooperate fully in any investigation when requested by ADB to do so. As determined on a case-by-case basis by ADB, such cooperation includes, but is not limited to, the following: (a) being available to be interviewed and replying fully and truthfully to all questions asked; (b) providing ADB with any items requested that are within the party's control, including, but not limited to, documents and other physical objects; (c) upon written request by ADB, authorizing other related entities to release directly to ADB such information that is specifically and materially related, directly or indirectly, to the said entities or issues which are the subject of the investigation; (d) cooperating with all reasonable requests to search or physically inspect their person and/or work areas, including files, electronic databases, and personal property used on ADB activities, or that utilizes ADB's Information and Communications Technology (ICT) resources or systems

¹ Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

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		(including mobile phones, personal electronic devices, and electronic storage devices such as external disk drives); (e) cooperating in any testing requested by ADB, including but not limited to, fingerprint identification, handwriting analysis, and physical examination and analysis; and (f) preserving and protecting the confidentiality of all information discussed with, and as required by, ADB. All Bidders, consultants, contractors and suppliers shall require their officers, directors, employees, personnel, agents to ensure that, in its contracts with its sub-consultants, Subcontractors, and other third parties engaged or involved in ADB-related activities, such sub-consultants, Subcontractors, and other third parties similarly are obliged to cooperate fully in any investigation when requested by ADB to do so. The Contractor undertakes that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the bid, have been given or received in connection with the procurement process or in the contract execution.
Maximum total liability of the Contractor to the Employer	17.6	The product of 1.10 times the Accepted Contract Amount
General Requirements for Insurances	18.1	The issuing party shall be the Contractor.
Periods for submission of insurance:	18.1 (a)	a. evidence of insurance: 14 days
	18.1 (b)	b. copies of relevant policies: 21 days
Maximum amount of deductibles for insurance of the Employer's risks	18.2 (d)	NRs. 500,000.00 (Five hundred thousand only)
Minimum amount of third-party insurance	18.3	NRs. Fifteen (15.00) Million with no limit on the number of occurrences.
Date by which the DB shall be appointed	20.2	28 days after the Commencement
The DB shall be comprised of	20.2	Three Members
List of potential Dispute Board sole members	20.2	None

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Appointment (if not agreed) to be made by	20.3	President of FIDIC (International Federation of Consulting Engineers) World Trade Center II –Geneva Airport Box 311 29 route de Pres-Bois CH-1215 Geneva 115 Switzerland
Obtaining Dispute Board's Decision	20.4	<i>This sentence shall be added as the last paragraph in GCC Sub-clause 20.4:</i> "If the decision of the DB requires a payment by one Party to the other Party, the DB may require the payee to provide an appropriate security in respect of such payment."
International arbitration shall be administered by	20.6 (a)	International arbitration shall be: (i) Administered by: Singapore International Arbitration Centre (SIAC) shall be the institution to administer the arbitration. (ii) Conducted in accordance with the rules of: Singapore International Arbitration Centre (SIAC)
Place of Arbitration	20.6	Singapore
Failure to Comply with Dispute Board's Decision	20.7	<i>GCC Sub Clause 20.7 shall be replaced with the following sentence:</i> "In the event that a Party fails to comply with any decision of the DB, whether binding or final and binding, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [Arbitration] for summary or other expedited relief, as may be appropriate. Sub-Clause 20.4 [Obtaining Dispute Board's Decision] and Sub-Clause 20.5 [Amicable Settlement] shall not apply to this reference."

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Part B – Specific Provisions

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Definitions	1.1	
Specifications	1.1.1.5	The Specifications includes: (a) Standard Specifications issued under the authority of the Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads (2073/2016 with amendment 2078/2022), (b) Special Provisions to the Standard Specifications
Commencement Date	1.1.3.2	<i>At the end of the Sub-Clause add the following paragraph.</i> “Commencement Date of the Phase 2: Performance Based Maintenance Works” means the day immediately following the conclusion of the Defects Notification Period of the Phase 1: Upgrading Works.
Time for Completion	1.1.3.3	At the end of the Sub-Clause, add the following paragraphs. “Time for Completion of the Phase 2: Performance Based Maintenance Works” means the time for completing the Phase 2: Performance Based Maintenance Works, which will start at the end of the DNP for Phase 1.”
Defects Notification Period	1.1.3.7	In the fifth line immediately after “calculated,” delete the remaining text and add “from the date on which the Phase 1: Upgrading Works is completed as certified under Sub-Clause 10.1 [Taking Over of the Works and Sections] and as stated in the Taking-Over Certificate of the Phase 1: Upgrading Works.”
Accepted Contract Amount	1.1.4.1	Immediately after “execution” delete “and” and replace with “,” and immediately after “completion” add “and performance based maintenance”.
Works	1.1.5.8	<i>Delete the sentence and insert the following:</i> “Works” means the Permanent Works, the Temporary Works, and Performance Based Maintenance Works.
Additional Sub Clauses:		<i>Add the following Sub-Clauses 1.1.5.9 and 1.1.5.10 to Clause 1.1.5 [Works and Goods]</i>
Maintenance Phase Works	1.1.5.9	“Maintenance Phase Works” means the Phase 2: Performance Based Maintenance Works to be executed by the Contractor.
Construction Phase Works	1.1.5.10	“Construction Phase Works” means the Phase 1: Upgrading Works to be executed by the Contractor, including the Defect Notification Period.
Other Definitions	1.1.6	Add Sub-Clauses 1.1.6.11 and 1.1.6.12 after Sub-Clause 1.1.6.10, as follows:

