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PUNATSANGCHHU-II HYDROELECTRIC PROJECT AUTHORITY



STANDARD BIDDING DOCUMENT

FOR

RESTORATION WORK OF CONTROL ROOM ON NORTHERN PORTAL OG
HIGHWAY TUNNEL

Tender No.: PHPA-II/CE(P&C)/DAM /2026/09

APRIL 2026



BLANK

NOTICE INVITING TENDER (NIT)



DETAILED NOTICE INVITING TENDER (NIT)

Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) invites sealed Bids from class "S" Bhutanese Contractors for carrying out "**Restoration Work of Control Room on Northern Portal of Highway Tunnel**".

1. Detailed specifications, scope of Work and terms and conditions are given in the Bidding Documents which are enclosed as per the following schedule:

NIT No.	:	PHPA-II/CE(P&C)/DAM/2026/09
Document availability date & time	:	30.04.2026 to 26.05.2026 upto 1730 Hrs
Bid receipt date & time	:	On or before 27.05.2026 upto 1000 Hrs. (BST)
Bid opening date & time & Venue.	:	27.05.2026 at 1030 Hrs. (BST)
Bid Security	:	Nu. 64,000.00

2. Issue of Bidding Documents shall not automatically construe that the Bidder fulfils the Qualifying Requirements which shall be determined during Bid evaluation based on data/documents submitted by the Bidder. Bids shall be submitted at the address given in the BDS and shall be opened in the presence of Bidder's representatives who choose to attend.
3. All Bids must be accompanied by Bid Security as specified in the BDS. Bids not accompanied with an acceptable Bid security as specified in Bidding Documents or Bids accompanied with Bid Security of inadequate value and validity shall be rejected at the time of the opening.
4. Eligibility and Qualification Requirement for Bidders shall be as specified in the BDS.
5. A Non-refundable tender fee pf **Nu./Rs. 1000** in the form of Demand Draft(DD) or Cash warrant drawn in favour of PHPA-II, shall be submitted during the submission of bids, or deposit directly into PHPA-II's account No. **102081338** maintained with bank of Bhutan, Wangdue
6. PHPA-II reserves the right to accept or reject any Bid partly or fully or cancel the bidding process without assigning any reasons thereof and in such case no Bidder/intending Bidder shall have any claim arising out of such action.

Chief Engineer,
Procurement & Contracts Wing,
PHPA-II, Bjimthangkha, Wangdue.



NIT

SECTION I – INSTRUCTIONS TO BIDDERS



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A. INTRODUCTION

1. Scope of Works

1.1 The scope of the works shall be as specified in section V, Technical Specifications and Bidding Data Sheet (BDS). The name and identification number of the contract is provided in the NIT.

2. Site Visit

2.1 **The Bidder, at his own interest, responsibility and risk, must visit and examine the Site of Work and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for the Works. The costs of visiting the Site shall be at the Bidder's own expense.**

2.2 The bidder or his representative will be granted permission to enter the site of work only upon the condition that the Employer or his personnel or agent will not be responsible for death or personal injury or loss or damage to property and other loss, damage, cost or expenses incurred as a result of inspection/visit.

3. Fraud and Corruption

3.1 As per the RGoB policy, Employer require that the Bidders and Contractors observe the highest standards of ethics during the procurement and execution of contracts. The terms "Corrupt Practice", "Fraudulent practice": "Collusive practice", "Coercive practice" and "Obstructive practice" shall be as per the definition in **GCC Clause 1** In pursuance of this policy, the Employer:

- a) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question.
- b) will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that they have, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing for the contract.
- c) will have the right to require that a provision be included in Bidding Documents and in contracts, requiring Bidders, Contractors, and their Subcontractors to permit the Employer, any organization or person appointed by the Employer to inspect their accounts and records, and other documents relating to their Bid submission and contract performance and to have them audited by auditors appointed by the Employer.



- d) requires that Bidders, as a condition of admission to eligibility, execute and attach to their bids an Integrity Pact Statement in the form provided in Section VI. Failure to provide a duly executed Integrity Pact Statement may result in disqualification of the Bid; and
- e) will report any case of corrupt, fraudulent, collusive, coercive, or obstructive practice to the relevant RGoB agencies, including but not limited to the Anti-Corruption Commission (ACC) of Bhutan, for necessary action in accordance with the statutes and provisions of the relevant agency.

4. Eligible Bidders

4.1 A Bidder, and all parties constituting the Bidder, may have the nationality of any country specified in the BDS, subject to the restrictions specified in **ITB Clause 5**. 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.

4.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. Bidders may be considered to have a conflict of interest with one or more parties in this bidding process if they:

- a) are associated, or have been associated in the past, with a firm or any of its affiliates that has been engaged by the Employer to provide consulting services for the preparation of the design, specifications, and/or other documents to be used for the procurement of the Goods and related Service to be purchased pursuant to these Bidding Documents, or
- b) submit more than one Bid in this bidding process, except for alternative offers permitted under **ITB Clause 13**. However, this does not limit the participation of subcontractors in more than one Bid.
- c) employ or otherwise engage, either directly or through any of their affiliates, a dependent or close relative of the Employer employee or has an authority over it. For the purposes of this Sub-Clause, a close relative is defined as an immediate family which includes a father, mother, brother, sister, spouse, and own children.
- d) Have a relationship with each other directly or through common third parties, that puts them in a position to have access to information about or influence in the Bid of another Bidder, or influence the decisions of Employer regarding this bidding process; or have the same legal authorized representative for purposes of this Bid.

e) An Employer formed by the merger of two or more companies or



divisions of such companies engaged in execution of Works as specified in the Bidding Documents can also participate provided the constituent companies or divisions before merger individually or jointly meet the stipulated qualification requirements fully.

- 4.3 If so, specified in the BDS, if a Foreign/expatriate Bidder, who is currently not doing business within the Kingdom of Bhutan, is awarded the contract, the Bidder may be represented by an agent in the Kingdom of Bhutan. The agent shall be a legal entity, equipped and able to carry out the Contractor's obligations.
- 4.4 Where an agent is permitted to submit the Bid on behalf of the Foreign Bidder, payment of agency commission, if any, to the Foreign Bidder shall only be made in the local currency. The agent and the Foreign Bidder shall not be permitted to submit separate bids in the same bidding process. On the other hand, an agent shall not be allowed to work with and represent more than one party/Bidder.
- 4.5 In case of JV with any of the Bhutanese Bidder the payment to the Bhutanese member of the JV for the services from within Bhutan shall be in local currency.
- 4.6 The Bidder shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

5. Exclusion of Bidders

- 5.1 A Bidder shall be excluded from participating in this bidding process under the following circumstances:
 - a) Bidder is insolvent or is in receivership or is bankrupt or is in the process of being wound up; or has entered into an arrangement with creditors; or
 - b) Bidder's affairs are being administered by a court, judicial officer, or appointed liquidator; or
 - c) Bidder has suspended business or is in any analogous situation arising from similar procedures under the laws and regulations of his country of establishment; or
 - d) Bidder has been found guilty of professional misconduct by a recognized tribunal or professional body; or
 - e) Bidder has not fulfilled his obligations with regard to the payment of taxes, or other payments due in accordance with the laws of the country in which he is established or of the Kingdom of Bhutan; or
 - f) Bidder has been convicted for fraud and/or corruption by a competent authority, or
 - g) Bidder is guilty of serious misrepresentation in supplying information in



this tender; or

- h) The Bidder has been debarred/blacklisted from participation in public procurement by the competent authority; or
- i) as a matter of law or official regulation, RGoB prohibits commercial relations with the country in which the Bidder is constituted, incorporated, or registered.

6. Joint Venture Bids

6.1 Bids submitted by a joint venture, if so, permitted in the BDS, formed by a number of legal entities as specified in the BDS subject to the condition that the total number of legal entities shall not exceed three (3) entities, shall comply with the following requirements:

- a) The Bid shall be signed by an authorized signatory of the joint venture, who has been authorized by all the other members, so that the bid is legally binding on all members.
- b) One of the partners shall be designated as leader who shall have the authority to conduct all business for and behalf of any and all members of the joint venture. This authorization shall be evidenced by submitting with the bid a power of attorney signed by legally authorized signatories of the other members:
- c) The leader shall be authorized to receive instructions for and on behalf of any and all members of the Joint Venture and the entire execution of the contract, including payment, shall be done exclusively with the leader;
- d) All members of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with its terms; and
- e) A copy of the agreement entered into by the joint venture members as per the format provided in the bidding documents shall be submitted with the Bid. In order for JV to qualify, either the lead partner must meet the minimum technical qualification requirements or can be met jointly by the JV partners, as specified in the BDS.

6.2 The financial qualification requirements however may be met jointly by the members of the JV subject to the condition that each member can independently meet at least the minimum financial qualification requirements as specified in the BDS. Failure to comply with this requirement will result in rejection of the Joint Venture's Bid.

6.3 A firm can be a member in only one joint venture: bids submitted by joint ventures including the same firm as member in more than one JV in the same bidding process shall be rejected.



B. BIDDING DOCUMENTS

7. Contents of Bidding Documents

7.1 The bidding documents are those as stated below and should be read in conjunction with any corrigendum/modification issued on these documents:

- Notice Inviting Tender (NIT)
- Instructions to Bidders
- Bid Data Sheet (BDS)
- General Conditions of the Contract
- Special Conditions of Contract (SCC)
- Forms
- Bill of Quantity (BoQ)
- Drawings

7.2 The bidder is expected to examine carefully the contents of all the above documents. Failure to comply with the requirement of bid submission will be at bidders' own risk. Bids, which are not substantially responsive to the requirement of the bidding document, will be rejected. Prior to last date of submission of tender the Employer, for any reason whatsoever, may modify the tender by issuing corrigendum, which will become a part of tender document. No modification of bid shall be permissible after last date of submission, whatever may be the reason.

7.3 The PHPA-II at its discretion may extend as necessary the deadline for submission of tender, if considered necessary.

8. Clarification of Bidding Documents

8.1 The Bidder shall examine the bidding documents thoroughly in all respects and if any conflict, discrepancy, error or omission is observed, the Bidder may request clarification promptly. A prospective Bidder requiring any clarification on the bidding documents may notify Employer in writing by post or e-mail, to the address mentioned in BDS, not later than the date and time specified in BDS.

8.2 Employer shall issue clarification(s) as it may think fit in writing by post or e-mail prior to the deadline/ extended deadline for submission of Bids prescribed by Employer. All such clarifications shall form part of the bidding documents and shall accompany the Bidder's bid

8.3 For the information of all Bidders, the clarifications (including a description of the enquiry but without identifying its source) will be sent to all prospective bidders.

8.4 Bidders shall not be allowed to seek any clarification on the bidding documents in person or by telephone or other verbal means. Any queries sent



by the Bidders after the date and time notified in the BDS or extended date, if any, shall not be entertained.

8.5 Should Employer deem it necessary to amend the bidding documents as a result of a clarification, it shall do so following the procedure under **ITB Clause 10**.

8.6 Any failure on the part of the Bidder to comply with the provisions under **ITB Clause 8** shall not excuse him/her for performing the works in accordance with the contract, in case of award.

9. Pre-Bid Meeting

9.1 A pre-bid meeting shall be conducted only if necessary to clarify doubts and concerns of the Bidders prior to submission of bids. The Bidders who have purchased the bidding documents shall attend pre-bid meeting to be held on the date, time and location specified in BDS.

9.2 Non-attendance at the pre-bid meeting shall not be a cause for disqualification of Bidders but at the same time shall not entitle them to raise any query at a later date.

9.3 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, shall be circulated to all Bidders who have downloaded the bidding documents

9.4 Any modification to the bidding documents that may become necessary as a result of the pre bid meeting shall be made by Employer through the issue of an addendum pursuant to **ITB Clause 10**.

10. Amendment of Bidding Documents

10.1 At any time prior to the deadline for submission of bids, the PHPA-II may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by the issuance of a Corrigendum/Addendum.

10.2 The corrigendum/addendum will be sent in writing to all prospective bidders and the bidders shall promptly acknowledge receipt thereof to the PHPA-II.

10.3 In order to afford prospective bidders reasonable time required to consider a corrigendum/addendum in preparing their bids, the PHPA-II at its discretion may extend the deadline for the submission of bids.



C. PREPARATION OF BIDS

11. Cost of Bidding

The Bidder shall bear all costs, direct or indirect associated with the preparation and submission of his bid (including site visits and attending pre-bid meetings) and Employer in no case shall be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

12. Language of Bid

The bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the bidder and the PHPA-II shall be written in the English language only.

13. Alternative Bids

Alternative bids shall not be considered, unless specifically allowed in the BDS.

14. Documents Comprising the Bid

The tender to be prepared and submitted by the bidder for consideration shall comprise of the following: -

- a) Complete set of bidding document, BoQ & forms duly filled in and signed, wherever required, without altering the formats.
- b) Bid Security in accordance with **ITB Clause 18**.
- c) Integrity Pack Statement duly executed by the bidder as per form no.5
- d) Documentary evidences establishing Bidder's Eligibility and Qualification stipulated in BDS.
- e) Alternative bids if permitted in BDS
- f) Any other documents required in the BDS

15. Bid Prices and Discounts

15.1 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract or subject to variation, as specified in the BDS.

15.2 The Bidder shall fill in unit rates/ prices for all items of the Works described in the BoQ in figures. The unit rates/ prices quoted in the BoQ shall also be deemed to include any incidentals not shown or specified but reasonably implied or necessary for the proper completion and functioning of the whole specified item of the Works in accordance with the Bidding Documents and shall also deem to include the cost of construction of infrastructural facilities required for execution of the Contract and not included in the Works. The Contract shall be for the whole Works based on the unit rates and prices in the Priced BoQ submitted by the Bidder.



DEFINITIONS AND INTERPRETATIONS

Clause – 1 Definitions

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

- i) 'PHPA-II'/ 'Employer' /'Purchaser' / 'Project Authority' means the Punatsangchhu-II Hydroelectric Project Authority and the legal successor in title to the PHPA-II who will employ the Contractor.
- ii) "RGoB" means the Royal Government of Bhutan.
- iii) 'Contractor'/ 'Supplier' means the person or persons, firm or company, group of firms or Joint Venture, whose bid has been accepted by the PHPA-II and includes the Contractor's personal representatives, successors and permitted assigns.
- iv) "Engineer-in-Charge" means the Engineer-in-Charge appointed from time to time by the PHPA-II and notified in writing to the Contractor to act as the Engineer-in-Charge for the purposes of the Contract.
- v) "Engineer-in-Charge's Representative" means any Resident Engineer or assistant of the Engineer-in-Charge appointed from time to time by the PHPA-II or the Engineer-in-Charge to perform the duties set forth in Clause-2 hereof, whose authority shall be notified in writing to the Contractor by the Engineer-in-Charge.
- vi) "Works" shall include both Permanent Works and Temporary Works.
- vii) "Temporary works" means all temporary works of every kind required in or about the execution or maintenance of Works.
- viii) "Permanent Works" means the permanent works to be executed and maintained in accordance with the Contract.
- ix) "Contract" means the Conditions Governing the Contract, Technical Specifications, Drawings, priced Bill of Quantities, Letter of Award and the Contract Agreement.
- x) "Contract Price" or "Contract value" means the sum indicated in the Letter of Award. The Contract Price when exceeds the awarded value (without escalation), it shall be revised at 6 (six) monthly intervals comprising BoQ items actually executed plus the extra/deviated items valued at base date without escalation for the purpose of regulating percentage based issues.
- xi) "Constructional Plant", "Plant and Equipment" or "Machinery" means and include plant, equipment, machinery, tools, appliances,



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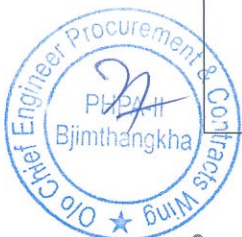
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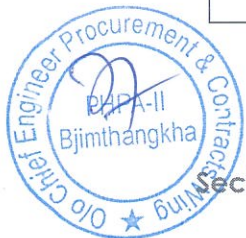
21.8	Submission of Bids electronically: NA
22.1	The deadline for the submission of the Bid is: 27.05.2026 at 10:00 Hours (BST).
25.1	The bid Opening shall take place at: Venue: <i>Office of Chief Engineer,</i> <i>Proc. & Contracts Wing,</i> <i>Punatsangchhu-II Hydroelectric Project,</i> <i>Bjimthangkha, Wangdue, Bhutan.</i> Date and Time: 27.05.2026 at 10:30 Hours (BST)
32.1	A margin of domestic Preference: shall not apply.
36.1	The Performance Security shall be provided in any one of the following forms, issued any schedule banks/financial institutions in Bhutan/India: a) An unconditional and Irrevocable Bank Guarantee as per form no.3. b) A Demand Draft c) A Banker's Cheque/Cash Warrant d) Direct Deposit in PHPA-II's Account No. 102081338 maintained with Bank of Bhutan
36.1 & 37.1	The successful Bidder shall submit the performance security and sign the Contract within Ten (10) days from the date of issue of the Letter of Award.