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		Sub-Clause 1.1.6.11: Joint Venture “Joint Venture” or “JV” means a joint venture, association, consortium or other unincorporated grouping of two or more persons, whether in the form of a partnership or otherwise. Sub-Clause 1.1.6.12: JV Undertaking “JV Undertaking” means the letter provided to the Employer as part of the Tender setting out the legal undertaking between two or more persons constitute the Contractor as a JV. This letter shall be signed by all the persons who are members of the JV, shall be addressed to the Employer, and shall include: (a) each such member’s undertaking to be jointly and severally liable to the Employer for the performance of the Contractor’s obligations under the Contract; (b) identification and authorization of the leader of the JV; and (c) identification of the separate scope or part of the Works (if any) to be carried out by each member of the JV. The words “JV Undertaking” are synonymous with “JV Agreement” and “Joint Venture Agreement”.
Priority of Documents	1.5	The document to be added to the list of Priority of Documents after (e): (f) List of Eligible Countries that was specified in Section 5 of the Bidding Document and the list renumbered accordingly
Care and Supply of Documents	1.8	<i>Add the following text at the end of Sub-clause 1.8:</i> Irrespective of the above, the Contractor shall be responsible for the production of detailed construction drawings as may be necessitated by his work programme pursuant to Sub-Clause 8.3 and as the Engineer may deem necessary for the proper execution of the Works. The Contractor shall supply two copies of draft prints of all such detailed construction drawings for the Engineer’s review and when approved by the Engineer shall supply six final prints together with a reproducible copy on computer disk or as may be otherwise approved by the Engineer.

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Joint and Several Liability	1.14	Delete the entire contents of Sub-Clause 1.14 and replace with: If the Contractor is a Joint Venture: (a) the members of the JV shall be jointly and severally liable to the Employer for the performance of the Contractor's obligations under the Contract; (b) the JV leader shall have authority to bind the Contractor and each member of the JV; and (c) Neither the members nor (if known) the scope and parts of the Works to be carried out by each member nor the legal status of the JV shall be altered without the prior consent of the Employer (but such consent shall not relieve the altered JV from any liability under sub-paragraph (a) above). In the context of JV, the word "leader" is synonymous with the words "lead partner" and "Lead Partner", the word "member" is synonymous with "partner" and "Partner", and "members" with "partners" and "Partners".
Engineers Duties and Authorities	3.1	Add the following at the end of the subclause: The Engineer shall obtain the specific approval of the Employer before taking action under the following Sub-Clauses of these Conditions: (A) Sub-Clause 4.12: agreeing or determining an extension of time and/or additional cost. (B) Sub-Clause 13.1: instructing a Variation, except; (i) in an emergency situation as determined by the Engineer, (C) Sub-Clause 13.3: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.1 or 13.2. (D) Sub-Clause 13.4: specifying the amount payable in each of the applicable currencies. Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

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Contractor's General Obligations	4.1	In the fourth paragraph, immediately after "construction," add "and maintenance." In the fifth paragraph, delete "whenever required by the Engineer" and replace it with "as part of his quality assurance obligations". <i>After the fifth paragraph, add the following paragraph:</i> "The Contractor shall prepare and submit working drawings, shop drawings, and schedules for all works to be constructed and maintained under the Contract and shall be fully responsible for the accuracy of these working drawings, shop drawings, and schedules which shall be deemed to be Contractor's Documents in accordance with the Contract and be submitted in accordance with the provisions for the same. The working drawings, shop drawings, and schedules shall be based on the Drawings and the actual site conditions as surveyed by the Contractor and agreed with the Engineer."
		<i>At the end of this Sub-Clause, add the following paragraph:</i> "On or before completion of the Construction Phase Works, the Contractor shall arrange to furnish to the Engineer, as part of Contractor's Documents, "as-built" drawings of the permanent works of the construction phase works (not limited to works designed by the Contractor), in the quality and detail to be approved by the Engineer. The "as-built" drawings shall be prepared, and submitted for the Engineer's checking and acceptance, progressively with the progress of the construction phase works. The Taking-Over Certificate for the construction phase works shall not be issued by the Engineer until the "as-built" drawings of the permanent works of the construction phase works are submitted and accepted.
Performance Security	4.2	In the third paragraph, immediately after "Certificate," add "for the Phase 1: Upgrading Works and Phase 2: Performance Based Maintenance Works". <i>Add the following paragraph after the sixth paragraph</i> The Contractor may prepare two separate performance securities: (i) One 5% of the Accepted Contract Amount with the validity period of 97 months and (ii) the remaining portion of the required performance security with the validity period of 37 months, hence totaling the accepted performance Security Amount. At the completion of the Defects Notification Period of the Phase 1: Upgrading Works, the Contractor may be released with the performance security amount as per (ii) above, with the validity period of 37 months.

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		The remaining Performance Security amount as per (i) above, ie 5% of the Accepted Contract Amount, may be released during the PBM phase in the manner described below: If the Contractor complies with the Operational Service Levels defined in Table 29.5 and 29.6.3 Pavement Roughness and Surface Distress Index in Section 2914 of Part II Employer's Requirements, the Performance Security may be reduced by zero point eight percent (0.80%) of the Accepted Contract Amount after the completion of each year of the first three years of Phase 2. The remaining Performance Security of the Accepted Contract Amount shall be retained until the Contractor has complied with all obligations of the Contract.
Contractor's Representative	4.3	<i>At the end of the second paragraph of Sub-Clause 4.3, add the following:</i> If the Contractor is a Joint Venture, the Contractor's Representative shall be from the Lead Partner. The Contractor's Representative shall be a Senior Employee of the Contractor and working with the firm continuously for at least three years prior to the bid submission deadline. The Contractor's Representative shall be at the Site continuously during the period of Phase 1 Works, who shall not be engaged in any other business unrelated to the Contractor or the Works. If s/he/she is required to be temporarily absent during the period (which shall not exceed 21 days in any single occasion and 42 days in any year), suitable replacement personnel shall be temporarily appointed, subject to the Engineer's prior consent.
Subcontractors	4.4	<i>Add the following at the end of Sub-clause 4.4 :</i> The maximum percentage of Subcontracting permitted is: 60% of the total Contract Amount. Add new text to Sub-clause 4.4, after item (b) as follows: (c) The proposed Subcontractor shall demonstrate the following minimum construction experience, within the last five (5) years, as applicable to the portion of the Works proposed to be subcontracted: (i) Road Works: Experience in the construction of at least one (1) contract involving two (2) or more lane bituminous road works with a minimum length of five (5) kilometres; OR (ii) Bridge Works: Experience in the construction of at least one (1) contract involving a two (2) or more lane motorable bridge with a minimum length of fifty (50) meters having pile foundation; OR (iii) Other Works: Experience in carrying out works of comparable scope, complexity, and methods, with a value or quantity equal to at least fifty percent (50%) of the works intended for

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		subcontracting. For the purpose of this Sub-Clause, "experience" shall mean successful completion of the works. Add new text to this Sub-clause 4.4, after item (d) as follows: (e) In the event of approved subcontracting, the Contractor shall ensure that Subcontractors do not further subcontract their contract; (f) The Contractor shall keep a log showing the following information on all Subcontractors, suppliers, and transporters engaged in the Contract Works: (a) Name and address (b) Copy of Subcontracting agreement (c) Works and value of Subcontract (d) Commencement and completion dates (e) Copy of payments and Interim payments made to Subcontractor The Contractor shall submit a copy of the above log monthly to the Engineer's representative _____."
Co-operation	4.6	Add new text to this Sub-clause 4.6 at the end as follows: There may be other contractors working on similar and/or adjacent roads. The Contractor shall at all times allow the free passage of all traffic, including vehicles and equipment of other Contractors. The maintenance of the road or way shall be the responsibility of the Contractor.
Setting Out	4.7	At the end of the second paragraph, add the following: "For this purpose, before commencement of the work on the site, the Contractor and representative of the Engineer jointly shall carry out a check/setting out survey, in the presence of the Engineer, to verify the accuracy of the items of reference and submit the results of the verification survey to the Engineer for his acceptance."
Unforeseeable Physical Conditions	4.12	Add the following subparagraph at the end of GCC Sub-clause 4.12: In addition to notice of any unforeseeable physical conditions, the Contractor shall provide the Engineer with a written notice of any unanticipated environmental, resettlement risks or impacts that arise during construction, implementation, or operation of the Project that were not considered in applicable IEE, EMP, and RP; attached hereto as Appendix 1 through Appendix 4.

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Rights of Way and Facilities	4.13	<i>Add the following paragraphs as first paragraphs of Sub-clause 4.13:</i> The Contractor shall ascertain the location of all access paths, watercourses, irrigation channels, sewers, drains, water pipes, electricity and telecommunication cables and other services, and structures etc. which may be encountered during the execution of the Works. He shall temporarily support or divert and subsequently reinstate all such services and structures as necessary and to the satisfaction of the Engineer. As soon as any such service or structure is encountered on, over, under, in or through the Site during the performance of the Contract, the Contractor shall make a record of the location and description of such service or structure and shall send the same forthwith to the Engineer. Where permanent diversion or support of such service or structure is rendered necessary as the unavoidable result of the execution and maintenance of the Works in accordance with the Contract, the Engineer, after consultation with the Employer, will instruct the Contractor as to the diversion or support to be provided, and the Contractor shall be paid the costs thereof in accordance with Clause 13 hereof. <i>Add the following paragraphs at the end of Sub-clause 4.13:</i> The Contractor shall comply with (i) the measures and requirements set forth in the Resettlement Plan ("RP"), to the extent it concerns impacts on affected people during construction; and (ii) any corrective or preventive actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor implementation of the RP. The Contractor shall allocate a budget at his own cost for compliance with these measures, requirements and actions.
Avoidance of Interference	4.14	<i>After the first paragraph of this Sub-Clause, add the following paragraph:</i> "Without in any way limiting the Contractor's obligations and responsibilities under the Contract, because the Site or part thereof is used by the public, the Contractor shall programme and execute the Works to avoid inconvenience or disruption to the public.

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		No work on any part of the Site used by the public shall be permitted until such time as alternate routes in the form of roads, diversions, footpaths, accesses and the like (whether permanent or temporary) have been provided by the Contractor, together with all necessary safety features and devices and appurtenant drainage, and the alternate route(s) have been deemed acceptable for public use by the Engineer."
Transport of Goods	4.16	<i>Add the following paragraph at the end of Sub-clause 4.16:</i> The Contractor shall agree with the Engineer and adequately record the condition of roads, agricultural land, and other infrastructure prior to the start of transporting materials, goods, and equipment, and construction.