	<p>a) An unconditional and Irrevocable Bank Guarantee as per form no.3.</p> <p>b) A Demand Draft</p> <p>c) A Banker's Cheque/Cash Warrant</p> <p>d) Direct Deposit in PHPA-II's Account No. 102081338 maintained with Bank of Bhutan</p>
18.3	The Bid Security shall be issued by: Any schedule banks/financial institutions in Bhutan.
18.4	The Bid security shall remain valid till: 120 days from the date of bid opening
20.1	In addition to the original Bid, the number of copies is: NA
21.1	<p>For bid submission purposes only, the Employer's address is:</p> <p><i>The Chief Engineer, Proc. & Contracts Wing, Punatsangchhu-II Hydroelectric Project, Bjimthangkha, Wangdue Bhutan.</i></p> <p>Phone number: 02-471744/471713</p> <p>Email-ID : contracts@phpa2.gov.bt</p>
21.3	<p>Single-Stage Two Envelope process</p> <p>The Bidder shall seal the Bids in separate inner envelopes contained within one outer envelope. All envelopes shall be sealed with adhesive or other sealant.</p> <p>Superscript of Cover Envelope:</p> <p>"CONFIDENTIAL"</p> <p>Bid for: Restoration Work of Control Room on Northern Portal of Highway Tunnel</p> <p>Tender No.: PHPA-II/CE(P&C)/DAM/2026/09</p> <p>Addressed to:</p> <p><i>The Chief Engineer, Proc. & Contracts Wing, Punatsangchhu-II Hydroelectric Project, Bjimthangkha, Wangdue Bhutan.</i></p> <p>Not to be opened Before: 27.05.2026 at 10:30 Hrs (BST)</p>



	<p>Note: Bidder shall submit copy of reports on financial standing of the bidder such as profit and loss statements, balance sheets or auditor's report of the past three years containing the above information.</p> <p>2) Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following: -</p> <p>a) Three similar completed works costing not less than Nu/Rs1,277,000.00;</p> <p style="text-align: center;">or</p> <p>b) Two similar completed works costing not less than Nu/Rs. 1,597,000.00;</p> <p style="text-align: center;">or</p> <p>c) One similar completed work costing not less than Nu/Rs. 2,555,000.</p> <p>Note:</p> <p>i. similar work – works involving Structural steel works, civil repair works, drainage works and fencing works</p> <p>ii. Bidder shall submit copy of the work order (s) / completion Report or certificate (s).</p>
14 (f)	<p>1) Copy of a Valid Trade License or other documents to prove the legal status and place of registration of the business.</p> <p>2) Latest Tax Clearance Certificate</p>
15.1 & 15.3	The prices quoted by the Bidder shall not be adjustable.
15.4	GST and any other applicable taxes shall be borne and paid by the Bidder
16.1	The currencies of the Bid shall be: Ngultrum/Rupees
17.1	The Bid validity period shall be: 90 days from the last date of bid submission.
18.1	The Bidder shall furnish a bid security in the amount of Nu/Rs. 64,000.00.
18.2	The Bid Security shall be provided in any one of the following forms:



BID DATA SHEET

The Bid Data Sheet (BDS) contains information and provisions that are specific to this bidding process only. For clarity in the BDS, its clauses are numbered with the same numbers as the corresponding ITB clauses.

Wherever there is a conflict, the provisions herein shall prevail over those in the ITB

ITB Clauses	Particulars
1.1	Scope of the work: As specified in BoQ & TS.
2.1	Bidders may inspect the work site and its surroundings prior to submitting their bids.
5.1 (i)	Names of the countries from which contracting works or any payments to persons or entities in that country are prohibited: NIL
6	Joint Venture/consortium (JV/C) Bids are permitted: Not Permitted
8.1, 8.4 & 10.1	For Bid clarification purposes, the Employer's address is: <i>The Chief Engineer, Proc. & Contracts Wing, Punatsangchhu-II Hydroelectric Project, Bjimthangkha, Wangdue Bhutan.</i> <i>Phone number: 02-471744/471713 Email-ID : contracts@phpa2.gov.bt</i> Bid Clarification requests will be received ON or BEFORE: Date & Time: 20.05.2026 upto 1730 Hours
9.1	A pre-bid meeting : shall not take place
12	The language of a bid is: English
13	Alternative Bids: shall not be permitted
14.d	The following minimum Qualifying Requirement has to be met by the Bidder: 1) Average Annual financial turnover during the latest 3 financial years should be at least Nu./Rs. 958,000.00



SECTION II -BID DATA SHEET (BDS)



under the signature of the authorized signatory within seven (7) days of the date of notification of award.

- 35.2 Until a formal contract is prepared and secured, the LoA shall constitute a binding contract between the successful Bidder and Employer.
- 35.3 Upon the furnishing of performance security pursuant to **ITB Clause 36** by the successful Bidder. Employer shall promptly notify each unsuccessful Bidder and return their bid security.

36. Performance Security

- 36.1 Within the time specified in the BDS, the successful Bidder shall submit Performance Security equal to 10% of the Contract Price and in the form stipulated in the BDS.
- 36.2 Failure of the successful Bidder to comply with the requirements of **ITB Clause 37** and shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security
- 36.3 Upon the successful Bidder's signing of the Contract and furnishing of the Performance Security, the Employer shall promptly notify unsuccessful Bidders and shall discharge their Bid Securities.

37. Signing of Contract

- 37.1 Upon accepting the Letter of Award (LoA), the successful Bidder shall submit the Performance Security and sign the Contract as per form no. 1 within the time specified in the BDS.



32.2 A domestic Bidder shall provide all evidence necessary to prove that it meets the following criteria to be eligible for a margin of preference in the comparison of its Bid with those Bidders who do not qualify for the preference. A domestic Bidder shall:

- a) be registered within Bhutan, constituted under and governed by the civil, commercial or public law of Bhutan, and have its statutory office, central administration or principal place of business there.
- b) have majority ownership by nationals of Bhutan.
- c) not subcontract more than twenty percent (20%) of the initial Contract Price. Excluding provisional sums, to foreign contractors, suppliers and/or consultants.

32.3 Joint Ventures, Consortia and Associations of domestic firms may be eligible for the margin of preference provided that:

- a) the individual partners satisfy the criteria of eligibility of **ITB Clause 32.2 (a)** and the JV/C/A is registered in Bhutan:
- b) the JV/C/A does not subcontract more than ten percent (10%) of the initial Contract Price, excluding provisional sums, to foreign firms, and the JV/C/A satisfies any other criteria specified for the purpose of domestic preference eligibility, as specified in the BDS. The procedure used to apply the margin of preference shall be as stipulated in the BDS.

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

33.1 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.

F. AWARD OF CONTRACT

34. Award Criteria

34.1 Employer shall award the Contract to the successful Bidder whose bid has been determined to be substantially responsive and to be the lowest evaluated Bid, further provided that the Bidder is determined to be eligible and qualified and has the capacity and capability to fulfil the contract in accordance with relevant provisions of the bidding document.

35. Notification of Award

35.1 Prior to the expiry of the period of bid validity, Employer shall notify the successful Bidder, through a Letter of Award (LoA), that its bid has been accepted indicating the award price. The successful bidder shall return a copy of the LoA to Employer after duly recording "Accepted Unconditionally"



- d) adjustments due to the application of the evaluation criteria specified in the BDS
 - e) adjustments due to the application of a margin of preference, in accordance with **ITB Clause 33**, if applicable
- 30.3 Employer's evaluation of a bid shall exclude and not take into account any allowance for price adjustment during the period of execution of the contract, if provided in the Bid.
- 30.4 The evaluation shall be based on the evaluated cost of fulfilling the Contract in compliance with all commercial, contractual and technical obligations under the Bidding Documents.
- 30.5 For the purpose of comparison, the total price offered by all substantially Responsive bids of qualified Bidders shall be compared to determine the lowest evaluated Bid.

31. Abnormally High / Low Bids

- 31.1 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 Bidders to perform the contract for the offered bid price.
- 31.2 If the lowest evaluated Bid appears abnormally low and/or serious is unbalanced, Employer may require the Bidder to produce written explanations of justifications and detailed price analysis for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. Abnormally low Bid may or may not be accepted.
- 31.3 If Employer decides to accept the abnormally low Bid for the Bid with seriously unbalanced rates after considering the above, the Bidder shall be required to provide additional differential security in addition to the performance security, an equivalent to the difference between the estimated and quoted price to a maximum of (ten percent) 10% of the quoted price to protect Employer against any financial loss in the event of default of the successful Bidder under the Contract.
- 31.4 If the lowest evacuated Bid is abnormally high in the discretion of the Employer, then the Employer may seek justification for the high rates and if necessary, negotiate with the lowest evaluated Bidder and may reject the bid if considered to be abnormally higher than the estimate.

32. Margin of preference

- 32.1 If specified in the BDS, domestic Contractors may receive a margin of preference in during evaluation, for which this clause shall apply.



28. Preliminary examination of bids and Determination of Responsiveness

- 28.1 The Employer shall examine the Bids to confirm that all documents and information requested in **ITB Clause 14** have been provided and to determine the completeness of each document submitted.
- 28.2 Prior to the detailed evaluation of bids, the Employer shall determine whether each bid:
- Meets the eligibility criteria defined in **ITB Clause 4**
 - has been properly signed
 - is accompanied by required bid security
 - is substantially responsive to the requirement of bidding document.
- 28.3 A substantially responsive document is one which conforms to all the terms & conditions and specifications without material deviation or reservation which:
- affects in any substantial way the quality or scope of the work.
 - limits in any substantial way the scope of work.
 - is inconsistent with the bidding document.
 - affects unfairly the competitive position of other bidders.
- 28.4 Bids not found substantially responsive are liable to be rejected. Conditions if added by the bidder, which have adverse bearing on the cost and scope of tendered work shall make the tender liable for disqualification.

29. Corrections of Errors in Bids

The price bids shall be checked by the Employer for any arithmetic errors in computation and summation. Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit rate and the quantity, the unit rate as quoted will govern and the total amount shall be corrected. If the bidder does not accept the corrected amount of bid, his bid will be rejected.

30. Detail Evaluation and Comparison of Bids

- 30.1 The Employer shall evaluate each Bid that has been determined up to this stage of the evaluation, to be substantially responsive.
- 30.2 To evaluate and compare Bids, the Employer shall consider the following:
- the final bid price, as quoted in accordance with **ITB Clause 15**
 - price adjustment for correction of arithmetic errors in accordance with **ITB Clause 29**
 - price adjustment due to discounts offered in accordance with **ITB Clause 15**



- 25.5 Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid Opening.
- 25.6 All other envelopes shall be opened one at a time. The Bidders' names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, bid withdrawals, substitutions or modifications, the presence or absence of Bid Security, responses to any Bidding Documents addenda, and such other details as the Employer may consider appropriate shall be announced by the Employer at the Bid Opening.
- 25.7 No Bid shall be rejected at Bid Opening except for late Bids pursuant to **ITB Clause 23** and Bid Security not in accordance with **ITB Clause 18**.
- 25.8 Substitution Bids and modifications submitted pursuant to **ITB Clause 24** that are not opened at Bid Opening shall not be considered for further evaluation.
- 25.9 The Bidders' representatives and attendees who are present shall be requested to sign the record of Bid Opening. The omission of a Bidder's or other attendee's signature on the record shall not invalidate the contents and effect of the record.
- 25.10 In the case of the Single Stage Two Envelope Bid, the technical bid shall only be opened on the bid opening date. The date for opening the financial bid shall be intimated to the Bidders whose Bid is found responsive in the technical evaluation.

26. Confidentiality of Bids

- 26.1 After the public opening of bids, information relating to the examination, clarification, evaluation and comparison of bids and recommendations concerning the Award of Contract shall not be disclosed to bidders or other persons not officially concerned with such process.
- 26.2 Any effort by a bidder to influence the Employer in the process of examination, clarification, evaluation and comparison of bids, and in decisions concerning Award of Contract, may result in the rejection of his bid.

27. Clarification of Bids

To assist in the examination, comparison and evaluation of bid the PHPA-II may ask bidders for clarification of the bids, if any. But no change in price or substances of bid will be sought, agreed or permitted. The request for clarification and its response shall invariably be in writing.



24. Modification and Withdrawal of Bids

- 24.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative. Bids requested to be withdrawn shall be returned unopened to the Bidders.
- 24.2 The substitution or modification of the Bid must accompany the respective written notice and must be:
- a) submitted in accordance with **ITB Clause 20 and 21** in addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "SUBSTITUTION" or "MODIFICATION;" and
 - b) Received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with **ITB Clause 22**.
- 24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiry of the period of Bid validity or any extension thereof.
- 24.4 Withdrawal, substitution, or modification of a bid between the deadline for submission of bids and expiration of the period of bid validity specified as extended pursuant to **ITB Clause 17.1**, may result in the forfeiture of the Bid Security pursuant to **ITB Clause 18.8**. If the lowest or the lowest evaluated Bidder withdraws his bid between the periods specified in this clause, the bid security of the Bidder shall be forfeited.

E. BID OPENING AND EVALUATION

25. Bid Opening

- 25.1 The Employer shall conduct the Bid Opening in public, in the presence of Bidder-designated representatives who choose to attend, and at the address, date, and time specified in the BDS.
- 25.2 Bidders, their representatives, and other attendees at the Bid Opening shall not be permitted to approach any members of the Bid Opening Committee or any of the Employer employees.
- 25.3 First, envelopes marked "WITHDRAWAL" shall be read out and the envelope with the corresponding Bid shall not be opened but shall be 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.
- 25.4 Next, envelopes marked "SUBSTITUTION" shall be opened, read out, and exchanged with the corresponding Bid being substituted. The substituted Bid shall not be opened but shall be returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid Opening.



authorized to sign Bid on behalf of the Bidder, and

ii. Be marked "ORIGINAL" "ALTERNATIVE" (if permitted) and "COPY"

- 21.4 Where bids are invited under the single stage single envelope, both technical and financial bid shall be in one envelope.
- 21.5 In addition to the identification required in **ITB Clause 21.2**, the inner envelopes shall indicate the name and address of the Bidder; to enable the Bid to be returned unopened in case it is declared late pursuant to **ITB Clause 23**.
- 21.6 If the outer envelope is not sealed and marked as above, the Employer shall assume no responsibility for the misplacement or premature opening of the Bid.
- 21.7 In the Two-Stage Process, Bidders shall be advised to submit only the technical bids in the first stage. In the second stage, Bidders shall be requested to submit both their technical bids as modified and agreed upon with the Employer, and the financial bids based on the modified technical bids simultaneously in two separate sealed envelopes.
- 21.8 When so specified in the BDS Bidders shall have the option of submitting their Bids electronically. Bidders submitting Bids electronically shall follow the procedures specified in the BDS.

22. Deadline for Submission of Bids

- 22.1 Bids must be received by the Employer in accordance with **ITB Clause 21**, no later than the date and time indicated in the BDS. In the event of the specified date for submission of Bids being declared a holiday for the Employer, the bids will be received up to the specified time on the next working day. Such postponement of the date will not have any impact on the other dates specified bidding document (Bid Validity and validity of Bid Security).
- 22.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents 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.
- 22.3 In the event of the deadline for submission of Bid extended by Employer, the Bidders shall have the option to submit their revised Bid in substitution either in full or in part of earlier Bid. In the absence of a revised Bid, the original Bid shall be considered for opening and subsequent evaluation if otherwise in order. Wherever. the Bidder has submitted the revised Bid in modification of earlier Bid. the earlier Bid shall be returned unopened to the Bidder.

23. Late Bids

Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected and returned unopened to the Bidder.



19. Bidding Condition

The bidder shall submit offers which comply fully with the requirements of the Bidding Documents. Any deviation in submitted bid for the bidding documents shall be liable for rejection.

20. Format and Signing of Bid

20.1 The Bidder shall prepare **ONE Original** document comprising the Bid as described in **ITB Clause 14** and clearly mark it "ORIGINAL." In addition, the Bidder shall submit copies of the Bid, in the number specified in the BDS. 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.

20.3 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the authorized person signing the Bid.

D. SUBMISSION OF BIDS

21. Submission of Bids

21.1 Bids shall be delivered by hand, courier, registered post so as to reach the Employer at the address specified in the BDS. The Employer shall not be responsible for any delay in receipt of the bid where sent by post or carrier.

21.2 The Bids shall be submitted in envelopes, signed and sealed in the manner stipulated here under or as mentioned in the BDS. The outer Envelope shall:

- a) be marked "CONFIDENTIAL".
- b) be addressed to the Employer provided in the BDS.
- c) bear the Tender name and number; and
- d) provide a warning not to open before the time and date for Bid Opening.

21.3 Single-Stage Two Envelope process:

- a) The Inner Envelope-I shall contain:
 - i. Technical bid, Bid Security and be signed across their seals by the person authorized to sign the Bid on behalf of the Bidder; and
 - ii. Be marked "ORIGINAL" "ALTERNATIVE" (if permitted) and "COPY"
- b) The inner envelope-II shall contain:
 - i. Financial bids and be signed across their seals by the person



award. A Bidder granting the request shall be required to extend the validity of their Bid securities correspondingly but shall not be required or permitted to modify its Bid.

17.3 The provision of **ITB Clause 18** regarding discharge and forfeiture of the Bid Security shall continue to apply during the extended period of the Bid validity.

18. Bid Security

18.1 The Bidder shall furnish, as part of its Bid, a Bid Security in original form, denominated in the currency and the amount specified in the BDS.

18.2 The Bid Security shall at the Bidder's option, be in any forms stipulated in the BDS.

18.3 Bid Security shall be issued by financial institution stated in the BDS.

18.4 Bid security shall be in its original form and copies shall not be accepted. Bid Security shall be valid for a period thirty (30) days beyond the bid validity period, as extended, if applicable, in accordance with **ITB Clause 17.2**. Accordingly, the Bid security shall remain valid till the date specified in the BDS.

18.5 Any Bid not accompanied by adequate Bid Security shall be rejected by Employer as non-responsive.

18.6 The Bid Securities of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder furnishing the Performance Security pursuant to **ITB Clause 36**.

18.7 In the case of a single-stage-two envelope and two-stage mode of tendering, the Bid Security of non-responsive Bidders shall be returned immediately after technical evaluation.

18.8 The Bid Security shall be liable for forfeiture if:

- a) Bid is withdrawn during the period of its validity
- b) The bidder has been found practicing corrupt or fraudulent or collusive or coercive practices during the bidding process
- c) If the successful bidder fails to:
 - i) Corrections of Bid prices is not accepted by the bidder
 - ii) submit an acceptable performance security
 - iii) sign the Contract.