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Protection of the Environment	4.18	Add the following paragraphs at the end of Sub-clause 4.18: The Contractor shall, to the satisfaction of the Engineer, take all necessary precautions for the efficient protection of all surface and sub-surface water courses against all kinds of pollution arising from the execution of the works. The Contractor shall ensure that at all locations where his labor force is living or working, other than labor living in their own homes, adequate facilities are provided to collect and treat all sewage and wastewater, and to ensure that the outflows from such treatment facilities comply with recognized national or International standards for sewage treatment discharges. The Contractor shall ensure that fuel wood is not used as firewood and as a means of heating during the preparation or processing of any materials forming part of the Works. The Contractor shall take special precautions in connection with the establishment of storage facilities for diesel fuel, petrol, lubricants, bitumen, and bituminous materials. Storage facilities shall not be placed in rock-fall-prone areas. They shall have barriers and impervious surfaces preventing leakages of spilt material outside the storage area or into the underlying soils. The Contractor shall ensure that any cut or fill slopes are planted with grass or other approved plant cover as soon as possible to protect them from erosion. This planting shall follow the commendations in the Nepali manual entitled “Vegetative Structures for Stabilizing Highway Slopes” (DoR), or the requirements of the Specification as directed by the Engineer. The water used in the construction shall not be allowed to affect water availability in the local communities. Where a scarcity of water is expected to arise, the Contract shall explore and tap alternative sources of safe water. In case of interference with the water supply of a settlement, the Contractor is liable to provide the affected population with potable drinking water from alternative sources at no extra cost to the Contract or the local people. The Contractor shall also comply with all applicable national, regional, provincial, and local environmental laws and regulations. The Contractor shall (a) establish an operational system for managing environmental impacts, (b) carry out all of the monitoring and mitigation measures set forth in the EMP attached hereto as Appendix 2 and IEE, and (c) allocate the budget required to ensure that such measures are carried out. The Contractor shall submit quarterly reports on the carrying out of such measures to the Employer. The Contractor shall allocate a budget at his own cost for compliance with these measures, requirements and actions.

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Progress Reports	4.21	In the sub-paragraph (g) just after “relations;” delete “and” At the end of sub-paragraph (h), delete “.” and replace with “;”, and add the following sub-paragraphs (i), (j), (k), (l), (m), and (n): (i) the status of all Variations; (j) details of all matters affecting, or likely to affect, the progress or cost of the Works and particulars of the preventative and remedial measures which have been, are being, or may be taken in respect of those matters; (k) any other particulars reasonably required by the Engineer; (l) monitoring of the obligations in Sub-Clauses 4.7, 4.13, 4.18, 6.4, 6.7, 6.20, 6.21, and 6.23; (m) daily diary of the site works; (n) safe guard status of the project; (o) Material delivered to the site and material consumed in the works; (p) Plant and equipment on Site together with the number of hours worked by and the current condition of each item; and (q) All incidents affecting the safety and the health and welfare of persons and causing property damage, together with such other records as the Engineer may from time to time require to be kept and provided.
Labor Laws	6.1	Add at the end the following sentence: The Contractor shall comply with the Employer’s applicable Labor Laws and regulations and incorporate applicable workplace occupational Safety norms.
Health and Safety	6.7	Add at the end the following sentence: “The Contractor shall arrange all medical facilities as per the Standard Operation Procedure Guideline (SOP) of ADB / Government of Nepal Guideline for COVID-19 Pandemic and any other Pandemic to its employees engaged under the project and to members of the local communities surrounding the Project area, particularly women.” The Contractor shall provide appropriate facilities (latrines, drinking water, the likes) for workers at the construction site.

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Contractor's Personnel	6.9	Add the following paragraph at the beginning of Sub Clause 6.9. The Contractor shall appoint the natural persons named in the Bid to the positions of Key Personnel. If not so named, or if an appointed person fails to act in the relevant position of Key Personnel, the Contractor shall submit to the Engineer for consent the name and particulars of another person the Contractor proposes to appoint to such position. If consent is withheld or subsequently revoked, the Contractor shall similarly submit the name and particulars of a suitable replacement for such position. The Contractor shall not, without the Engineer's prior consent, revoke the appointment of any of the Key Personnel or appoint a replacement unless the person is unable to act as a result of death, illness, disability or resignation, in which case the appointment shall be deemed to have been revoked with immediate effect and the appointment of a replacement shall be treated as a temporary appointment until the Engineer gives his/her consent to this replacement, or another replacement is appointed, under this Sub-Clause). All Key Personnel shall be based at the Site (or, where Works are being executed off the Site, at the location of the Works) for the whole time that the Works are being executed. If any of the Key Personnel is to be temporarily absent during execution of the Works, a suitable replacement shall be temporarily appointed, subject to the Engineer's prior consent. All Key Personnel shall be fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language]. If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreter(s) available during all working hours, sufficient for that person to properly perform his/her duties under the Contract.
Child Labor	6.21	Please delete the contents within this subclause and replace with the following: "The Contractor shall not employ any child to perform any work, including work that is economically exploitative, or is likely to be hazardous to, 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. "Child" means a child below the statutory minimum age specified under applicable national law in Nepal."
Respectful Work Environment	6.25	<i>The following sentence shall apply:</i> The Contractor shall ensure that its employees and sub-contractors observe the highest ethical standards and refrain

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		from any form of bullying, discrimination, misconduct, and harassment, including sexual harassment, and shall, at all times, behave in a manner that creates an environment free of unethical behavior, bullying, misconduct, and harassment, including sexual harassment. The Contractor shall take appropriate action against any employees or sub-contractors, including suspension or termination of employment or sub-contract, if any form of unethical or inappropriate behavior is identified. The Contractor shall conduct training programs for its employees and subcontractors to raise awareness on and prevent any form of bullying, discrimination, misconduct, and harassment, including sexual harassment, and to promote a respectful work environment. The Contractor shall keep an up-to-date record of its employees and subcontractors who have attended and completed such training programs and provide such records to the Employer or the Engineer at their first written request.
Keeping Records of Contractor's Materials, Equipment, and Incidents	6.26	Add new GCC Sub-clause 6.26: The Contractor shall prepare and submit to the Engineer on a monthly basis detailed records showing: (i) materials delivered to the Site and materials consumed in the Works; (ii) plant and equipment on Site together with the number of hours worked by and the current condition of each item; (iii) all incidents affecting the safety and the health and welfare of persons and causing damage to property, together with such other records as the Engineer may from time to time require to be kept and provided; (iv) Daily diary shall be included in these records.
Manner of Execution	7.1	Insert the following paragraphs at the end of Sub-Clause 7.1: The Contractor shall submit complete documents and information pertaining to the method statements for manufacture, installation and construction which the Contractor proposes to adopt or use, (and if applicable such calculations of stresses, strains and deflections and the like that will or may arise in the Works or to the other works comprising the Project or any parts thereof during installation from the use of such methods). The Engineer will then check to see whether, if such method statements are adhered to, the Works can be executed in accordance with the Contract and without detriment to the Works (when completed) and to other works comprising the Project and in a manner which minimizes disruption to road and pedestrian traffic.

Subject	Ref. GCC	Data
		The Engineer shall inform the Contractor in writing within 21 days after receipt of the above information, a) that the Contractor's proposed method statements for manufacture, installation, and construction have the consent of the Engineer; or b) In what respects, in the opinion of the Engineer, the Contractor's proposed method statements for manufacture, installation, and construction: (i) fail to comply with the Specification and Drawings; (ii) would be detrimental to the Works and/or to the other works comprising the Project; (iii) do not comply with the other requirements of the Contract; or c) as to the further documents or information which is required to enable the Engineer to properly assess the proposed method statements for manufacture, installation, and construction. In the event that the Engineer does not give his consent, the Contractor shall take such steps or make such changes in the said method statements or supply such further documents or information as may be necessary to meet the Engineer's requirements and to obtain his consent. The Contractor shall not change the method statements for manufacture, installation, and construction that have received the Engineer's consent without further review and consent in writing of the Engineer. Notwithstanding the foregoing provisions of this Sub-Clause, or those certain of the Contractor's proposed method statements for manufacture, installation, and construction may be the subject of the consent of the Engineer, the Contractor shall not be relieved of any of its liability or obligation under the Contract.
Inspection	7.3	In sub-paragraph (b), delete "and construction" and replace with ", construction and performance-based maintenance".
Commencement of Works	8.1	Delete subparagraph (d) of GCC 8.1 and replace with: (d) receipt by the Contractor of the first instalment of the Advance Payment under Sub-Clause 14.2 [Advance Payment], provided that the corresponding bank guarantee has been delivered by the Contractor. If, however, the Contractor does not submit the advance payment guarantee for the first installment in accordance with Sub-Clause 14.2 [Advance Payment] within 42 days after receiving the Letter of Acceptance, the conditions precedent for the Commencement of Works as provided in this sub-paragraph (d) are deemed to have been fulfilled.
Programme	8.3	In sub-paragraph (a), immediately after "erection" insert ", performance-based maintenance".

Subject	Ref. GCC	Data
Incentive for early completion	8.13	Add this Sub-Clause 8.13, after the Sub-Clause 8.12: This Sub-Clause shall apply only if the Contractor completes the whole of the Works within the Time for Completion under Sub-Clause 8.2 [Time for Completion], and without any extension under Sub-Clause 8.4 [Extension of Time for Completion]. In case of any extension of Time for Completion of the whole of the Works under Sub-Clause 8.4, Sub-Clause 8.13 shall not apply, and the Contractor shall not be entitled to any incentive payment under this Sub-Clause or for any additional payment in lieu of the incentive, under any Clause of these Conditions or otherwise in connection with the Contract. Subject to the preceding paragraph, and for achieving an early completion of the whole of the Works (Phase 1) in accordance with the Contract, the Contractor will be paid, at a sole discretion of the Employer, 0.02% of the Accepted Contract Amount (excluding Provisional Sum and VAT) per each day completed earlier, within a maximum limit of 10% of the Accepted Contract Amount (excluding Provisional Sum and VAT). Early completion period shall be counted, with reference to the Commencement Date, backward from the Time for Completion for the whole of the Works under Sub-Clause 8.2 [Time for Completion] (Phase 1) and without any extension under Sub-Clause 8.4 [Extension of Time for Completion], provided that on the date on which the Works are completed in accordance with the Contract, as stated in the Taking-Over Certificate issued to the Contractor under Sub-Clause 10.1(a), no minor outstanding work or defects remain in the Works. In case any minor outstanding work or defects remain in the Works on the date on which the Works are completed in accordance with the Contract, as stated in the Taking-Over Certificate issued to the Contractor under Sub-Clause 10.1(a), the early completion of the whole of the Works will be deemed to have been achieved only on the date the Contractor completes all the minor outstanding works and remedies all the defective works. Payment for achieving early completion shall follow the same currencies and proportion as in the Schedule of Payment Currencies. Any incentive payment for achieving early completion shall be made only after the Engineer issues- (a) The Taking-Over Certificate for the whole of the Works under Sub-Clause 10.1, stating the date on which the Works were completed in accordance with the Contract;