18.9 The Bid Security of a JV/C must be in the name of the JV/C that submits the bid.



- 15.3 If, in accordance with the BDS, prices quoted by the Bidder are subject to adjustment during the performance of the Contract:
- a) The prices quoted by the Bidder shall reflect changes in the cost of labour, material, etc. in accordance with the procedures specified in **GCC Clause 70.1**
 - b) The Employer shall indicate the name, source and origin of indices along with their base values and corresponding coefficients as per SCC.
- 15.4 Unless otherwise specified in the BDS, the unit rates/ prices quoted in the BoQ shall be inclusive of all taxes, duties, levies & charges (including those levied on the construction material quarried from land owned by Employer or otherwise), as of thirty (30 days) days prior to the deadline for submission of Bids. GST and any other applicable taxes shall be borne and paid by the Bidder
- 15.5 The total price at the bottom of the Priced BoQ shall be indicated both in figures and words.
- 15.6 If rebate/discount is offered, the overall discount in percentage shall be brought out in the Priced BoQ. Conditional rebates/discount, if any, offered by any Bidder shall not be considered during Bid evaluation.
- 15.7 Items for which no rate or price is entered by the Bidder in the Priced BoQ shall not be paid by Employer when executed and shall be deemed covered by the other rates and prices mentioned in the Priced BoQ.

16. Currencies of Bid and Payment

- 16.1 The unit rates and prices shall be quoted by the Bidder in any of the currency (ies) specified in the BDS.
- 16.2 The reference exchange rate (selling rate) prevailing on the day of Bid opening or the immediate preceding date as posted by the Royal Monetary Authority of the Kingdom of Bhutan shall be used for the conversion of prices.
- 16.3 The payment to the Contractor shall be made in the currency of Bid and any banking charges related to payment shall be borne by the Contractor.

17. Bid Validity Period

- 17.1 Bids shall remain valid till the date specified in the BDS. A bid valid for a shorter period shall be liable for rejection by Employer as non-responsive.
- 17.2 In exceptional circumstances, prior to the expiry of the Bid validity period, Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing to all the participating Bidders. A Bidder may refuse the request to extend the validity of its Bid without forfeiting its Bid Security. In such a case, the Bid of the Bidder, refusing to extend the validity of its Bid, shall not be considered for evaluation and



The Contractor shall bear all costs and charges for special or temporary rights of way required by him in connection with access to the Site. The Contractor shall also provide, at his own cost, any additional facilities outside the Site required by him for the purpose of the Works.

Clause – 43 Time for Completion

The period of completion of the whole of the Work shall be as mentioned in the SCC and LOA or such extended time as may be allowed under **Clause – 44** hereof. The period of completion shall be reckoned from the date of signing of contract.

Clause – 44 Extension of Time for Completion

Should the amount of extra or additional work of any kind or any cause of delay referred to in these Conditions, or exceptional adverse climatic conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the Completion of the Works, the Engineer-in-Charge shall determine the period of such extension and shall notify the Contractor accordingly. Provided that the Engineer-in-Charge is not bound to take into account any extra or additional or other special circumstances unless the Contractor has, within 28 days after such work has been commenced, or such circumstances have arisen, or as soon thereafter as is practicable, submitted to the Engineer-in-Charge, full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time. The Contractor shall not be entitled to any payment for the time related costs incurred by him, if any, except those provided under the Contract, during the extended period for completion of Works.

Clause – 45 Shift Works

- 45.1 To achieve the required progress, the Work may be required to be carried out round the clock. The period of completion and number of working days shall not be affected by the number of shifts each day. No extra amount on account of any shift work is payable to the Contractor.
- 45.2 Whenever the Work is carried out at night, adequate lighting of working areas and access paths shall be provided by the Contractor at his cost. Sufficient notice shall be given by the Contractor to the Engineer-in-Charge regarding details of Works in shifts so that necessary supervision could be provided.



Works, or that part thereof in regard to which progress is suspended and if such permission is not granted within that time, the Contractor by a further written notice so served may, but is not bound to, elect or treat the suspension where it affects part only of the Works as an omission of such part under **Clause – 51** hereof, or, where it affects the whole Works, as an abandonment of the Contract by the PHPA-II.

COMMENCEMENT AND DELAYS

Clause – 41 Commencement of Works

The Contractor shall commence the Works on Site within a period specified in the SCC and shall proceed with the Works with due expedition and without delay.

Clause – 42 Possession of Site

- 42.1. Save in so far as the Contract may prescribe, the extent of portions of the Site of which the Contractor is to be given possession from time to time, and the order in which such portion shall be made available to the Contractor, and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Engineer-in-Charge will after issuing written order to commence the Works, give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in **Clause – 14 hereof**, if any, and otherwise in accordance with such reasonable proposals of the Contractor as he shall, by written notice to the Engineer-in-Charge, make and will, from time to time as Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due despatch in accordance with such programme or proposals, as the case may be. If the Contractor suffers delay or incurs cost from failure on the part of the Engineer-in-Charge to give possession in accordance with the terms of this Clause, the Engineer-in-Charge shall grant an extension of time for the completion of the Works and certify such sum as, in his opinion, shall be fair to cover the cost incurred, which sum shall be paid by the PHPA-II.

The Contractor shall not be allowed to occupy other Government and/or PHPA-II land for temporary uses or otherwise without the prior consent of the Engineer-in-Charge.

- 42.2. Rights of Way and Facilities



thereon or incidental thereto shall be recoverable from the Contractor by the Engineer-in-Charge or may be deducted from any money due or which may become due to the Contractor.

Clause – 40 Suspension of Work

40.1. The Contractor shall, on the written order of the Engineer-in-Charge, suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer-in-Charge may consider necessary and shall, during such suspension, properly protect and secure the Works, or such part thereof, so far as is necessary in the opinion of the Engineer-in-Charge. The extra cost incurred by the Contractor in giving effect to the instructions of the Engineer-in-Charge under this Clause shall be borne and paid by the PHPA-II unless such suspension is:

- a) otherwise provided for in the Contract, or
- b) necessary by reason of some default of or breach of Contract by the Contractor, or
- c) necessary by reasons of climatic conditions on the Site, or
- d) necessary for the proper execution of the Works or for the safety of the Works or any part thereof in so far as such necessity does not arise from any act or default by the Engineer-in-Charge or from any of the risks defined in **Sub-Clause – 20.6** hereof.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Engineer-in-Charge within twenty eight days of the order of the Engineer-in-Charge. The Engineer-in-Charge shall settle and determine such extra payment and/or extension of time under **Clause-44** hereof to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer-in-Charge be fair and reasonable.

40.2. Suspension lasting more than 90 days

If the progress of the Works or any part thereof is suspended on the written order of the Engineer-in-Charge and if permission to resume work is not given by the Engineer-in-Charge within a period of ninety days from the date of suspension, then, unless such suspension is within paragraph (a), (b), (c) or (d) of **sub-clause 40.1** of this Clause, the Contractor may serve a written notice on the Engineer-in-Charge requiring permission within twenty eight days from the receipt thereof to proceed with the



Clause – 38 Examination of Work before covering up

38.1 No Work shall be covered up or put out of view without the approval of the Engineer-in-Charge or his Representative and the Contractor shall afford full opportunity for the Engineer-in-Charge or the Engineer-in-Charge's Representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereof. The Contractor shall give due notice whenever any such work or foundations is or are ready or about to be ready for examination and the Engineer-in-Charge or the Engineer-in-Charge's Representative shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such foundations.

38.2 Uncovering and making Openings

The Contractor shall uncover any part or parts of the Works or make openings in or through the same as the Engineer-in-Charge or Engineer-in-Charge's Representative may, from time to time, direct and shall reinstate and make good such part or parts to the satisfaction of the Engineer-in-Charge and all such costs shall be borne by the Contractor.

Clause – 39 Removal of Improper Work and Materials

39.1. The Engineer-in-Charge shall have power to issue instructions from time to time for;

- a) the removal from the Site, within such time or times as may be specified in the instructions, of any materials which, in the opinion of the Engineer-in-Charge, are not in accordance with the Contract,
- b) the substitution of proper and suitable materials, and
- c) the removal and proper re-execution, notwithstanding any previous test thereof or interim payment there for, of any work which in respect of materials or workmanship is not, in the opinion of the Engineer-in-Charge, in accordance with the Contract.

39.2. Default of Contractor in Compliance

In case of default on the part of the Contractor in carrying out such instruction, as specified in sub-clause 39.1 of this clause, the Engineer-in-Charge shall be entitled to employ and pay other persons to carry out the same and all expenses consequent



acceptable source. Additional suppliers and change of suppliers shall be subject to the approval of the Engineer-in-Charge.

- (d) The workmanship shall be of the kind described in the Contract and in accordance with the Engineer-in-Charge's instructions.
- (e) All the materials and the workmanship shall be subjected, from time to time, to such tests as the Engineer-in-Charge may require at the place of manufacture, fabrication or preparations, or on the Site or at such other place or places as may be specified in the Contract, or at all of any of such places. The Contractor shall provide such assistance, instruments, machines, labour and materials as are required for examining, measuring and testing any material and shall supply samples of materials, before incorporation in the Works, for testing, as may be selected and required by the Engineer-in-Charge.

36.3 Cost of Samples

All samples shall be supplied by the Contractor at his own cost.

36.4 Cost of Tests

The cost of making any test intended by or provided for in the Contract shall be borne by the Contractor.

36.5 Cost of Tests not provided for etc.

If any test is ordered by the Engineer-in-Charge which is either:

- a. Not so intended by or provided for, or
- b. (In the cases above mentioned) is not so particularized, or
- c. (though so intended or provided for) is required by the Engineer-in-Charge to be carried out at any place other than the site or the place of manufacture or fabrication or preparation, of the materials tested, shows the workmanship or materials not to be in accordance with the provisions of the Contract or the satisfaction of the Engineer-in-Charge, then the cost of such test shall be borne by the Contractor.

Clause – 37 Inspection of Operations

The Engineer-in-Charge or any person authorized by him shall, at all times, have access to the Works and to all workshops and places where the Work is being prepared or from where materials, manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.



MATERIALS AND WORKMANSHIP

Clause – 36 Materials and Workmanship

36.1 Materials and Workmanship

- a) Unless otherwise specified in the SCC, the Contractor shall be responsible for arranging all the materials required for the construction of the Works from the source(s) acceptable to the PHPA-II. He shall also be responsible for proper transportation and storage of these materials to the satisfaction of the Engineer-in-Charge and shall bear all related costs.
- b) The Engineer-in-Charge shall be entitled at any reasonable time, to inspect or examine all such materials. The Contractor shall provide reasonable assistance for such inspection or examination as may be required.
- c) The Contractor shall initiate timely action to procure the materials well in advance so as to ensure that the progress of Works does not suffer for want of the materials on the site at least thirty days before these are intended to be used on Works. Any setback to the progress of the Works and consequent delay in completion of the Works on account of non-availability of materials on Site shall be the sole responsibility of the Contractor.
- d) Any assistance that the Engineer-in-Charge can give to the Contractor for arranging the materials shall be provided on a “no responsibility basis”.

36.2 Quality of materials and Workmanship and Tests

- (a) The Contractor shall, provide the materials of the quality, kind and specifications as provided in the Contract. The Contractor shall produce to the Engineer-in-Charge, certified quality test reports in respect of the materials procured by him.
- (b) In case the materials procured by the Contractor are not to the satisfaction of the Engineer-in-Charge and do not conform to the specifications laid in the Contract, such materials shall be rejected by the Engineer-in-Charge and the cost incurred on such procurement shall be responsibility of the Contractor.
- (c) The Bidders shall specify, in their Bid, the source of supply of the key materials to satisfy the PHPA-II that the materials of standard quality and specifications are procured. In case the source specified by the Bidder is not acceptable to the PHPA-II, the Bidder shall be required to substitute the source by an



The Contractor shall, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer-in-Charge or his Representative, an adequate supply of drinking and other water for the use of the Contractor's staff and workmen.

34.3 Alcoholic Liquor & Drugs

The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor, or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Sub-Contractors, agents or employees.

34.4 Disorderly Conduct, etc.

The Contractor shall, at all times, take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection, of persons and property in the neighbourhood of the Works against the same.

34.5 Contractor to Follow Labour Laws

The Contractor shall, in respect of labour employed by him, comply with the provision of the various labour laws, Minimum Wages as per regulations issued by RGoB and shall indemnify the PHPA-II in respect of all claims that may be made against the PHPA-II for non-compliance thereof by the Contractor.

Notwithstanding anything contained herein, the Engineer-in-Charge may take such actions as may be necessary for compliance of the various labour laws and recover the costs thereof from the Contractor.

34.6 Observance by Sub-Contractors

The Contractor shall be responsible for observance by his Sub-Contractors of the foregoing provisions.

Clause – 35 Returns of labour etc.

The Contractor shall, deliver to the Engineer-in-Charge or his Representative, a return in detail in such form and at such intervals as the Engineer-in-Charge may prescribe showing the supervisory staff and the number of the several classes of labour from time to time employed by the Contractor on the site and such information in respect of constructional plant as the Engineer-in-Charge may require.



Clause – 32 Contractor to keep Site clear

- 32.1 During the progress of the Works, the Contractor shall keep the site reasonably free from all unnecessary obstructions and shall store or dispose of any Constructional plant and surplus materials and clear away and remove from the site any wreckage, rubbish or Temporary Works no longer required.
- 32.2 In case the Contractor does not keep the area clean and if found necessary to get the area cleaned, the Engineer-in-Charge shall issue a notice of forty eight hours, and in the event of non-compliance by the Contractor, get the area cleaned by some other agency. The cost of such cleaning shall be borne by the Contractor. In case of rubbish accumulating due to deposition by more than one Contractor, the share of charges to be borne by the Contractors as indicated by the Engineer-in-Charge shall be final.

Clause – 33 Clearance of Site on Completion

On the completion of the Works, the Contractor shall clear away and remove from the Site all Constructional Plant, surplus materials, rubbish and Temporary Works of every kind, and leave the whole of the site and Works clean and in a workman like condition to the satisfaction of the Engineer-in-Charge.

LABOUR

Clause – 34 Labour

34.1 Engagement of Labour

The Contractor shall make his own arrangements for the engagement of all labour local or otherwise, and, save in-so-far as the Contract otherwise provides, for the transport housing, feeding and payment thereof. The Contractor shall not employ in connection with the Works any person who has not completed 18 years of age. No female labour shall be employed in night shifts. The Contractor shall have to arrange permits for the labour/staff for their entry into Bhutan, at his own cost. The recruitment of labour force, technical, administrative and other personel of the contractor engaged on the project will be confined to nationals of Bhutan and India. However, the Contractor shall recruit local manpower (skilled and unskilled) and use local resources to the extent possible

34.2 Supply of Water



Should it be found necessary for the Contractor to move one or more loads of Constructional Plant, machinery or pre-constructed units or parts of units of work over part of a highway or bridge, the moving whereof is likely to damage any highway or bridge unless special protection or strengthening is carried out, then the Contractor shall, before moving the load on to such highway or bridge, give notice to the Engineer-in-Charge or Engineer-in-Charge's Representative of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway or bridge. Unless within fourteen days of the receipt of such notice, the Engineer-in-Charge shall, by counter-notice, direct that such protection or strengthening is unnecessary, then the Contractor will carry out such proposals or any modification thereof that the Engineer-in-Charge shall require and, unless there is an item or are items in the Bill of Quantities for pricing by the Contractor of the necessary works for the protection or strengthening aforesaid, the costs thereof shall be paid by the PHPA-II to the Contractor.

28.3 Settlement of Extraordinary Traffic Claims

If during the execution of the Works or at any time thereafter the Contractor shall receive any claim arising out of the execution of the Works in respect of damage or injury to highways or bridges, he shall immediately report the same to the Engineer-in-Charge and thereafter the PHPA-II shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims, proceedings, damages, costs, charges and expenses in relation thereto. Provided always that if and so far as any such claims or part thereof shall, in the opinion of the Engineer-in-Charge, be due to any failure on the part of the Contractor to observe and perform his obligations under sub-clauses 30.1 and 30.2 of this Clause, then the amount certified by the Engineer-in-Charge to be due to such failure shall be paid by the Contractor to the PHPA-II.

Clause – 31 Opportunities for other Contractors

The Contractor shall, in accordance with the requirements of the Engineer-in-Charge, afford all reasonable opportunities for carrying out their works to any other Contractors employed by the PHPA-II and their workmen and to the workmen of the PHPA-II and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any Contract which the PHPA-II may enter into in connection with or ancillary to the Works.



proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay, timber or other construction materials required from Bhutan for the Project.

- 28.2 In the event of any claims made under or action brought against the PHPA-II in respect of any such matters as aforesaid, the Contractor shall be immediately, notified thereof and the Contractor shall be at liberty, at his own expense, to settle any disputes or to conduct any litigation that may arise therefrom. Provided that the Contractor shall not be liable to indemnify the PHPA-II if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

Clause – 29 Interference with Traffic and Adjoining Properties

All operations necessary for the execution of the Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the public, or the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the PHPA-II or of any other person. The Contractor shall save harmless and indemnify the PHPA-II in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters in-so-far as the Contractor is responsible there for.

Clause – 30 Extraordinary Traffic

- 28.1 Protection of Highways and Bridges

The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his sub-contractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic, as will inevitably arise from the moving of plant and material from and to the Site, shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

- 28.2 Special Loads



Clause – 26 Giving of Notices, Payment of Fees and Compliance with Statutes and Regulations etc.

26.1 Giving of Notices and Payment of Fees

The Contractor shall give all notices and pay all fees required to be given or paid by any Statute, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution of Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

26.2 Compliance with Statutes, Regulations etc.

The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance or Law as aforesaid and the regulations or bye-laws of any local or other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the PHPA-II indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or by-law.

26.3 The PHPA-II will repay or allow to the Contractor all such sums as the Engineer-in-Charge shall certify to have been properly payable and paid by the Contractor in respect of such fees.

Clause – 27 Fossils etc.

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site of the Works shall, as between the PHPA-II and the Contractor, be deemed to be the absolute property of the PHPA-II/RGoB. The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall immediately upon discovery thereof and, before removal, acquaint the Engineer-in-Charge or the Engineer-in-Charge's Representative of such discovery and carry out, at the expenses of the PHPA-II, the Engineer-in-Charge's or the Engineer-in-Charge's Representative's orders as to the disposal of the same.