Subject	Ref. GCC	Data
		(b) the certificate indicating the date on which the Contractor has completed all minor outstanding works and remedied defects noted in issuing the Taking-Over Certificate under Sub-Clause 10.1(a); and (c) The certificate for achieving an early completion of the whole of the Works in accordance with this Sub-Clause, stating the achieved early completion period and its corresponding early completion incentive amount to be paid to the Contractor in accordance with this Sub-Clause. To apply for an incentive payment for achieving early completion for which the Contractor considers himself entitled under this Sub-Clause, he must include all the support documents (a) to (c) indicated above, in a monthly Statement under Sub-Clause 14.3.
Taking Over of the Works and Sections	10.1	Replace the last sentence of the second paragraph with the following sentence: "The Contractor may similarly apply for a Taking-Over Certificate for Phase 2: Performance Based Maintenance after its completion. After the third paragraph, add the following paragraph: "Pursuant to sub-paragraph (a) above, any works related to road, traffic, or public safety or which may affect the protection of the Works in any respect, as determined by the Engineer, shall not be deemed to be minor outstanding works or defects which will not substantially affect the use of the Works within the meaning of this Sub-Clause."
Interference with Tests on Completion	10.3	In the second paragraph, immediately after "Defect Notification Period", add "of the Phase 1: Upgrading Works".
Completion of Outstanding Work and Remedying Defects	11.1	In sub-paragraph (a), after "Taking-Over Certificate" insert "for Phase 1: Upgrading Works".
Cost of Remedying Defects	11.2	Add the following at the end of Sub-clause 11.2: Upon the completion of construction (Phase:1 and Phase:2), the Contractor shall fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition as recorded by the Contractor in consonance with its obligation in Sub-clause 4.16.
Extension of Defects Notification Period	11.3	In the first paragraph, immediately after "taking over," add "for Phase 1: Upgrading Works".
Performance Certificate	11.9	Delete the second paragraph and replace it with the following:

Subject	Ref. GCC	Data
		“Separate Performance Certificate shall be issued for Phase 1: Upgrading Works and Phase 2: Performance Based Maintenance Works. The Engineer shall issue a Performance Certificate for Phase 1 within 28 days after the latest of the expiry dates of the Defect Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor’s Documents and completed and tested all the Works, including remedying any defects. The Engineer shall issue a Performance Certificate for Phase 2 after completing all the works specified in the Special Provisions to the Standard Specifications for Performance Based Maintenance. A copy of the Performance Certificates shall be issued to the Employer.”
Provisional Sums	13.5 (b) (ii)	Add the following paragraphs at the end of (b) (ii) of Sub-clause 13.5: For the emergency works as determined by the Engineer during Phase 2, the budget is allocated in the provisional sums for the payment of the works. The payment for emergency works shall be made at existing Bill of Quantities (BoQ) rates or at appropriate Day-works rates for each corresponding BoQ pay items with the Adjustments for Changes in Cost in accordance with Sub-clause 13.8. Such payments shall not be subject to additional overhead because of the fact that the BoQ and Dayworks rates quoted by the Contractor are with his overhead.

Subject	Ref. GCC	Data
Adjustments for Changes in Cost	13.8	Phase1: Upgrading Works The Contract Price shall be adjustable during Contract Execution for Phase 1: Upgrading works. The formulae to be applied shall be as given in the GCC Clause 13.8, and the coefficients shall be as stated in the relevant table of adjustment data. Phase 2: Performance Based Maintenance Works The Contract Price shall be adjustable during Contract Execution for Phase 2: Performance Based Maintenance Works. In the manner described below. The amount certified in each payment certificate shall be adjusted by applying the formulae below $P_c = A_c + B_c I_{mc}/I_{oc}$ Where: P_c is the adjustment factor for the portion of the Contract Price Payable The non-adjustable and adjustable coefficients shall be as follows: $A_c = 0.15$ $B_c = 0.85$ The index (I) shall be the National Salary and Wage Index: Construction Laborer published by Nepal Rastra Bank. I_{mc} is the index value prevailing at the end of the month being invoiced. I_{oc} is the index value prevailing 28 days before the commencement of the Phase 2" Performance based Maintenance Works
The Contract Price	14.1	Add the following paragraph at the end of Sub-clause 14.1: The Contractor shall also pay royalties, tolls, value-added tax, and income tax. With respect to the income taxes, including taxes on the Contractor's staff, personnel, and labor, the Contractor shall perform such duties regarding Tax Deductions at Source (TDS) thereof as may be applicable by the laws and regulations of Nepal.
Payment of Retention Money	14.9	In the first paragraph, in the first and second sentences after "Taking-Over Certificate", insert "for Phase 1: Upgrading Works". Delete the second paragraph and replace it with the following: "Promptly after the expiry date of the Defects Notification Period of Phase 1: Upgrading Works, out of the 50% outstanding balance of the Retention money, the Engineer shall certify 25% of it for payment to the Contractor."

Subject	Ref. GCC	Data
		In the fifth paragraph, in the first sentence, after “Taking Over Certificate”, insert “for Phase 1: Upgrading Works”. Delete the sixth (last) paragraph of the Sub-clause 14.9. Add the following paragraph at the end of Sub-clause 14.9: If the Contractor complies with the Operational Service Levels defined in Table 29.5 and 29.6.3 Pavement Roughness and Surface Distress Index in Section 2914 of Part 2 Employer's Requirements, the outstanding 25% of the Retention Money after the Defects notification Period of Phase 1: Upgrading Works shall be repaid to the Contractor in the following manner: At the end of each completed year of the Phase 2: Performance Based Maintenance Works, by 5 % of the Retention Money at the end of each year, so that the Retention Money will be reduced to nil at the completion of 5 (five) years of Phase 2: Performance Based Maintenance Works.
Payment Reduction	14.16 (Additional Clause)	Add additional Clause 14.16 “Payment Reduction” as below: Reduction of monthly payments for performance-based maintenance works shall be applied in case of non-compliance with Service Levels by means of Payment Reduction Points (PRP), as indicated in the Section 2910 to 2917, of Part 2: Employer's Requirements. The value of each Payment Reduction Point (PRP) is NRs. 800.00 during the first full six (6) months of Phase 2 and NRs. 1,300.00 thereafter. The Payment Reduction Points are subject to price adjustment in a manner as described in Clause 13.8 for Phase 2 works.
Eligibility	21	Add New GCC Clause 21 “Eligibility”
	21.1	Add new GCC Sub-clause 21.1 as follows: The Contractor shall have the nationality of an ADB member country. 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.
	21.2	Add new GCC Sub-clause 21.2 as follows:

Subject	Ref. GCC	Data
		The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries, 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.