Clause – 28 Patent Rights and Royalties

28.1 The Contractor shall save harmless and indemnify the PHPA-II from and against all claims and proceedings for or on account of infringement of any patent rights, designs, trademark or name or other protected rights in respect of any Constructional Plant, machine, work, or material used for or in connection with the Works or any of them and from and against all claims,



Contractor shall be promptly reported to the Engineer-in-Charge and other statutory bodies of the Government stating clearly and in sufficient details of the facts and circumstances of the accidents and the action taken. In all cases the Contractor shall indemnify the PHPA-II against all loss or damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fines, if any, payable by the PHPA-II as a consequence of failure to give notice or failure to conform to the provisions of any Act in regard to such accidents.

24.3 Insurance against Accident, etc. to Workmen

The Contractor shall insure against such liability with any insurance companies in Bhutan, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall, when required, produce to the Engineer-in-Charge or the Engineer-in-Charge's Representative such policy of insurance and the receipt for payment of the current premium. Provided always that, in respect of any persons employed by any sub-contractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the PHPA-II is indemnified under the policy, but the Contractor shall require such sub-contractor to produce to the Engineer-in-Charge or the Engineer-in-Charge's Representative, when required, such policy of insurance and the receipt for the payment of the current premium.

Clause – 25 Remedy on Contractor's Failure to Insure

If the Contractor shall fail to affect and keep in force the insurances referred to in **Clauses – 21, 23 and 24** hereof, or any other insurance which he may be required to affect under the terms of the Contract, then and in any such case the PHPA-II may affect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the PHPA-II as aforesaid from any money due or which may be become due to the Contractor, or recover the same as a debt due from the Contractor.

Failure of the Contractor to maintain adequate insurance cover as set out under **Clause – 21, 23 and 24** hereof or any other insurance which he may be required to affect under the terms of the Contract, shall not relieve him of any Contractual responsibility.



Clause – 23 Third Party Insurance

- 23.1 Before commencing the execution of the Works the Contractor, but without limiting his obligations and responsibilities under **Clause – 22** hereof, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the PHPA-II, or to any person, including any employee of the PHPA-II, by or arising out of the execution of the Works or in the carrying out of the Contract.
- 23.2 The Contractor shall, whenever required, produce to the Engineer-in-Charge or the Engineer-in-Charge's Representative the original policy or policies of insurance and the receipts for payment of the current premiums and furnish attested copies thereof.
- 23.3 Provision to Indemnify PHPA-II
- The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the PHPA-II, the insurer will indemnify the PHPA-II against such claims and any costs, charges and expenses in respect thereof.

Clause – 24 Accident or Injury to Workmen

- 24.1 The PHPA-II shall not be liable for or in respect of any damages or compensation payable according to law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub-Contractor, save and except an accident or injury resulting from any act or default of the PHPA-II, its agents, or servants.
- The Contractor shall indemnify and keep indemnified the PHPA-II against all such damages and compensation, save and except as aforesaid, and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
- 24.2 On the occurrence of accident arising out of the Works which result in death, or which is so serious as to be likely to result in death, the Contractor shall, within twenty four hours of such accident, report in writing to the Engineer-in-Charge and other statutory bodies of the Government the facts stating clearly and in sufficient details the circumstances of such accident and the subsequent action. All other accidents on the Works involving injuries to persons or damage to property other than that of the



- b) loss or damage to the extent that it is due to the design of the Works other than any part of the design provided by the Contractor.

20.6 Force Majeure/Excepted risks are as under:

- a) War, hostilities (whether war be declared or not), invasion, act of foreign enemies, act of public enemies.
- b) ionizing, radiations or contamination by radio activity from any nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly.
- c) Pressure waves caused by aerial devices traveling at supersonic speeds.
- d) Riot, commotion, disorder, strike or lockout by persons other than the Contractor's personnel.
- e) Any operation of the forces of nature against which an experienced Contractor could not reasonably have been expected to take precautions.

Clause – 21 Insurance of Plant & Equipment

The Contractor shall take insurance cover to the replacement value, for the Constructional Plant, equipment and other things brought on to the site by him.

Clause – 22 Damage to persons and Property

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the PHPA-II against all losses and claims in respect of injuries or damage to any persons or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution and maintenance of the Works and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to injuries or damage to persons or property resulting from any act or neglect of the PHPA-II, his agent, servants, or other Contractors, not being employed by the Contractor, or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the Contractor, his servants or agents, such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the PHPA-II, its servants or agents or other Contractors for the damage or injury.



for any accidents that may occur on account of his failure to take proper and timely precautions. In default thereof, the Engineer-in-Charge may provide such fencing, lights, ventilation and watchmen as he may deem necessary and charge the cost thereof to the Contractor.

Clause – 20 Care of Works

- 20.1 The Contractor shall take full responsibility for the care of the Works from the date of Commencement of Works until the date of issue of the Completion Certificate for the whole of the Works when the responsibility for the said care shall pass to the PHPA-II.
- 20.2 In the event of any loss or damage to the Works or any part thereof, during the period for which the Contractor is responsible for the care thereof, from any cause whatsoever, other than the risks defined in **Sub-Clauses 20.5 & 20.6** of this Clause, the Contractor, at his own cost, shall rectify such loss or damage so that the Permanent Works conform in every respect with the provisions of the Contract to the satisfaction of the Engineer-in-Charge. The Contractor shall also be liable for any loss or damage to the Works occasioned by him in the course of any operation carried out by him for the purpose of complying with his obligations under **Clause – 49 & 50**.
- 20.3 In the event of any loss or damage to the Permanent Works which may occur or arise out of any of the Risks defined in **Sub-Clause 20.5** of this Clause, the same shall be made good/rectified by the Contractor, if and to the extent required by the Engineer-in-Charge, at the cost of the PHPA-II which sum shall be determined by the Engineer-in-Charge in accordance with **Clause -51 and Clause -52**.
- 20.4 In the event of any loss or damage which may occur or arise out of any of the risks defined in **Sub-Clause 20.6** of this Clause, neither party to the Contract shall be liable to the other for any such loss or damage. However, in the event of any loss or damage to the Permanent Works arising as a consequence of the risk(s) defined in **Sub-Clause 20.6** of this Clause the same shall be made good/rectified by the Contractor at the cost of the PHPA-II which sum shall be determined by the Engineer-in-Charge under the provisions of the Contract.
- 20.5 The PHPA-II's risks are as under;
- a) loss or damage due to the use or occupation by the PHPA-II of any section or part of the Permanent Works except as may be provided for in the Contract.



Clause – 17 Setting out

The Contractor shall be responsible for the true and proper setting out of the works in relation to original points, lines and levels of reference given by the Engineer-in-Charge in writing and for the correctness, subject as above mentioned, of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith. If, at any time during the progress of Works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer-in-Charge or the Engineer-in-Charge's Representative, shall at his own cost, rectify such error to the satisfaction of the Engineer-in-Charge or the Engineer-in-Charge's Representative, unless such error is based on incorrect data supplied in writing by the Engineer-in-Charge or the Engineer-in-Charge's Representative, in which case the expense of rectifying the same shall be borne by the PHPA-II. The checking of any setting out or of any line, alignment, grade, dimensions or level by the Engineer-in-Charge or the Engineer-in-Charge's Representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench marks, pegs and other things used in setting out the Works.

Clause – 18 Boreholes and Exploratory Excavation

If, at any time during the execution of the Works, the Engineer-in-Charge shall require the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of **Clause-51** hereof, unless a provision in respect of such anticipated work shall have been included in the Bill of Quantities.

Clause – 19 Watching and Lighting

- 19.1 The Contractor shall, in connection with the Works, provide and maintain at his own cost, all lights, guards, fencing and watching when and where necessary or required by the Engineer-in-Charge or the Engineer-in-Charge's Representative, or by any duly constituted authority, for the protection of the Works, or for the safety and convenience of the public or others.
- 19.2 The Contractor shall also be responsible for temporary roadways, footways, guards, fences, caution notices etc. as far as the same may be rendered necessary by reason of the Work for the pedestrians or other traffic and of owners and occupiers of the adjacent property and of the public and shall remain responsible



representative approved in writing by the Engineer-in-Charge, which approval may at any time be withdrawn, is to be constantly on the Works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer-in-Charge, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving written notice of such withdrawal, remove the agent from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another agent approved by the Engineer-in-Charge. Such authorized agent or representative shall receive, on behalf of the Contractor, directions and instructions from the Engineer-in-Charge or subject to the limitations of Clause 2 hereof, the Engineer-in-Charge's Representative.

Clause – 16 Contractor's Employees

- 16.1 The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Works:
- a) only such technical assistants as are skilled and experienced in their respective trades and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise, and
 - b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.
 - c) Experienced Safety Officer to maintain and supervise safety requirements at the site of Works. Safety standards shall be followed as provided in these documents.
- 16.2 The Engineer-in-Charge shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person employed by the Contractor in or about the execution or maintenance of the Works who, in the opinion of the Engineer-in-Charge, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable and such persons shall not be again employed upon the Works without the written permission of the Engineer-in-Charge. Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Engineer-in-Charge.



their descriptions, durations, and dependencies or precedencies, necessary to the completion of the Works.

- f) The construction programme and each revision thereof shall be subject to review and approval by the Engineer-in-Charge for conformity with the requirements of this clause. The Contractor shall assist the Engineer-in-Charge in reviewing and evaluating each programme furnished. Disapproved programmes will be returned to the Contractor which shall be revised by him to correct the defects noted, and shall be resubmitted to the Engineer-in-Charge within 15 days after receipt by the Contractor.
- g) The Contractor shall, whenever required by the Engineer-in-Charge or Engineer-in-Charge's Representative also provide in writing, for his information a general description of the arrangements such as deployment of modern and efficient machinery, skilled and unskilled labour and methods, which the Contractor proposes to adopt for the execution of Works.
- h) The Contractor shall have to obtain prior approval of the Engineer-in-Charge for the sequence of construction which he proposes to adopt.

14.1.2 Quality Assurance Plan

- a) The quality assurance program and procedures should be in line with the requirements specified in the Technical Specifications.
- b) All costs associated with testing of materials required as per Technical Specifications shall be deemed to be included in the rates/prices in the Bill of Quantities.

14.2 The submission to and approval by the Engineer-in-Charge or Engineer-in-Charge's Representative of such programmes or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

Clause – 15 Contractor's Superintendence

The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer-in-Charge may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor, or a competent and authorized agent or



Clause – 13 Works to be to the Satisfaction of Engineer-in-Charge

Save in-so-far as it is legally or physically impossible the Contractor shall execute and maintain the Works in strict accordance with the Contract to the satisfaction of the Engineer-in-Charge and shall comply with and adhere strictly to the Engineer-in-Charge's instructions and directions on any matter whether mentioned in the Contract or not, touching or concerning the Works. The Contractor shall take instructions and directions only from the Engineer-in-Charge, or, subject to the limitations referred to in Clause- 2 hereof, from the Engineer-in-Charge's Representative.

Clause – 14 Programme to be Furnished

14.1 Before the date of commencement, the Contractor shall, after the acceptance of his Bid, submit to the Engineer-in-Charge for his approval, a construction programme and quality assurance plan.

14.1.1 Construction Programme

- a) The detailed construction programme submitted by the Contractor for orderly completion of the Works, shall show planned sequence of operations and the dates for commencement and completion of all salient feature of the Works.
- b) The programme shall cover activities on the Site and procurement and delivery activities.
- c) The programme shall be orderly and realistic, and shall be revised at three monthly intervals or as necessary, as the work progresses to meet this requirement and should include a chart of the principal quantities of Work forecast for execution monthly, and a schedule of payments expected to be made to the Contractor by the PHPA-II.
- d) If at any time it should appear to the Engineer-in-Charge that the actual progress of the Works does not conform to the approved programme, the Contractor shall produce, at the request of the Engineer-in-Charge, a revised programme showing the modifications to the approved programme necessary to ensure completion of the Works within the time for completion as defined in **Clause – 43 hereof**.
- e) The construction programme shall be in the form of a network diagram and activity listing. The network diagram shall show in detail and in orderly sequence all activities,



- 10.4 Should the Contract period, for whatever reasons be extended, the Contractor, on receipt of written request from the Engineer-in-Charge, shall at his own cost get the validity period of Bank Guarantee in respect of Performance Security furnished by him extended and shall furnish the extended/revised Bank Guarantee to the Engineer-in-Charge before the expiry date of the Bank Guarantee originally furnished. However, the Bank Guarantee charges for the extended period will be reimbursed at actuals if the Bank Guarantee period is extended for execution of BoQ amount due to the reasons not attributable to the Contractor.
- 10.5 The Performance Security will be released by the PHPA-II, after the issue of the Maintenance Certificate.

Clause – 11 Inspection of Site

- 11.1 The PHPA-II shall have made available to the Contractor with the Bidding Documents such data on subsurface conditions as shall have been obtained by or on behalf of the PHPA-II from investigations undertaken relevant to the Works and the Bid shall be deemed to have been based on such data, but the Contractor shall be responsible for his own interpretation thereof.
- 11.2 The Contractor shall also be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied himself, so far as is practicable, before submitting his Bid, as to the form and nature thereof, including the subsurface conditions, the hydrological and climatic conditions, the extent and nature of work, and materials necessary for the completion of the Works, means of access to the Site and the accommodation he may require and, in general, shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Bid.

Clause – 12 Sufficiency of Bid

The Contractor shall be deemed to have satisfied himself before bidding as to the correctness and sufficiency of his Bid for the Works and of the rates and prices stated in the priced Bill of Quantities and the Schedule of Rates and Prices, if any, which Bid rates and prices shall, except in-so far as it is otherwise provided in the Contract, cover all his obligations under the Contract, and all matters and things necessary for the proper execution and maintenance of the Works.



- 8.2 The Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction, provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the Permanent Works, or for the design or specification of any Temporary Works prepared by the Engineer-in-Charge.
- 8.3 The Contractor shall promptly inform the Engineer-in-Charge of any error, omission, fault and other defect in the design of or specifications for the Works which are discovered when reviewing the Bidding Documents or in the process of execution of the Works.
- 8.4 Where no specifications have been laid down, the materials used and the Work done shall conform to the relevant I.S. Code or any internationally accepted Standards or as directed by the Engineer-in-Charge.
- 8.5 All instructions and orders given by the Engineer-in-Charge at Site are to be maintained in the Site Instruction Book and shall be taken to have been conveyed to the Contractor for his compliance.
- 8.6 The Contractor must have a site office to receive normal correspondence between 10 AM and 5 PM on working days and urgent correspondence at any time on all days.

Clause – 9 Contract Agreement

The Contractor Shall, when called upon so to do, enter into and execute a Contract Agreement, to be prepared and completed at the cost of the PHPA-II in the Proforma annexed at form no.1, with such modification as may be necessary.

Clause – 10 Performance Security

- 10.1 For the due performance of the Contract, the Contractor shall furnish to the PHPA-II a performance security equivalent to 10% of the contract price in the form as specified in SCC.
- 10.2 The proceeds of the performance security shall be payable to PHPA-II as compensation for any loss, resulting from Contractor's failure to complete his obligation under the Contract.
- 10.3 The performance security shall be valid until 30 days after the date of issue of Maintenance Certificate.



Several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies, the documents shall take precedence in the order in which they are set out in the Proforma of Agreement (form no. 1).

Clause – 6 Drawings

6.1 Custody of Drawings

The drawings shall remain in the sole custody of the Engineer-in-Charge, but one copy thereof shall be furnished to the Contractor free of charge. The Contractor shall provide and make, at his own expense, any further copies required by him. At the completion of the Contract, the Contractor shall return to the Engineer-in-Charge all drawings provided under the Contract.

6.2 One copy of drawings to be kept on site.

The drawings, furnished to the Contractor as aforesaid, shall be kept by the Contractor on the Site and the same shall, at all reasonable times, be available for inspection and use by the Engineer-in-Charge and the Engineer-in-Charge's Representative and by any other person authorized by the Engineer-in-Charge in writing.

Clause – 7 Further Drawings and Instructions

The Engineer-in-Charge shall have full power and authority to supply to the Contractor from time to time, during the progress of the Works, such further drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and maintenance of the Works. The Contractor shall carry out and be bound by the same.

GENERAL OBLIGATIONS

Clause – 8 Contractor's General Responsibilities

8.1 The Contractor shall, subject to the provisions of the Contract, and with due care and diligence, execute and maintain the Works and provide all labour, including the supervision thereof, materials, constructional plant and all other things, whether of a temporary or permanent nature, required in and for such execution and maintenance, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.



- a) Failure of the Engineer-in-Charge's Representative(s) to disapprove any Work or materials shall not prejudice the powers of the Engineer-in-Charge thereafter to disapprove such Work or materials and to order the pulling down, removal or breaking up thereof.
- b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer-in-Charge's Representative(s), he shall be entitled to refer the matter to the Engineer-in-Charge, who shall thereupon confirm, reverse or vary such decision.

Clause – 3 Assignment

The Contractor shall not assign the Contract or any part thereof, or any benefit or interest therein or thereunder, otherwise than by a charge in favour of the Contractor's bankers of any money due or to become due under this Contract, without the prior written consent of the PHPA-II.

Clause – 4 Sub-letting

Unless stated in the SCC, the Contractor shall not sub-let the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not sub-let any part of the Works without the prior written consent of the Engineer-in-Charge, which shall not be unreasonably withheld, and such consent, if given, shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, servants or workmen. Provided always that the provision of labour on a piece work basis shall not be deemed to be a sub-letting under this Clause.

CONTRACT DOCUMENTS

Clause – 5 Language and Law

- 5.1 The Contract as well as all the correspondence and documents relating to the bid, exchanged by the bidder and the PHPA-II, shall be submitted in the language prescribed in the SCC. All supporting documents and printed literature in connection with the bid shall be in the language specified in the SCC.
- 5.2 The law to which the Contract is to be subject and according to which the Contract is to be construed shall be as specified in the SCC.
- 5.3 Documents Mutually Explanatory



commissioning for the supplied goods, training and other such obligations of the Contractor covered under the Contract.

- xxxviii) "Project Manager" means the person appointed from time to time by the Contractor and notified in writing to the PHPA-II to act as the in-charge for the purpose of the Contract.
- xxxix) Bid Data Sheet (BDS) means the proforma sheet, which contains data and information specific to a particular work.
- xl) SCC means the Special Conditions of Contract.
- xli) Joint Venture (JV) means a joint venture, association or consortium of not more than three (3) legal entries that pool their resources and skills to undertake a large or complex Contract in the role as a Contractor, with all legal entries (members in the JV being legally liable, jointly and severally, through a joint venture agreement between the members of the JV for the execution of the Contract in the event of a member's withdrawal.

ENGINEER-IN-CHARGE AND ENGINEER-IN-CHARGE'S REPRESENTATIVES (S)

Clause – 2 Duties and powers of Engineer-in-Charge and Engineer-in-Charge's Representative(s)

- i) The Engineer-in-Charge shall carry out such duties in issuing decisions, certificates and orders as are specified in the Contract.
- ii) The Engineer-in-Charge's representative(s) shall be responsible to the Engineer-in-Charge, and his duties are to watch and supervise the works and to test and examine any materials to be used or workmen employed in connection with the Works. He shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract nor, except as expressly provided hereunder or elsewhere in the Contract, to order any Work involving delay or any extra payment by the Engineer-in-Charge, nor to make any variation of or in the Works.
- iii) The Engineer-in-Charge may, from time to time in writing, delegate to the Engineer-in-Charge's Representative(s) any of the powers and authorities vested in the Engineer-in-Charge and shall furnish to the Contractor a copy of all such written delegations of Powers and authorities. Any written instructions or approval given by the Engineer-in-Charge's Representative(s) to the Contractor within the terms of such delegation, but not otherwise, shall bind the Contractor as though it had been given by the Engineer-in-Charge. Provided always as follows:



- xxii) "Letter of Award" means the letter from the PHPA-II conveying acceptance of the bid subject to such reservations as may have been stated therein.
- xxiii) "Tonne or Metric Tonne" means 1,000 kgs (one thousand kilograms). Metric system shall be followed in all interpretation and execution of Works under this Contract. Any conversion found necessary shall be in accordance with the figures given in 'Indian Standard', IS 786-1967 and subsequent revision(s) of this Standard.
- xxiv) "I.S." means Indian Standard Specifications with latest amendments or revisions as currently in force at the time of execution of the Works.
- xxv) "Day" means a day from midnight to midnight.
- xxvi) "Month" means from the beginning of a given date of a calendar month to the end of the preceding date of the next calendar month.
- xxvii) "Week" means seven consecutive days.
- xxviii) "Quarter" means a period of three consecutive months starting from January, April, July and October i.e. January to March, April to June, July to September and October to December.
- xxix) "C.W.C" means Central Water Commission, Government of India.
- xxx) "C.E.A" means Central Electricity Authority, Government of India.
- xxxi) "Near Relative" means wife/husband, parents and grandparents, children, first cousins, brothers-in-law, sisters-in-law and parents-in-law.
- xxxii) "Rupees" means Rupees in Indian Currency.
- xxxiii) "Ngultrum" means Ngultrum in Bhutanese Currency.
- xxxiv) Words in singular number shall include the plural number and vice-versa where the context so requires. "He" shall include "She" and vice-versa.
- xxxv) "Cost" mean all expenditure properly incurred or to be incurred whether on or off the site including overhead and other charges allocable thereto but does not include any allowance for profit.
- xxxvi) The "Goods" means all the gates, hoists, equipment, machinery and/or other materials which the Contractor is required to supply to PHPA-II under the Contract.
- xxxvii) "Services" means services ancillary to the supply of Goods such as transportation and insurance and any other incidental services such as installation, performance of onsite erection, testing, painting,



other implements of all description or things of whatsoever nature required in or about the execution, or maintenance of the Works but does not include materials or other things intended to form or forming part of the Permanent Works.

- xii) "Specifications" means the Technical Specifications and other Specifications referred to in the Bidding Documents and any modification thereof or addition thereto or deduction therefrom as may, from time to time, be furnished/decided by PHPA-II and/or submitted by the Contractor and approved in writing by the Engineer-in-Charge.
- xiii) "Drawings" means the drawings referred to in the Specifications and any modification of such drawings approved in writing by the Engineer-in-Charge and such drawings, as may, from time to time, be furnished by PHPA-II and/or submitted by the Contractor and approved in writing by the Engineer-in-Charge.
- xiv) "Site" means the land and other places on, under, in or through which the Permanent Works or Temporary Works, designed by the Engineer-in-Charge are to be executed and any other lands and places provided by the PHPA-II for the purposes of working space or any other purpose as may be specifically designated in the Contract or subsequently approved as forming part of site.
- xv) "Approved" means approved in writing, including subsequent written confirmation of previous verbal approval and "approval" means approval in writing, including as aforesaid.
- xvi) "Consultant" means WAPCOS Ltd., its legal successors or permitted assigns.
- xvii) "Chief Engineer" means the Chief Engineer-in-Charge of the Works or his successor and to whom the Engineer-in-Charge reports.
- xviii) "Managing Director" means the Technical and Administrative head of the Project.
- xix) "Govt" means Government of India.
- xx) "Sub-Contractor" means the party or parties having direct contract with the Contractor and to whom any part of the Contract has been sublet by the Contractor with the consent, in writing, of the Engineer-in-Charge.
- xxi) "Manufacturer" means the party proposing to design and/or manufacture the equipment and materials as specified complete or in part.



Clause – 46 Rate of Progress

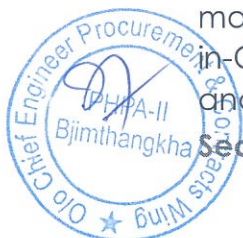
- 46.1 To ensure proper progress during the execution of the Works, the Contractor shall complete 1/8th of the Works before 1/4th of the whole time allowed in the Contract has elapsed, 3/8th of the Works before one half of such time has elapsed and 3/4th of Works before 3/4th of such time has elapsed.
- 46.2 If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works of any section at any time is not commensurate with the rate of progress stipulated in **Sub-clause 46.1** of this Clause and in the opinion of the Engineer-in-Charge does not ensure completion by the prescribed time or extended time for completion, the Engineer-in-Charge shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer-in-Charge may approve to expedite progress so as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps.

Clause – 47 Liquidated Damages for Delay

- 47.1 If the Contractor shall fail to achieve completion of the Works within the time, then the Contractor shall pay to the PHPA-II, the sum stated in the SCC as liquidated damages for such default for every day or part of a day which shall elapse between the time prescribed in the contract and the date of certified completion of the Works. The PHPA-II may without prejudice to any other method of recovery, deduct the amount of such damages from any money in its hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.
- 47.2 The aggregate of the liquidated damages payable to the PHPA-II under this clause shall be subject to a maximum of ten percent of the Contract Price.

Clause – 48 Certification of Completion of Works

When the whole of the Works have been completed and have satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer-in-Charge or to the Engineer-in-Charge's Representative(s). Such notice and undertaking shall be in writing and shall be deemed to be a request by the Contractor for the Engineer-in-



Charge to issue a Certificate of Completion in respect of the Works. The Engineer-in-Charge shall, within twenty-one days of the date of delivery of such notice either issue to the Contractor, a Certificate of Completion stating the date on which, the Works are completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the Works which, in the Engineer-in-Charge's opinion, are required to be done by the Contractor before the issue of such Certificate. The Engineer-in-Charge shall also notify the Contractor of any defects in the Works affecting completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Certificate of Completion within twenty-one days of completion to the satisfaction of the Engineer-in-Charge of the Works so specified and making good any defects so notified.

MAINTENANCE AND DEFECTS

Clause – 49 Maintenance and Defects

49.1 Period of Maintenance

In these Conditions, the expression "Period of Maintenance" shall mean a period defined in the SCC calculated from the date of completion of the Works, certified by the Engineer-in-Charge in accordance with **Clause – 48** hereof.

49.2 Execution of Work of Repair, etc.

To the intent that the Works shall, at or as soon as practicable after the expiration of the Period of Maintenance be delivered to the PHPA-II in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer-in-Charge, the Contractor shall complete the work, if any, outstanding on the date of completion, as certified under **Clause – 48** hereof, as soon as practicable after such date and shall execute all such work of repair, amendment, reconstruction, rectification and making goods defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer-in-Charge during the Period of Maintenance or within fourteen days after its expiration, as a result of an inspection made by or on behalf of the Engineer-in-Charge prior to its expiration.

49.3 Cost of Execution of Works of Repair, etc.

All repair works shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer-in-Charge, be due to the use of materials or workmanship not in accordance with the Contract, or due to neglect or failure on the part of the Contractor to comply with



any obligation, expressed or implied, on the Contractor's part under the Contract. If, in the opinion of the Engineer-in-Charge such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it were additional work.

49.4 Remedy on Contractor's Failure to carry out Work Required

If the Contractor shall fail to do any such work as aforesaid required by the Engineer-in-Charge, the PHPA-II shall be entitled to employ and pay other persons to carry out the same and if such work is the work which, in the opinion of the Engineer-in-Charge, the Contractor was liable to do at his own expense under the Contract, then all expenses consequent there on or incidental thereto shall be recoverable from the Contractor by the Engineer-in-Charge from any money due or which may become due to the Contractor.

Clause – 50 Contractor to Search

The Contractor shall, if required by the Engineer-in-Charge in writing, search under the directions of the Engineer-in-Charge for the cause of any defect, imperfection or fault appearing during the progress of the Works or in the Period of Maintenance. Unless such defect, imperfection or fault is one for which the Contractor is liable under the Contract, the cost of work carried out by the Contractor in searching as aforesaid shall be borne by the PHPA-II. If such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of **Clause – 49** hereof.

ALTERNATIONS, ADDITIONS, OMISSIONS AND EXTRA ITEMS

Clause – 51 Variations

51.1 The Engineer-in-Charge shall make any variation in the form, quality or quantity of the Works or any part thereof or substitution for original specifications, design, drawings and instructions that may, in his opinion be necessary and for that purpose, or if for any other reason it shall, in his opinion be appropriate, he shall have power to order the Contractor to do and the Contractor shall do any or all of the following:

- a) increase or decrease the quantity of any work included in the Contract,
- b) omit or substitute any such work,



- c) change the character or quality or kind of any such work
- d) change the levels, lines, positions and dimensions of any part of the works
- e) execute, additional work of any kind necessary for the completion of the Works, and
- f) Change any specified sequence, or timing of construction of any part of the Works.

No such variations shall in any way vitiate or invalidate the Contract, but the effect if any, of all such variations shall be valued in accordance with **Clause – 52** hereof.

Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of Contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor. Any altered, additional or substituted work which the Contractor may be directed to do in the manner above specified as part of the Work, shall be carried out by the Contractor on the same conditions in all respects on which he agreed to do the main Work.

- 51.2 The Unit Rates entered in the Bill of Quantities for the individual items shall apply for the quantities of Work increased or decreased by not more than thirty percent (30%) for each item.
- 51.3 Should the quantity of Work actually executed under any item exceed by more than thirty percent (30%) of the quantity provided in the Bill of Quantities for that item, the rate for such excess over 130% quantity under the item may be revised in accordance with the procedure indicated under **Clause – 52** hereof.
- 51.4 Should the quantity of work actually involved under any item, get reduced by more than 30% of the quantity provided in the Bill of Quantities for that item, the rate for that item may be revised in accordance with the procedure indicated in **Clause – 52**. The payment for this item will continue to be made at the original rate till revised rate is decided.

Clause – 52 Extra Items

- 52.1 The rates for such items of Work as are required to be executed due to variations, as stated in **Clause – 51** above shall be payable in the manner as stated hereunder:



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- 52.2 The rates already provided in the Bill of Quantities, shall apply in respect of the same item(s) of Works to be executed due to variation subject to provisions of **Clause – 51.2** above.
- 52.3 For the variation in quantities in respect of item(s) exceeding the prescribed limits of $\pm 30\%$ as aforesaid, the rates for such item(s) and the rates for extra items not existing in the Bill of Quantities for the respective sub-head shall be determined by the Engineer-in-Charge on the basis of actual analysed cost comprising of the cost of materials to be supplied by the Contractor (including transportation and taxes, levies if paid), wages of labour actually engaged for the particular work and 80% (skilled labour) & 55% (unskilled labour) thereof on the cost of such labour component so as to cover the fringe benefits and other indirect/incidental expenses required to be actually incurred on the labour by the Contractor including cost on account of compliance with all the Acts, Laws, Statutes, Regulations or Bye Laws pertaining to labour, cost of ownership and operation and maintenance of plant and machinery used for the work plus 20% to cover the Contractor's overheads, profits. The above indirect labour charges are as per CWC guide lines. If, as and when, there is any revision of the CWC guidelines in these percentages of hidden charges, such revised percentages shall be made applicable. The profit element shall be 10 (ten) percent. The hourly use rate of equipment shall be worked out as per latest CWC guidelines.

For the purpose of Price adjustment, the rates analysed as above will be de-escalated to base date and Price adjustment will be applied as per **Clause-70**.

The decision of Engineer-in-Charge in deriving rates as aforesaid, shall be conclusive and binding on the Contractor.

- 52.4 If requested by the Contractor the time for completion of the work shall, in the event of any variation resulting in additional cost over the Contract Price, be extended in the proportion which the altered, additional or substituted work bears to the original Contract Price plus such further additional time as may be considered reasonable by the Engineer-in-Charge whose decision shall be conclusive as to such provision.
- 52.5 Under no circumstances, the Contractor shall at any stage suspend the work on account of non-settlement of rates of such varied Work.



PLANT, TEMPORARY WORKS AND MATERIALS

Clause – 53 Plant, Temporary Works and Materials

53.1 Contractor to Provide Plant

The Contractor shall provide at his own expense all Constructional Plant, Temporary Work and materials including Equipment, Materials and Camps required for the execution of the Works.

53.2 Plant etc., Exclusive Use for the Works

All Constructional Plant, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Work and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent, in writing, of the Engineer-in-Charge.

53.3 Removal of Plant etc.

Upon completion of the Works, the Contractor shall remove from the Site all the said Constructional Plant and Temporary works remaining thereon and any unused materials provided by the Contractor.

53.4 PHPA-II not Liable for Damage to Plant etc.

The PHPA-II shall not at any time be liable for the loss of or damage to any of the said Constructional Plant, Temporary Works or materials save as mentioned in **Clause – 20** and **Clause – 65** hereof.

53.5 Customs Clearance

The PHPA-II will assist the Contractor where required, in obtaining import license and import duty exemption certificate for third country imports of Constructional Plant and other things required for the works. The Contractor shall be responsible for customs clearance at the port of destination and payment of customs fee and customs clearance charges etc.

Clause – 54 Approval of Materials etc. not implied

The operation of **Clause – 53** hereof shall not be deemed to imply any approval by the Engineer-in-Charge of the materials or other matters referred to there-in nor shall it prevent the rejection of any such materials at any time by the Engineer-in-Charge.



MEASUREMENT

Clause – 55 Quantities

The quantities set out in the Bill of Quantities are the estimated quantities of the Work, but they are not to be taken as the actual quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

Clause – 56 Works to be measured

The Engineer-in-Charge shall, except as otherwise stated, ascertain and determine by measurement the value in terms of the Contract of work done in accordance with the Contract. He shall, when he requires any part or parts of the Works to be measured, give notice to the Contractor's authorized agent or representative, who shall forthwith attend or send a qualified agent to assist the Engineer-in-Charge in making such measurement, and shall furnish all particulars required by either of them. Should the Contractor not attend, or neglect or omit to send such agent, then the measurement made by the Engineer-in-Charge or approved by him shall be taken to be the correct measurement of the work. For the purpose of measuring such permanent work as it to be measured by records and drawings, the Engineer-in-Charge's Representative shall prepare records and drawings month by month of such work and the Contractor, as and when called upon to do in writing, shall, within fourteen days, attend to examine and agree such records and drawings with the Engineer-in-Charge's Representative and shall sign the same when so agreed. If the Contractor does not so attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree with the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor shall, within fourteen days of such examination, lodge with the Engineer-in-Charge's Representative for decision by the Engineer-in-Charge, notice in writing of the respects in which such records and drawings are claimed by him to be incorrect.

Clause – 57 Method of Measurement

The Works shall be measured net, notwithstanding any general or local custom, except where otherwise specifically described or prescribed in the Contract.

Clause – 58 Security Rules

The Project shall be a protected Area. The Contractor, his employees and labourers shall have to follow the Security Rules as may be imposed from time to time by the Engineer-in-Charge. If the Contractor, his employees or



labourers are found to be reluctant to follow the Rules, the Engineer-in-Charge will have the right to prohibit such persons from entering into the Project Area.

Clause – 59 Personnel

- 59.1 The Contractor shall submit to the PHPA-II, the details and bio-data of all personnel he proposes to bring into Bhutan for the performance of the Works under the Contract. Such data for each person shall, besides the proof of his citizenship, contain the name, his present address, his assignment and responsibility in connection with the Works, and a short resume of his qualifications, experience etc. in relation to the Works to be performed by him.
- 59.2 Any person unsuitable and unacceptable to the PHPA-II shall not be brought to Bhutan. Any person, if found unsuitable or unacceptable to the PHPA-II on a later date, shall within a reasonable time, be repatriated by the Contractor, who shall make alternative arrangements for providing a suitable replacement
- 59.3 No person brought to Bhutan for the purposes of the Works shall be repatriated without the consent of the PHPA-II in writing, which shall be based on a written request from the Contractor for such repatriation giving reasons for such an action to the Engineer-in-Charge. The PHPA-II may give permission for such repatriation provided it is satisfied that the progress of Works shall not suffer due to such repatriation/replacement.
- 59.4 The Contractor and his expatriate personnel shall observe/respect all Bhutanese Acts, Laws, Rules and Regulations and shall not in any way interfere with Bhutanese political and religious affairs and shall meticulously follow any other Rules and Regulations which the RGoB, the PHPA-II and the Engineer-in-Charge may impose on them from time to time. The Contractor's expatriate personnel shall work and live in close co-operation with their co-workers and the community and shall not engage themselves in any other employment either part time or full time nor shall they take part in any local politics.
- 59.5 The PHPA-II will assist the Contractor, to the extent possible, in obtaining necessary permits to travel to Bhutan and back by issue of necessary certificates and other information needed by the RGoB and other agencies.