FOR REFERENCE ONLY

APPENDIX

General Conditions of Dispute Board Agreement

- 1. Definitions** Each "Dispute Board Agreement" is a tripartite agreement by and between:
- (a) the "Employer";
 - (b) the "Contractor"; and
 - (c) the "Member" who is defined in the Dispute Board Agreement as being:
 - (i) the sole member of the "DB" (or "dispute board") and, where this is the case, all references to the "Other Members" do not apply, or
 - (ii) one of the three persons who are jointly called the "DB" and, where this is the case, the other two persons are called the "Other Members."

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

- 2. General Provisions** Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:
- (a) the Commencement Date defined in the Contract,
 - (b) when the Employer, the Contractor, and the Member have each signed the Dispute Board Agreement, or
 - (c) When the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Board Agreement shall terminate upon the expiry of this period.

- 3. Warranties** The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor, and the Engineer. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance, which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is

- (a) experienced in the work, which the Contractor is to carry out under the Contract;
- (b) experienced in the interpretation of contract documentation; and
- (c) fluent in the language for communications defined in the Contract.

- 4. General Obligations of the** The Member shall

Member

- (a) have no interest, financial or otherwise, in the Employer, the Contractor or Engineer, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor, or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor, and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer, or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor, or the Engineer, except as may be agreed in writing by the Employer, the Contractor, and the Other Members (if any);
- (e) comply with the annexed procedural rules and with Subclause 20.4 of the Conditions of Contract;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not, while a Member, enter into discussions or make any agreement with the Employer, the Contractor, or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- (h) ensure his/her availability for all site visits and hearings as are necessary;
- (i) become conversant with the Contract and with the progress of the Works (and of any other parts of the project of which the Contract forms part) by studying all documents received, which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the DB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor, and the Other Members (if any); and
- (k) be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5. General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the Dispute Board's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the

Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member, and the Other Members (if any),

- (a) be appointed as an arbitrator in any arbitration under the Contract;
- (b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- (c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the Dispute Board under Subclause 20.4 of the Conditions of Contract, which will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6. Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for
 - (i) being available on 28 days' notice for all site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in subparagraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee, which shall be considered as payment in full, for
 - (i) each day or part of a day up to a maximum of 2 days' travel time in each direction for the journey between the Member's home and the site, or another location of a meeting with the Other Members (if any);
 - (ii) each working day on Site visits, hearings, or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.

- (c) all reasonable expenses, including necessary travel expenses (air fare in less than first class, hotel and subsistence, and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, faxes and telexes: a receipt shall be required for each item in excess of five percent (5%) of the daily fee referred to in sub-paragraph (b) of this Clause;
- (d) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor, and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the Dispute Board; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Subclause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7. Termination

At any time, (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when

received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor, and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

8. Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 (a)-(d) above, he shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the Dispute Board which are rendered void or ineffective by the said failure to comply.

If the Member fails to comply with any of his obligations under Clause 4 (e) - (k) above, he shall not be entitled to any fees or expenses hereunder from the date and to the extent of the noncompliance and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses already received by the Member, for proceedings or decisions (if any) of the Dispute Board, which are rendered void or ineffective by the said failure to comply.

9. Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination, or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

Procedural Rules

Unless otherwise agreed by the Employer and the Contractor, the Dispute Board shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor, and the Dispute Board, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.

The timing of and agenda for each site visit shall be as agreed jointly by the Dispute Board, the Employer, and the Contractor, or in the absence of agreement, shall be decided by the Dispute Board. The purpose of site visits is to enable the Dispute Board to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to endeavor to prevent potential problems or claims from becoming disputes.

Site visits shall be attended by the Employer, the Contractor, and the Engineer and shall be coordinated by the Employer in cooperation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the Dispute Board shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.

The Employer and the Contractor shall furnish to the Dispute Board one copy of all documents which the Dispute Board may request, including Contract documents, progress reports, variation instructions, certificates, and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the Dispute Board comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.

If any dispute is referred to the Dispute Board in accordance with Subclause 20.4 of the Conditions of Contract, the Dispute Board shall proceed in accordance with Subclause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the Dispute Board shall

- (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case; and
- (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.

The Dispute Board may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.

Except as otherwise agreed in writing by the Employer and the Contractor, the Dispute Board shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor, and the Engineer, and to proceed in the absence of any party who the Dispute Board is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

The Employer and the Contractor empower the Dispute Board, among other things, to

- (a) establish the procedure to be applied in deciding a dispute;
- (b) decide upon the Dispute Board's own jurisdiction, and as to the scope of any dispute referred to it;
- (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Guidelines;
- (d) take the initiative in ascertaining the facts and matters required for a decision;
- (e) make use of its own specialist knowledge, if any;
- (f) decide upon the payment of financing charges in accordance with the Contract;
- (g) decide upon any provisional relief such as interim or conservatory measures; and
- (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.