CERTIFICATES AND PAYMENT

Clause – 60 Payment

60.1 Terms of payment

- 60.1.1 The payment, including any advance, if applicable, shall be paid as specified in the SCC.
- 60.1.2 The Contractor's request for payment shall be made to Employer in writing accompanied by invoices and documents, describing, as appropriate, the work done and related services performed in fulfilment of the obligation stipulated in the Contract.
- 60.1.3 Payments shall be made promptly by the Employer, no later than thirty (30) days after receipt of bills and documents, provided that the documents are complete with all the requirements of Employer.
- 60.1.4 No payment made by Employer here shall be deemed to constitute acceptance by Employer of the works or any parts) thereof.
- 60.1.5 The currency or currencies in which payments are made to the Contractor under this Contract shall be those in which the Contract Price is expressed in the Contractor's Bid.
- 60.1.6 Wherever applicable, the release of first progressive interim payment shall be subject to submission of documentary evidence by the Contractor towards having taken the insurance policy (ies) and acceptance of the same by the Engineer-In-Charge.

60.2 Advance Payments

- 60.2.1 Mobilization Advance
 - a. If stated in SCC, the employer may grant interest free mobilization advance to the extent of **10% (ten percent)** of the Contract Price on production of the irrevocable Bank Guarantee for an equivalent amount of advance as per the Proforma at form no. 4.
 - b. The advance is recoverable and the deduction of the advance shall be made on pro-rata percentage basis from the interim payments certified by the Engineer-in-Charge under the Contract. The entire amount of advance shall be fully recovered by the time 80% (eighty percent) of the Contract is executed.



60.2.2 Secured Advance

- a. If stated in the SCC, the employer may provide the secured advance to the contractor against the construction materials provided that;
1. the materials are in accordance with the Specification for the Permanent Works,
 2. Such materials have been delivered to site, and are properly stored and protected against loss or damage or deterioration to the satisfaction of the Engineer-in-Charge.
 3. the Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer-in-Charge and such records shall be available for inspection by the Engineer-in-Charge,
 4. the Contractor shall submit with his monthly statement the estimated value of the materials on Site together with such documents as may be required by the Engineer-in-Charge for the purpose of valuation of the materials and providing evidence of ownership and payment therefor;
 5. ownership of such materials shall be deemed to vest in the PHPA-II, and
- b. The sum payable for such materials on Site shall not exceed 75 percent of the ex-factory/ex-warehouse price of manufactured materials or stockpile value of locally produced materials such as sand, aggregates and crushed stone.
- c. The advance is recoverable and the deduction of the advance shall be made on pro-rata percentage basis from the interim payments certified by the Engineer-in-Charge under the Contract. The entire amount of advance shall be fully recovered by the time 80% (eighty percent) of the Contract is executed.

60.2.3 Retention Money

- a) A retention amounting to **10% (10 percent)** of the amount included in any monthly Interim Payment Certificate pursuant to **sub-clause (i)** of this Clause due to the Contractor on account of Permanent Works executed by him shall be made by the Engineer-in-Charge.
- b) The Retention Money shall be certified due for payment after the expiration of the Period of Maintenance, notwithstanding that at such time there may be outstanding claims by the Contractor against the PHPA-II. Provided always that, if at such time there



shall remain to be executed by the Contractor any Works ordered during such period pursuant to **Clause – 49 and 50** hereof, the PHPA-II shall be entitled to withhold payment until the completion of such Works or so much of the Retention Money as shall, in the opinion of the Engineer-in-Charge represent the cost of the Works so remaining to be executed.

- c) If the Contractor expressly requests in writing, he shall be permitted to convert the Retention Money deducted from his Interim Payment Certificates into a Bank Guarantee issued in favour of the Punatsangchhu-II Hydroelectric Project Authority by the Bank of Bhutan, the State Bank of India, or any scheduled Bhutanese or Indian bank. The Bank Guarantee shall be in the Proforma attached at form no.5.
- d) The Bank Guarantee shall remain valid for at least thirty days beyond the period of maintenance.

60.2.4 Taxes and Duties

- a) The prices bid by the Contractor shall include all duties, taxes, , and levies that may be levied in accordance with the laws and regulations in force as of the date 30 days prior to the closing date of submission of bids. As such, except as otherwise specifically provided in the SCC, the Contractor shall bear and pay all taxes, duties, levies and charges assessed on the contractor, its subcontractors or their employees by all municipal, state or national government authorities in connection with works in and outside of the Kingdom of Bhutan.
- b) At the time of release of payment, tax shall be deducted at source (TDS) from Bhutanese Bidders and International Bidders as specified in the SCC from the gross amount of bills.
- c) The Contractor's staff, personnel and labour shall be liable to pay personal income tax in Bhutan in respect of such of their salaries and wages as are chargeable under the laws and regulations in force and the Contractor shall perform such duties with regard to such deductions thereof as may be imposed on him by such laws and regulations.

Clause – 61 Approval only by Maintenance Certificate

No certificate other than the Maintenance Certificate referred to in **Clause – 62** hereof shall be deemed to constitute approval of the works.



Clause – 62 Maintenance Certificate

62.1 The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer-in-Charge stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer-in-Charge within twenty eight days after the expiration of the Period of Maintenance, or, if different periods of maintenance shall become applicable to different sections or parts of the Works, the expiration of the latest such period, or as soon thereafter as any works ordered during such period, pursuant to **Clause – 49 and 50** hereof, shall have been completed to the satisfaction of the Engineer-in-Charge and full effect shall be given to this Clause, notwithstanding any previous entry on the Works or the taking possession, working or using thereof or any part thereof by the PHPA-II. Provided always that the issue of the Maintenance Certificate shall not be a condition precedent to payment to the Contractor of the retention money in accordance with the conditions set out in **Clause – 60** hereof.

62.2 Cessation of PHPA-II's Liability'

The PHPA-II shall not be liable to the Contractor for any matter or thing arising out of or in connection with Contract or execution of the Works unless the Contractor shall have made a claim in writing in respect thereof before the giving of the Maintenance Certificate under this Clause.

62.3 Unfulfilled Obligations

Notwithstanding the issue of Maintenance Certificate, the Contractor and, subject to **sub clause 62.2** of this Clause, the PHPA-II shall remain liable for the fulfillment of any obligation incurred under the provisions of the Contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such Certificate is issued and, for the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto.

REMEDIES AND POWERS

Clause – 63 Remedies and Powers

63.1 Default of Contractor

If the Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in bankruptcy, or shall make an arrangement with or assignment in



favour of his creditors, or shall agree to carry out the Contract under a committee of inspection of his creditors or, being a corporation, shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or if the Contractor shall assign the Contract, without the consent in writing of the PHPA-II first obtained, or shall have an execution levied on his goods, or if the Engineer-in-Charge shall certify in writing that, in his opinion, the Contractor;

- a) has abandoned the Contract, or
- b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for twenty-eight days after receiving, from the Engineer-in-Charge, written notice to proceed, or
- c) has failed to remove materials from the site or to pull down and replace work for twenty eight days after receiving from the Engineer-in-Charge's written notice that the said materials or work had been condemned and rejected by the Engineer-in-Charge under these conditions, or
- d) despite previous warnings by the Engineer-in-Charge's in writing, is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligations under the Contract, or
- e) has, to the detriment of good workmanship, or defiance of the Engineer-in-Charge's instruction to the contrary, sub-let any part of the Contract;

then the Engineer-in-Charge may, after giving fourteen day's notice in writing to the Contractor, enter upon the Site and Works and expel the Contractor, from the entire Works or part thereof, without thereby voiding the Contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the PHPA-II or the Engineer-in-Charge by the Contract, and may itself complete the entire Work or part thereof as the case may be or may employ any other Contractor to complete the Works. The PHPA-II or such other Contractor may use for such completion so much of the Constructional Plant, Temporary works and materials, which have been deemed to be reserved exclusively for the execution of the works, under the provisions of the Contract, as he or they may think proper, and the PHPA-II may, at any time, sell any of the said Constructional Plant, Temporary works and unused materials and apply the proceeds of sales



in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

63.2 Valuation at Date of Forfeiture

The Engineer-in-Charge shall, as soon as may be practicable after any such entry and expulsion by the PHPA-II, fix and determine ex-parte, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work actually done by him under the Contract and the value of any of the said unused or partially used materials, any Constructional Plant and any Temporary Works.

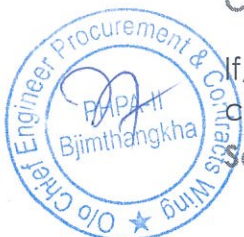
63.3 Payment after Forfeiture

If the PHPA-II shall enter and expel the Contractor under this Clause, it shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs of execution and maintenance, damages for delay in completion, if any, and all other expenses incurred by the PHPA-II have been ascertained and the amount thereof certified by the Engineer-in-Charge. The Contractor shall then be entitled to receive only such sum or sums, if any, as the Engineer-in-Charge may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the PHPA-II the amount of such excess and it shall be deemed a debt due by the Contractor to the PHPA-II and shall be recoverable accordingly.

In the event of the above course being adopted by the Engineer-in-Charge, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any Constructional Plant, material or entered into any agreements or made any advances on account or with a view to the execution of the Works or the performance of the Contract.

Clause – 64 Urgent Repairs

If, by reasons of any accident, or failure, or other event occurring to in or in connection with the Works or any part thereof, either during the execution of



the Works or during the Period of Maintenance, any remedial or other work or repair shall, in the opinion of the Engineer-in-Charge or the Engineer-in-Charge's Representative, be urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such Work or repair, the PHPA-II may employ and pay other persons to carry out such work or repair as the Engineer-in-Charge or the Engineer-in-Charge's Representative may consider necessary. If the work or repair so done by the PHPA-II is work which, in the opinion of the Engineer-in-Charge, the Contractor was liable to do at his own expense under the Contract, all expenses properly incurred by the PHPA-II in so doing shall be recoverable from the Contractor by the PHPA-II, or may be deducted by the PHPA-II from any money due or which may become due to the Contractor. Provided always that Engineer-in-Charge or the Engineer-in-Charge's Representative, as the case may be, shall, as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

SPECIAL RISKS/TERMINATION

Clause – 65 Special Risks/Termination of Contract

65.1 Special Risks

The special risks are war, hostilities (whether war be declared or not), invasion, act of foreign enemies, the nuclear risks described in **Clause – 20.6** hereof.

65.2 Termination of the Contract

- d) If, during the currency of the Contract any of the Special Risks mentioned hereinabove which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavours to complete the execution of the Works. Provided always that the PHPA-II shall be entitled at any time after occurrence of such Special Risks to terminate the Contract by giving written notice to the Contractor and, upon such notice being given, this Contract shall, except as to the right of the parties under this Clause and to the operation of **Clause – 67** hereof, terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.
- e) Termination of Contract for PHPA-II's Convenience
- f) The PHPA-II shall be entitled to terminate this Contract at any time for the PHPA-II's convenience after giving sixty days prior notice to the Contractor, with a copy to the Engineer-in-Charge.

65.3 Removal of Plant on Termination



If the Contract shall be terminated under the provisions of the last preceding sub-clause, the Contractor shall, with all reasonable despatch, remove from the Site all Constructional Plant and shall give similar facilities to his sub-Contractors to do so.

65.4 Payment upon Contract Termination

If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the PHPA-II, in so far as such amounts or items shall not have already been covered by payments on account made to the Contractor, for all works executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

- a) The amounts payable in respect of any preliminary items, so far as the work or service comprised therein has been carried out or performed, and a proper proportion as certified by the Engineer-in-Charge of any such items, the work or service comprised in, which has been partially carried out or performed.
- b) The cost of materials or goods reasonably ordered for the works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials or goods becoming property of the PHPA-II upon such payments being made by it.
- c) A sum to be certified by the Engineer-in-Charge, being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the works insofar as such expenditure shall not have been covered by payments in this sub-clause before mentioned.
- d) The reasonable cost of removal of Constructional Plant under **sub-clause 65.3** of this Clause.

Provided always that against any payments due from the PHPA-II under this sub clause, the PHPA-II shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Constructional Plant and materials and any other sums which at the date of termination were recoverable by the PHPA-II from the Contractor under the terms of the Contract.

FRUSTRATION

Clause – 66 Payment in Event of Frustration

If a war, or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevented from fulfilling its



Contractual obligations, or under the law governing the Contract, the parties are released from further performance, then the sum payable by the PHPA-II to the Contractor in respect of the work executed shall be the same as that which would have been payable under **Clause – 65** hereof if the Contract had been terminated under the provisions of **Clause – 65** hereof.

SETTLEMENT OF DISPUTES & ARBITRATIONS

Clause – 67 Dispute Resolution

Except where otherwise provided in the Contract all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the Work or as to any

other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the Contract, design, drawings, specifications, estimates, instructions, orders to these conditions or otherwise concerning the Works or the execution or failure to execute the same whether arising during the progress of the Work or after the cancellation, termination completion or abandonment thereof shall be dealt with as mentioned hereinafter.

- i) If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or considers any decision of the Engineer-in-Charge on any matter in connection with or arising out of the Contract or carrying out of Work to be unacceptable, he shall promptly ask the Engineer-in-Charge in writing, for written instructions or decision. There upon the Engineer-in-Charge shall give his written instructions or decision within a period of thirty days of such request.

Upon receipt of the written instructions or decision, the Contractor shall promptly proceed without delay to comply with such instructions or decision.

If the Engineer-in-Charge fails to give his instructions or decision in writing within a period of thirty days after being requested for or if the Contractor is dissatisfied with the instructions or decision of the Engineer-in-Charge, the Contractor may within thirty days after receiving the instructions of decision file a written appeal to the Managing Director, PHPA-II who will constitute a Committee of which the Director (Technical) will be convenor, to resolve the dispute. The Committee shall afford an opportunity to the Contractor to be heard and to offer evidence in support of his appeal within forty five days of the receipt of the appeal by the Director (Technical). The Director (Technical) shall give a decision on behalf of the Committee within a period of thirty days after the Contractor has been heard and the Contractor has given evidence in support of his appeal. If the Director



(Technical) does not give a decision within thirty days, the Contractor will have the right to refer the dispute to arbitration.

If the Contractor is dis-satisfied with the decision of the Director (Technical), the Contractor, within a period of thirty days from receipt of the decision, shall indicate his intention to refer the dispute to arbitration failing which the said decision shall be final and conclusive.

- ii) Except where the decision has become final, binding and conclusive in terms of Sub Para (i) above, disputes or difference shall be referred for adjudication in accordance with the provision specified in the SCC.

NOTICES

Clause – 68 Notices

68.1 Service of Notices on Contractor

All certificates, notices or written orders to be given by the Engineer-in-Charge to the Contractor under the terms of the Contract shall be served either by sending by post or delivering the same to the Contractor's office on Site or his principal place of business, or such other address as the Contractor shall nominate for this purpose.

68.2 Service of Notices on PPHA-II or Engineer-in-Charge

All notices to be given to the PPHA-II or to the Engineer-in-Charge under the terms of the Contract shall be served by sending by post or delivering the same to the respective address given in the SCC.

68.3 Change of Address

Either party may change a nominated address to another address by prior written notice to the other party.

DEFAULT OF PPHA-II

Clause – 69 Default of PPHA-II

- 69.1 In the event of the PPHA-II failing to pay to the Contractor the amount due under any certificate of the Engineer-in-Charge within ninety days after the same shall have become due under the terms of the Contract, subject to any deduction that the PPHA-II is entitled to make under the Contract, the Contractor shall be entitled to issue a notice to the Engineer-in-Charge stating that he shall be terminating his Works after thirty days from the issue of such notice, for the reasons stated therein. However, if within the said period of thirty days, the Engineer-in-Charge



notifies the Contractor that the reasons stated in the notice of the Contractor are not valid or that the alleged event of default of the PHPA-II has been remedied or no longer exists, then the Contractor shall not be entitled to terminate the Contract.

- 69.2 If the Contractor becomes entitled to terminate the Contract in terms of **sub clause 69.1** of this Clause, after expiry of the notice of thirty days, he may, notwithstanding the provisions of **Clause – 53.2** hereof, remove from the Site all Constructional Plant brought by him.
- 69.3 In the event of such termination, the PHPA-II shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions in **Clause – 65** hereof, but in addition to the payments specified in **Clause – 65.4** hereof, the PHPA-II shall pay to the Contractor the amount of any loss or damage to Contractor arising out of or in connection with or by consequence of such termination.

CHANGES IN COSTS AND LEGISLATION

Clause – 70 Increase or Decrease of Costs

70.1 Contract Price Adjustment

- a) The regulation and payment of Contract Price Adjustment under the Contract shall be governed by the provisions herein under if the prices are permitted to be quoted with price adjustment formula.
- b) The Contract Price as awarded shall be the base Contract Price.
- c) A certain fixed percentage of the base Contract Price shall not be subject to any Contract Price Adjustment. The balance percentage to be specified shall be of identified components towards labour, material(s) and H.S. diesel oil, hereinafter called the variable component, shall be subject to Contract Price Adjustment.
- d) The fixed component and the variable components shall be specified in SCC.
- e) The amount of Contract Price Adjustment payable/ recoverable for the work done during the relevant period shall be calculated as under:

$$CPA = APC - BCP$$

Where,



CPA = Control Price Agreement
BCP = Base Contract Price
ACP = Adjusted Contract Price

ACP shall be computed as under:

$$ACP = BCP * \left[F + \frac{l * L_1}{L_0} + \frac{m * M_1}{M_0} + \frac{m * M_2}{M_0} \right]$$

$F + l + m = 1$

F = Fixed component expressed in percentage of the Base Contract Price which shall not be subject to any adjustment as quantified and stipulated in the SCC generally 20%

L = Labour component expressed in percentage of Base Contract Price which shall be subject to Price Adjustment as quantified and stipulated in the SCC generally upto 15% to 30%

M = Material component expressed in percentage (excluding material issued by Employer) of the Base Contract Price which shall be subject to Price Adjustment as quantified and stipulated in the SCC, generally 30% to 60%

L = Labour Index as stipulated in SCC

M = Material Index as stipulated in SCC

SUBSCRIPT

'0' = refers to the value of the above-mentioned labour/material indices as on thirty (30) days prior to the Bid opening date.