The Dispute Board shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the Dispute Board shall make and give its decision in accordance with Subclause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the Dispute Board comprises three persons:

- (a) it shall convene in private after a hearing, in order to have discussions and prepare

its decision;

- (b) it shall endeavor to reach a unanimous decision: if this proves impossible, the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
- (c) if a member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members to not make a decision.

FOR REFERENCE ONLY

FOR REFERENCE ONLY

**Appendix 1 – Environment Impact Assessment
(In separate Volume)**

FOR REFERENCE ONLY

**Appendix 2 – Environmental Management Plan
(In separate Volume)**

FOR REFERENCE ONLY

**Appendix 3 – Resettlement Plan
(In separate Volume)**

Appendix 4 – Gender Equity and Social Inclusion Plan

- Note –This Kakarbhitta-Laukahi Road Section of East-West Highway, which falls under "Gender Category (3rd)".
- Some Gender (SG) Elements do not require GESI Action Plan.

Section 9 - 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.

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FOR REFERENCE ONLY

Notice of Intention for Award of Contract

[on letterhead paper of the Employer]

[date of notification]

To: [name of the Bidder]
Attention: [insert name of the Bidder's authorized representative]
Address: [insert address of the Bidder's authorized representative]
Telephone/Fax numbers: [insert telephone/fax numbers of the Bidder's authorized representative]
E-mail Address: [insert e-mail address of the Bidder's authorized representative]

This is to notify you of our intention to award the contract [insert name of the contract and identification number, as given in the Bid Data Sheet]. You have [insert number of days as specified in ITB 41.1 of the BDS] days from the date of this notification to (i) request for a debriefing in relation to the evaluation of your Bid and/or (ii) submit a bidding-related complaint in relation to the intention for award of contract, in accordance with the procedures specified in **ITB 41.1 and ITB 46.1**.

The summary of the evaluation are as follows:

1. List of Bidders

Name of Bidder	Bid Price as Read out at Opening	Evaluated Bid Price

2. Reason/s Why Your Bid Was Unsuccessful

.....
.....
.....

3. The Successful Bidder

Name of Bidder:	
Address:	
Accepted Contract Amount:	
Duration of Contract:	
Scope of the Contract Awarded:	
Amount Performance Security Required:	

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

FOR REFERENCE ONLY

Letter of Acceptance

[on letterhead paper of the Employer]

[date]

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

Subject: Contract No. *[please specify]*

This is to notify you that your Bid dated *[date]* for execution of the *[name of the contract and identification number, as given in the Bid Data Sheet]* for the Accepted Contract Amount in the equivalent of *[amount in words and figures and name of currency]*, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract and any additional security required as a result of the evaluation of your bid, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

FOR REFERENCE ONLY

Contract Agreement

THIS AGREEMENT made the [date] day of [month], [year], 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 therein.

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) Letter of Acceptance,
 - (b) Letter of Technical Bid,
 - (c) Letter of Price Bid,
 - (d) Addenda Nos. [insert addenda numbers if any]
 - (e) the Particular Conditions of Contract – Part A,
 - (f) Particular Conditions of Contract – Part B,
 - (g) List of Eligible Countries that was specified in Section 5 of the Bidding Document
 - (h) General Conditions of Contract,
 - (i) Specifications,
 - (j) Drawings,
 - (k) completed Schedules including Bill of Quantities,
 - (l) the JV Undertaking (if the Contractor is a JV), and
 - (m) any other documents shall be added here.
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 [name of the borrowing country] on the day, month and year indicated above.

Signed by

Signed by

for and on behalf of the Employer
in the presence of

for and on behalf the Contractor
in the presence of

Witness, Name, Signature, Address, Date

Witness, Name, Signature, Address, Date

Performance Security

[Bank's name, and address of issuing branch or office]

Beneficiary: [Name and address of the Employer]

Date:

Performance Guarantee No.:

We have been informed that [name of the contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [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 [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 words]¹ [amount in figures] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, 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 [date] day of [month], [year],² and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.³

.....
[Signature(s) and seal of bank (where appropriate)]

If the bank issuing performance security is located outside the Employer's country, it shall be counter-guaranteed or encashable by a bank in the Employer's country.

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- ¹ The guarantor shall insert an amount representing the percentage of the accepted contract amount specified in the contract and denominated either in the currency(ies) of the contract or in any freely convertible currency acceptable to the Employer.
- ² Insert the date 28 days after the expected expiry of defect notification 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 [6 months][1 year], 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."
- ³ Or the employer may use "Uniform Rules for Demand Guarantees (URDG), ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded" as appropriate.

Advance Payment Security

[Bank's name, and address of issuing branch or office]

Beneficiary: [Name and address of the Employer]

Date:

Advance Payment Guarantee No.:

We have been informed that [name of the contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [name 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 words]¹ [amount in figures] 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 words]² [amount in figures] 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:

- (a) used the advance payment for purposes other than the costs of mobilization and cash flow support in respect of the Works; or
- (b) has failed to repay the advance payment when it has become due and payable in accordance with the conditions of the Contract, specifying the amount payable by the Contractor.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number [Contractor's account number] at [name and address of the bank].

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 percent (80%) of the Contract Price has been certified for payment, or on the [date] day of [month], [year],³ whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.⁴

.....
[Signature(s) and seal of bank (where appropriate)]

If the bank issuing advance payment security is located outside the Employer's country, it shall be counter-guaranteed or encashable by a bank in the Employer's country.

¹ The guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the Contract, or in any freely convertible currency acceptable to the Employer.

² Footnote 1.

³ Insert the expected expiration date of the time for completion. 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 [6 months][1 year], 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."

⁴ Or the employer may use "Uniform Rules for Demand Guarantees (URDG), ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded" as appropriate.