'1' = refers to the value of the corresponding labour/material indices as applicable for the preceding month in which the work is executed for which the adjustment is applicable, respectively.

- f) The total amount payable on the Base Contract Price on account of the Contract Price Adjustment as indicated in above shall not exceed the maximum of twenty percent (20%) of the Contract Price as awarded.
- g) Contract Price Adjustment(s) shall be calculated for the value of Works executed for the billing month as per agreed work schedule. For the purpose of payment/recovery of price Adjustments, such payment/refund shall be operative and payable in accordance with the schedule completion period (including authorized extensions, if any) or actual completion period, whichever is earlier. Provided further that the Contractor would be eligible for such price adjustment claims or shall be liable for refund on the quantum of Works scheduled or



the actual quantum of works done provided always that the work done is more than or equal to the scheduled of works as per agreed work schedule.

- h) The Contractor shall not be eligible for the payment of the price adjustment claims or liable for refund of Contract Price adjustment for the period beyond the schedule date of execution of works if the works has been delayed beyond the scheduled date(s) for reasons attributable to the Contractor. However, for quantities of works executed beyond the scheduled dates of execution, the contractor would be liable for the refund of Contract Price Adjustment(s) for such delayed work based on the value of the indices as applicable to the scheduled dates of execution, provide that if the indices of the actual dates of execution are lower than the indices as on scheduled dates of execution, then lower indices shall be applicable. In cases where the execution of works is delayed for reasons attributable to Employer, the Contractor shall be eligible for payment or refund of price adjustment on such delayed execution of Works based on the indices prevailing as on the date of execution of such works.
- i) Rates of items included in the Bill of Quantities, whose quantities have varied beyond the permissible deviation limits and rates of extra items derived and agreed from the items included in the Bills of Quantities shall also be subject to price adjustment as per this clause.
- j) The Contractor shall, every month after commencement of the Works, submit to the EIC a written notice of the changes, if any, that have occurred in the specified indices of materials, and Labour or that of Diesel price etc. during the previous reporting period containing the effective date of such change, with authenticated documentary evidence of the relevant applicable published indices/diesel price, etc.
- k) Monthly bills for Contract Price Adjustment shall be made by the Contractor commencing first, from the month when all the relevant/applicable indices/diesel price are available and not later than fifteen (15th) day of every month thereafter. The period for processing and making payment for these bills shall also be governed by the provisions as applicable on-account progressive interim payments.

70.2 Subsequent Legislation



If, after the date thirty days prior to the latest date of submission of bids for the Works there occur changes to any Statute, Ordinance, Decree or other Law or any regulation or by-law of any local or other duly constituted authority, or the introduction of any such Statute, Ordinance, Decree, Law, Regulation or bye-law which causes additional or reduced amount to the Contractor, other than under **Clause 70.1** , in the execution of the Works, such additional or reduced amount shall be certified by the Engineer-in-Charge after examining the record provided by the Contractor and shall be paid by or credited to the Employer. Notwithstanding the foregoing, such additional or reduced amount shall not be separately paid or credited if the same shall already have been taken into account in the indexing of any input to the price adjustment formulae.

70.3 Compliance with Statutes, Regulations, Acts, Laws etc.

The Contractor shall conform in all respects, with the provisions of all Acts, Laws, Statutes, Regulations, Ordinance etc. of the RGoB which may be applicable to the Works and with such rules and regulations of Public bodies or other duly constituted authority and shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such Act, Law, Statute, Regulation or bye-law etc.



SECTION IV – SPECIAL CONDITIONS OF CONTRACT (SCC)



SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract (SCC) shall supplement and/or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail.

GCC Ref., if any	Particulars
1 (vi)	The Engineer In-charge shall be: To be intimated at the Time of Award.
1 (xiii)	The site is located at: Highway Tunnel, PHPA-II Site, Wangdue, Bhutan.
4	Sub-letting: not allowed.
5.1	The language shall be: English.
5.2	The law that applies to the Contract is: The laws of the Kingdom of Bhutan
10.1	<p>The amount of the Performance Security shall be: 10% of the Contract Price.</p> <p>The types of acceptable Performance Securities are:</p> <p>(i) <i>Unconditional bank guarantee issued by a financial institute of Bhutan or any foreign bank acceptable and enforceable in any financial institution of Bhutan.</i></p> <p>(ii) <i>Cash warrant, or</i></p> <p>(iii) <i>Demand Draft, or Banker's Cheque.</i></p> <p>(iv) <i>Direct Deposit in PHPA-II's Account No. 102081338 maintained with Bank of Bhutan</i></p> <p>The Performance Security shall be issued by any financial institute of Bhutan.</p>
41	Commencement Date: <i>The Works shall commence on the 10th day from the date of issue of the LoA</i>
43	The Completion Date for the whole of the Works shall be: 3 months from the date of commencement.
49.1	The maintenance period shall be: 12 months from the date of completion.



47.1	<p>The applicable rate for liquidated damages (LD) for delay shall be: 0.1% per day of the Contract Price.</p> <p>The maximum amount of LD shall be: 10% of the Contract Price</p>
60.1.1	<p>Payments Terms:</p> <ol style="list-style-type: none"> 1. The Contractor shall prepare and submit monthly running bills for the works executed during the preceding month to the Engineer-in-Charge. 2. The certified amount of the running bills shall be released as progressive payment after completion of the relevant portion of the work, after adjusting any advance payments. 3. The final payment shall be released within sixty (60) days on receipt of the final bill, after successful completion of the work.
60.2.2	<p>The mobilization advance: 10% (ten percent) of the Contract Price shall be paid as mobilization advance on production of the irrevocable Bank Guarantee as per the Proforma at form no.4, issued by any financial institute of Bhutan</p>
60.2.2	<p>The secured advance: Not applicable (NA)</p>
60.2.3	<p>The proportion of payments retained is: <i>From every bill, 10% (ten percent) shall be deducted as retention money.</i></p>
60.2.4 (a)	<p>GST and any other applicable taxes shall be borne and paid by the Bidder.</p>
60.2.4 (b)	<p>The present rate of tax deducted at source (TDS) is: 2% for Bhutanese Contractors</p>
67	<p>The rules of procedure for dispute resolution:</p> <p><i>Except where the decision has become final, binding and conclusive in terms of Sub Para 67 (i), disputes or difference shall be referred for adjudication or arbitration in accordance with the Alternative Dispute Resolution Act of Bhutan.</i></p> <p>The place of arbitration shall be: Thimphu, Bhutan</p>



68.2	For notices, the addresses shall be: Attention: To be Intimated at The Time of Award Address:
70 (A)	Contract Price adjustment: <i>The Contract is not subjected to price adjustment.</i>



SECTION V – TECHNICAL SPECIFICATION



SECTION - I
GENERAL TECHNICAL SPECIFICATIONS
FOR RESTORATION OF CONTROL ROOM AT
HIGHWAY TUNNEL PORTAL



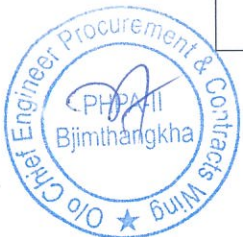
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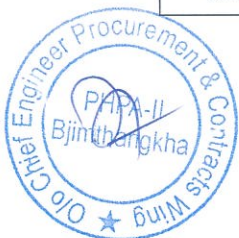
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SECTION-I
GENERAL TECHNICAL SPECIFICATIONS
FOR RESTORATION OF CONTROL ROOM AT
HIGHWAY TUNNEL PORTAL

1.0 General

The General Technical Specifications (hereinafter called **GTS**) shall give general information about execution of various items of works under the Contract and cover the specified stipulations for measurements and payment therefor included in the Bill of Quantities.

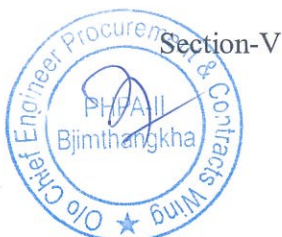
These specifications shall be the part of the requirements for various items of works, which shall be executed according to the stipulations of the Contract. Hence, the instructions given herein form an integral part of and are applicable to the bidding documents issued for the works. Addenda to these specifications may be issued, as required during bidding and construction phases.

These specifications shall be read in conjunction with Bill of Quantities (BoQ), drawings and the Conditions of Contract. While quoting the price, the Contractor shall comply with all provisions contained within the bidding documents with an objective to complete each items of work without any addition of cost thereof. In case Specifications, BoQ and Condition of Contract do not corroborate each other for completion of any item of work, the same as well as the assumptions made in quoting of price for such item(s) of Works shall be brought out clearly in the bid.

It is the intent of these specifications to establish acceptable standards of quality as specified in the technical specifications. Minor deviations in details due to manufacture's standard shop process for brought out items will be considered for acceptance provided that, in the opinion of the Engineer-in-Charge, the proposed substitutions are equal in quality to those specified.

All works shall be executed in conformity to the approved construction drawings and instructions issued by the Engineer-in-Charge for construction. Execution of works contemplated under these specifications shall include, in complete, all the procurement and supply of all required Man power (skilled and un-skilled) and Materials (inclusive of octroi and all other taxes and charges as levied, if any), Equipment, Plant and Machineries, office, stores and workshop etc., transportation, handling and placement of Materials and Equipment to site in a professional and diligent manner.

All works shall comply with the quality requirements defined in the relevant sections of these specifications and other section of the bidding documents. **Where no specifications have been laid down, the materials used and the Work done shall conform to the relevant Specifications for Building and Road Works: Royal Govt. of Bhutan, 2025 or I.S. Code or as directed by the Engineer-in-Charge.** The Contractor shall endeavour to provide all such necessary efforts in order to comply with the intent of these specifications to the satisfaction of the Engineer-in-Charge.



1.1 Scope of Work

The broad scope of works in general, shall be 'Restoration of control room at highway tunnel portal at Dam Complex' which shall include, but not limited to the following:

- i. Setting out survey, clearing and grubbing, excavation in soil and rock, backfilling, plain and reinforced concrete works.
- ii. Dismantling of existing control room
- iii. Restoration of foundations
- iv. Erection of steel structure as per drawings.
- v. Painting of structure.
- vi. Providing chain link mesh fencing
- vii. and other miscellaneous works to fulfil the architectural, structural and functional requirements but not limited to the major item of works, as per the approved design drawings and specifications and/or as directed by the Engineer-in-Charge.
- viii. The above work shall also include:
 - (a) Misc. works, if any

2.0 WORKING FACILITIES

2.1 Scope of work

The scope of works under this clause to design, provide, erect, operate and maintain all the working facilities as would be necessary for execution of the Works within the specified time schedule, but not necessarily limited to the following:

- Camp and Facilities
- Plant and Equipment
- Electric Power Supply System
- Water Supply System
- Sewage & Waste Water and Garbage Disposal System
- Temporary Access and Construction Roads

Working Facilities shall be subject to the Engineer-in-Charge's approval. The Contractor shall comply with all applicable laws, regulations, and ordinances relating to the construction and operation of the working facilities in Bhutan.

2.2 Submissions

The Contractor shall submit basic plans of Working Facilities along with his bid. He shall attach to his bid documents drawings and operating descriptions for his proposed working facilities. At least **15 days** prior to commencing the work, the Contractor **shall submit** to the Engineer-in-Charge for approval the drawings of layout and details of Working Facilities.

Should the Engineer-in-Charge determine that the details of working facilities furnished does not meet all requirements, the deficiencies shall be made good by the Contractor before commencement of the work. Any cost incurred therefor or replacement shall be borne by the Contractor.



2.3 Camp and Facilities

The Camp and Facilities shall include but are not limited to

- Office for the Contractor / Engineer-in-Charge's Site office
- Accommodation for Staff and Workmen
- Miscellaneous Working Facilities like:
- Stores, Warehouses and sheds for the Contractor
- Portable Explosive Magazines

Office for the Contractor shall be of sufficient size and fully furnished and equipped. All working facilities shall be equipped with proper light arrangement, water supply, telephone, sewage and waste water disposal system. Contractor shall make his own arrangement for all working facilities.

The Contractor shall acquaint himself with all applicable laws and regulations as applicable in Bhutan for handling and use of explosives. All such laws, regulations and rules etc., as are amended from time to time shall be binding on the Contractor. The Contractor shall also arrange mobile / portable explosive magazines of suitable capacity and explosive van. The Contractor shall arrange the security system for the Contractor's own mobile / portable magazine house.

2.4 Plant and Equipment

2.4.1 General

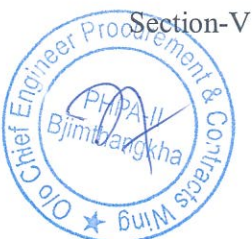
The Contractor shall provide all construction plants and equipment necessary for the efficient execution of the work described in the Specifications and details supplied by the Contractor in the construction plant and equipment schedule. The Contractor shall also deploy additional equipment, if needed, at his own cost for timely completion of the Works.

The capacity and number of equipment shall conform to the specific minimum requirements for the works and the climatic conditions prevailing at the site. The Contractor shall maintain all his equipment, tools and plants with sufficient spare parts, special tools for repair work and complete standby units of vital parts to guarantee a continuous operation without untimely delays. The Contractor shall remain fully responsible for any delays due to disregard of said necessity.

2.4.2 Transportation and Storage Facilities for Cement

Transportation of cement shall be accomplished in adequately weather-tight trucks or other means which will protect the cement completely from exposure to moisture. Storage of cement at the Site shall be done in weather-tight and properly ventilated structures with adequate provisions for the prevention of absorption of moisture. Said structures shall be complete with all equipment for loading, unloading and weighing of cement. The cement storage structure on the Site shall be at least **for 20-day capacity**, to be determined by the Contractor in consideration of supply capability.

2.5 Electric Power Supply System



PHPA-II will supply electricity at one point to the Contractor. The Contractor shall make all arrangement for distribution within his working area. The electric energy consumed by the Contractor shall be measured by a suitable Energy meter installed at the supply point and the cost thereof shall be paid by the Contractor at the prevailing rates.

The power supply to the construction sites, camps and the entire project area shall be designed for continuous operation, 24 hours a day, with sufficient capacity to satisfy peak and emergency demands.

The Contractor shall also furnish, install and maintain the electrical distribution system to the Engineer-in-Charge's site office.

2.6 Water Supply System

The Contractor shall be fully responsible for the arrangement of necessary facilities for water supply. The Contractor shall design, construct, equip, operate and maintain two separate water installations at the Site necessary for the adequate supply of:

- a) Raw water: for general construction use, treated to the extent necessary to meet specified requirements (e.g. for concrete),
- b) Potable water: for supply to all buildings and plants requiring high quality water meeting relevant requirements for drinking water.

The Contractor shall furnish, install, operate and maintain all pumps, piping, fittings, valves, storage tanks for the water supply and distribution systems, adequate in quantity and pressure. Raw water shall be used for construction purposes only if of adequate quality. There shall be no cross connections of any kind between the raw and potable water supply systems. Only potable water shall be piped into buildings.

2.7 Sewage, Waste Water and Garbage Disposal System

The Contractor shall design, construct, equip, operate and maintain all the installation necessary to properly collect, treat and dispose of sewage from the camp office and other construction facilities. The Contractor shall not, under any circumstances, discharge sewage or contaminated water into natural streams or any open areas. Treatment and disposal of sewage shall be performed in accordance with the current related standards and laws in force in Bhutan and always subject to the Engineer-in-Charge's approval. The drainage systems shall be designed taking into account the rainfall /snowfall rate in the area and the disposal of rainwater/snow shall be accomplished in such a way that no erosion problems are caused which may alter the stability of the soil.

The Contractor shall provide necessary arrangements for disposal of waste and garbage disposal. The areas surrounding camps, offices, job facilities and the work sites shall be kept clean and free of refuse at all times. No waste shall be dumped in areas other than those approved by the Engineer-in-Charge for waste disposal. No waste of any kind shall be deposited in any watercourses. The Contractor shall observe the norms prescribed by the Government of Bhutan for keeping all areas clean.

2.8 Testing and Quality Control



The Contractor shall collect the samples as specified or as directed by the Engineer-in-Charge, carryout the relevant test as approved by the Engineer-in-Charge and submit the test reports to the Engineer-in-Charge in time. All tests will be made according to the approved standards.

2.9 Medical Care Facilities

In the event of illness of an epidemic nature breaking out, the Contractor shall carry out and comply with all orders, arrangements or regulations, which may be issued by the Government or local authorities. Basic Medical facilities are available at Wangdue. The Contractor shall provide and maintain at least one first aid facilities at the work site.

2.10 Environmental Obligations

The Contractor shall, during the whole period of the Works comply fully with all applicable laws and regulations relating to environmental protection, mitigating measures for reducing environmental impacts and remedial works on completion of the Works. This obligation shall extend to the construction sites themselves, all the Contractor's site installations, and all quarries, borrow areas and tips.

2.11 Final Clean-Up

Upon the Completion of Works, or when any plant has completed its functions, the Contractor shall dismantle and demobilize all temporary facilities and remove all refuse, debris, objectionable material, and fill, grade and dress all excavated areas in a clean and proper condition acceptable to the Engineer-in-Charge. All such areas, as far as possible, shall conform to the natural appearance of the landscape.

2.12 Measurement and Payment

No separate payment for establishing the working facilities shall be made. Cost of all such working facilities shall be included in the unit price of works. No separate payment shall be made for complying with any environmental obligations required by applicable laws and regulations, and all such costs incurred by the Contractor to this end shall be considered as being included in the Contractor's Unit Prices.

3.0 PREPARATION OF SITE

3.1 Scope of Work

The Scope of Works under this clause covers preparation of the site of works as required or as designated by the Engineer-in-Charge for proper execution of various works under the Contract. The Contractor shall provide all equipment and machinery, skilled and auxiliary personnel and materials to commensurate with the various tasks and requirements associated with preparation of the site. He shall also adopt all safety measures of the workmen and others as per requirement and / or direction of the Engineer-in-Charge. Safety of the workmen and others in all respects bears the sole responsibility of the Contractor.

3.2 Submittals

At least ten **(10) days** before beginning of the works, the Contractor shall submit to the Engineer-in-Charge for his approval:

- a) Program of works indicating schedule of time and the area to be covered



- b) The arrangements, the Contractor intends to adopt to carry out the work.

3.3 Execution

3.3.1 General

Operation for Site preparation shall be strictly limited to the area to be occupied by the indispensable works unless otherwise directed by the Engineer-in-Charge. Clearing shall be extended to approximately three (3) meters beyond the limit of the works for permanent structures. For temporary works, such extension shall be as minimum as required.

During clearing and grubbing the trees and shrubs, pole lines, fences, monuments, pipe lines etc. within or adjacent to the work site which are not be disturbed shall be protected properly at his own cost, from injury or damage by the Contractor. In case of Archaeological monuments within or adjacent to the area, the Contractor shall provide necessary fencing all around as per the direction of the Engineer-in-Charge and protect the same properly during execution.

Methods, tools and equipment to be adopted for the work shall be such which will not affect the property to be preserved. Only such methods, tools and equipment as approved by the Engineer-in-Charge shall be adopted in the work.

3.3.2 Jungle Clearance

Jungle clearance shall comprise of cutting, removing and disposing of all materials such as vegetation, grass, brushwood, shrubs, stumps and trees and sapling of girth up to 300 mm measured at height of 1 m above ground level which in the opinion of Engineer-in-Charge are unsuitable for incorporation in the works, rubbish and other objectionable matters.

The roots of trees and saplings shall be removed to a depth of 600mm below ground level or 140mm below sub-grade level, whichever is lower. Trees and shrubs, etc. within or adjacent to the area which are not required to be disturbed during jungle clearance shall be properly protected by the Contractor at his own cost.

No trees shall be cut from outside areas designated unless absolutely warranted and approved by the Engineer-in-Charge and all trees designated outside the areas shall be protected carefully from any damage and cleared areas shall be maintained free of vegetable growth during the progress of the works.

3.3.3 Cutting / Felling of Trees

After clearance of the grass, vegetation, shrubs and bushes, etc, trees having girth of (i) 300mm to 600mm and (ii) above 600mm (measured at a height of one metre above ground level) shall be grouped separately and shall be numbered suitably at site. These trees shall be cut after approval of the Engineer-in-Charge. Felling trees shall include taking out roots up to 600 mm below ground level or 140 mm below sub-grade level whichever is lower.

The trunks and branches of trees shall be cleared of limbs and tops and cut to suitable places as directed by the Engineer-in-Charge. Wood, branches, twigs of trees and other useful material shall be the property of PHPA-II. The serviceable materials shall be stacked in the manner as directed by the Engineer-in-Charge.



All unserviceable materials shall be disposed off as per the directions of the Engineer-in-Charge. All excavation below ground level arising out of removal trees, stumps, etc. shall be filled with suitable material in 40cm layers and compacted thoroughly so that the surface at these points conform to the surrounding area.

3.3.4 Protection of Other Areas

The Contractor shall ensure that trees and other vegetation outside the areas of the permanent works and the minimal areas required for temporary works including access are protected and preserved from damage.

Any clearing required by the Contractor for construction of temporary works, and for any other purpose shall be at the Contractor's expense and shall not be carried out without the approval of the Engineer-in-Charge unless otherwise specified.

The Engineer-in-Charge reserves the right to reinstate any damage to vegetation and the surface of the ground beyond the areas of the Works (including temporary works) at the expense of the Contractor.

3.3.5 Disposal of Stripped Materials

All useful materials obtained from clearing operations shall be stacked in the manner as directed by the Engineer-in-Charge. Trunks and branches of trees shall be cleared of limbs and tops and stacked neatly at places indicated by the Engineer-in-Charge. The materials shall be the property of the Engineer-in-Charge.

All unserviceable materials which in the opinion of the Engineer-in-Charge cannot be used or auctioned shall be removed from and disposed off as per the direction of the Engineer-in-Charge.

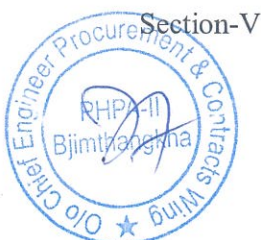
Care shall be taken to see that unserviceable materials are disposed off in such a manner that there is no likelihood of getting mixed up with the materials meant for construction.

When materials are to be buried, they shall be disposed off in horizontal layers alternatively with earth layers and shall be compacted to the maximum extent practicable by routing the haulage traffic over the area. The maximum height of these spoil materials will be 3 m with slope less than 4:1 (4 horizontal to 1 vertical) in adequate conditions in regard of safety for the stability of the deposit. Vegetal matter shall be covered with 1 m of earth material.

Disposal of waste materials by burning will be permitted only at times when conditions are considered favorable for burning and at locations approved by the Engineer-in-Charge. Materials to be burnt shall be piled neatly in such a manner and in such locations as to cause the least fire risk. Burning shall be thorough so that the burnt materials are reduced to ashes. No logs, branches or charred pieces shall be permitted to remain. The Contractor shall at all times take special precautions to prevent fire from spreading to areas beyond the limits of the cleared areas and shall have available at the times suitable equipment and supplied for use in preventing and suppressing fires. Care shall be taken to see that the burning of such material does not destroy or damage public or private property and adjacent vegetation, and the Contractor shall be fully responsible for destruction, damage, or nuisance, if any

3.3.6 Auxiliary Works

The auxiliary works comprise, but are not necessarily limited to, the following:



- removing and storing of boundary stones, protection of surveying points; benchmarks, etc and protection of all secondary survey points, profiles, etc.
- Difficulties to be overcome where excavation may have to be carried out on steep slopes.
- Difficulties in transport due to existing access conditions.
- Sorting of excavated material which, if necessary, is to be used for special purposes.
- Conveying and dumping equipment that might be required.

3.4 Measurement and Payment

3.4.1 Measurement

Measurement for preparation of site shall be done only for the designated area over which the cutting of grass, jungles, etc has been done and all rubbish has been removed. Cutting and uprooting of trees, having girth less than 300mm, measured at a height of one metre above ground level will not be measured and therefore, would be covered under "Clearing Jungle (including removal of Rubbish)". Area of site preparation shall be measured in sqm.

Measurement for cutting / felling of trees having girth of more than 300mm (girth measured at a height of one metre above ground level or top of the stumps if the height of the stump is less than 1 m from the ground) shall be done in terms of number according to sizes (a) 300-600mm and (b) more than 600-1200 mm (c) 1200-2400mm & (d) more than 2400mm.

3.4.2 Payment

Payment for site preparation shall be made at the Unit rate per sqm. Payment for cutting / felling of trees having girth specified in Clause 3.4.1 of this Section, shall be paid at the Unit rate for each size group separately.

The rate for each case shall cover the cost of carrying out all the required operations including cost of labour, materials, equipment hired / owned, tools and plants and incidentals necessary to complete the work. The rate also includes removal of stumps of trees of all sizes, excavation, back filling to required density, where necessary, and handling, salvaging, piling and disposing of the cleared materials with all lift and lead as directed by Engineer-in-Charge.

Where a contract does not include separate items of clearing or grubbing the same shall be considered incidental and contract unit prices for the same shall be considered as including clearing and grubbing operations.

4.0 CONCRETE WORKS

4.1 Scope of Work

The Scope of works under this clause covers concrete works (PCC and RCC) which shall consist of:

- Supply of all concrete constituents including reinforcements, labour, equipment, tools and plants, joint materials etc.
- Manufacturing, cooling, transporting, placing, consolidating, protecting and curing of concrete



- Constructing, erecting and dismantling of form work
- Placing materials for expansion and construction joints
- Placing reinforcements and embedded items.

The Contractor shall also provide all safety measures for the workmen and others as per standard practices and requirements and / or direction of the Engineer-in-Charge in execution of concrete works at his own cost and responsibility. However, approval given by the Engineer-in-Charge to the Contractor's methods and equipment shall not relieve the Contractor of his full responsibility for a proper and safe execution of concreting, or of liability for injuries to, or death of persons, or any obligations under this Contract.

4.2 Definitions

a. Fine aggregate (Sand)

Fine aggregate is defined as the part of aggregate having a maximum dimension of 4.8 mm.

b. Coarse aggregate

Coarse aggregate is defined as the part of aggregate having a minimum dimension of 4.8 mm and maximum of 40 mm.

c. Construction Joint

Concrete surfaces, upon or against which concrete is to be placed or where new concrete is to be adhered, that have become so rigid that the new concrete cannot be incorporated integrally with that previously placed are defined as construction joints.

d. Expansion or Contraction joint

All joints allowing relative movement of concrete structures with respect to an adjacent one, due to expansion, shrinkage, settlement of foundations etc. are to be considered expansion or contraction joints.

4.3 Submission

The Contractor shall perform the concrete works in accordance with the Specifications, the Drawings and the instructions of the Engineer-in-Charge. At **least seven (7) days** prior to commencement of the concrete work, the Contractor shall submit the details of materials of concrete and schedule of concreting to the Engineer-in-Charge for approval.

The approval given by the Engineer-in-Charge to the Contractor's plants and equipment or their operation or any construction method shall not relieve the Contractor of his full responsibility for the proper and safe execution of concrete work or any obligations under the Contract.

4.4 Materials

All materials like cement, aggregates, water, admixture, etc as would be required for production of concrete shall conform to the Specifications for Building & Road works, 2012, RGoB / IS Codes

4.5 Execution of Concrete Works

4.5.1 General Requirement



The concrete (Plain or RCC) to be produced and placed according to the Specifications, shall be of highest quality and uniformity. In all phases of operations, the Contractor shall be subject to strict inspection and tests to assure concrete of the best quality. Special emphasis shall be made on the uniformity of the concrete aggregates, water-cement ratio, consistency, air content and the temperature control of the concrete at the time of placement in the formwork, as well as the density and finishing when placed.

The Contractor shall be fully responsible for producing and maintaining the quality of concrete with especially compressive strength not inferior to the specified one, except if different instructions are given by the Engineer-in-Charge.

The Engineer-in-Charge shall have the right to reject concrete in any of the following events:

- (i) When mixing operations have not been started within thirty (30) minutes after the cement is added to the aggregates or,
- (ii) when more than fifteen (15) minutes have elapsed between the discharging of the mixer and the actual placing of the concrete, without agitating the concrete mix or,
- (iii) when more than one (1) hour has elapsed between the adding of the cement to the aggregates, and the actual placing of the concrete.

The Engineer-in-Charge reserves the right to specify a lesser time, if hot weather or other conditions cause quick stiffening of the concrete.

None of the concrete rejected by the Engineer-in-Charge shall be utilized in any of the permanent works. The re-tempering of concrete, which has partially hardened, that is, remixing with or without additional cement, aggregate or water shall not be permitted.

4.5.2 Execution of Plain Concrete Works (PCC)

4.5.2.1 Mixing of Concrete

Mixing of concrete shall be done by volume measure in the proportion as specified in the drawing and / or as directed by the Engineer-in-Charge. Boxes of suitable size shall be used for measuring sand and aggregates. The internal dimensions of the boxes shall be generally 35x25x40 cm deep or as otherwise approved by the Engineer-in-Charge. The unit of measurement for cement shall be a bag of 50 kg and this shall be taken as 0.035cum.

While measuring the aggregates, shaking ramming or heaping shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowance for bulking shall be made by adopting the method prescribed under "Mandatory tests".

Mixing shall be done in mechanical mixers. Mixing by hand shall be employed only in special cases with the specific prior permission of the Engineer-in-Charge. Stone aggregate shall be washed with water to remove dirt, dust or any other foreign materials, where necessary before putting into the mixer.

a. Machine Mixing

Before starting mixing in a mixer, the mixer drum shall be flushed clean with water. Measured quantity of dry coarse aggregate shall be placed in the skip followed by measured quantity of fine aggregate and then cement. In case damp sand is used, add half of the quantity of coarse



aggregate followed by cement and sand. Finally add balance quantity of the coarse aggregate. The skip shall be raised and dry materials slipped into the drum. The dry materials shall be mixed for at least four turns of the drum, after which the correct quantity of water shall be added gradually while the drum is in motion, to ensure even distribution with the dry material. The total quantity of water for mixing shall be introduced before 25% of mixing time has elapsed and shall be regulated to achieve the specified water- cement ratio. The materials shall be mixed for a period of not less than 2 minutes and until a uniform colour consistency is obtained. The time shall be counted from the moment at all the materials have been put into the drum.

The complete contents of the mixed concrete shall be emptied before recharging. When the mixer closed for the day or at any time exceeding 20 minutes, the drum shall be flushed clean.

b. Hand Mixing

Hand mixing shall be done on a smooth, clean and water-right platform of suitable size in the following manner.

- a) Measured quantity of sand shall be spread only
- b) The cement shall be dumped on the sand and distributed evenly
- c) The sand and cement shall be mixed intimately with spade, turning the mixture over and over again, until it is of even colour throughout and free from streaks.
- d) The sand cement mixture shall be spread out and measured quantity of coarse aggregate shall be spread on its top. Alternatively the measured quantity of coarse aggregate shall be spread out and the same cement mixture shall be spread on its top.
- e) The above materials shall be mixed at least three times by shoveling and turning over by twist from center to side, then back to the centre and again to the sides.
- f) A hollow shall be made in the middle of the mixed pile.
- g) Three quarters of the total quantity of water required shall be added while the material is turned in towards the centre with spades. The remaining water shall be added by water can fitted with rose head, slowly turning the whole mixture over and again until a uniform colour and consistency is obtained throughout the pile.
- h) The mixing platform shall be washed at the end of the day.

4.5.2.2 Consistency and Slump of Concrete

Concrete shall be of a consistency and workability suitable for the conditions on the job. For most concrete a "plastic" mix is required, which will not crumble, but will flow sluggishly when vibrated, without segregation.

The quantity of water to be used for each mix of 50 kg cement , to give the required consistency shall not be more than 34 litres for 1:3:6 mix, 30 litres for 1:2:4 mix, 27 litres for 1:1.5:3 mix and 25 litres for 1:1:2 mix. In the case of vibrated concrete, such limits specified may be suitably reduced to avoid segregation. The quantity of water shall be regulated by carrying out regular slump tests.

Slump tests shall be performed in accordance with the "Standard Method of Slump Test for Consistency of Portland Cement Concrete"- **IS-515**.The Engineer-in-Charge may require to



adopt a stiffer consistency than that specified wherever concrete of such consistency can be poured and be compacted easily by vibrators.

Wherever the limits for consistency and/ or slump are exceeded, the concrete shall be rejected and removed at the Contractor's expense. The slumps as given in the Table 4.1 shall be adopted for different kinds of work:

Table -4.1
Limit of Slump for Plain Concrete

Works	Slump in mm	
	Vibrator Used	Vibrator not used
Mass concrete in foundation, etc	10-25	50-75
Thin sections of flooring less than 75 mm thickness	25-40	75-100

4.5.2.3 Strength of Concrete

The compressive strength on work tests for different mixes shall be as given in the table 4.2

Table - 4.2
Compressive Strength of Concrete

Mix	Compressive strength in Kg./sq.cm	
	At 7 days	At 28 days
1:1:2	210	315
1:1.5:3	175	265
1:2:4	140	210

4.5.2.4 Placing of Concrete

The entire concrete to be used in the work shall be laid gently (not thrown) in layers not exceeding 170 mm and shall be thoroughly vibrated by means of mechanical vibrators till a dense concrete is obtained. The Engineer-in-Charge may however relax the condition specifying use of mechanical vibrators at his discretion for certain items depending upon the thickness of the members and feasibility of vibrating the same and permit hand compaction.

Hand compaction shall be done with the help of tamping rods so that the concrete is thoroughly compacted and completely worked into the corners of the formwork. The layers of concrete shall be so placed that the bottom layer does not finally set before the top layer is placed.

Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to the dry mixture. For items where the vibrators are not to be used, it shall be the duty of the Contractor to take the permission of the Engineer-in-Charge before the start of work.



During cold weather, concreting shall not be done when the temperature falls below 4.7⁰ C. The concrete placed shall be protected against frost by suitable covering. Concrete damaged by frost shall be removed and work redone. During hot weather, precaution shall be taken to see that the temperature of wet concrete does not exceed 38⁰ C.

When the placing of concrete is suspended, necessary removal of laitance and roughening the surface for jointing future work shall be done before the concrete sets. When the work is resumed the previous work must be thoroughly cleaned, roughened, watered and a grout of neat cement slurry of the proportion, 1 kg of cement per litres of water applied uniformly.

4.5.3 Execution of Reinforced Concrete Works (RCC)

4.5.3.1 General Requirement

The production of concrete for RCC works shall be as specified under concrete works (plain), vide **para-6.5.2**. Concrete shall be always mixed by mechanical mixer unless otherwise the Engineer-in-Charge permits hand mixing.

4.5.3.2 Fabrication of Reinforcements

a. General

The reinforcements, in general, shall be of Fe 500 grade, unless otherwise specified. The Contractor shall fabricate reinforcing steel to the dimensions and configurations as shown on the Drawings or as approved by the Engineer-in-Charge.

b. Bending

All bars shall be cut to the lengths and bent in accordance with IS: 2502 the bar bending schedules as approved by the Engineer-in-Charge.

Bars shall not be pre-heated for bending. Once bent, bars shall not be straightened or re-bent. Bending of bars protruding from matured concrete for the purpose of clearing embedded items shall be carried out only with the approval of the Engineer-in-Charge.

c.Placing of Reinforcements

Before the reinforcement bars are placed, the surfaces of the bars shall be cleaned of flaky rust, oil, or other foreign substances that are harmful to the bonding of reinforcement bars with concrete. Reinforcement bars shall be accurately placed in the position as shown on the Drawings or directed by the Engineer-in-Charge, and special care shall be exercised to prevent the reinforcement bars from being displaced during the placement of concrete.

Intersecting points and splices of the reinforcement bars shall be fixed by using suitable clips or annealed wires, the diameter of which shall be more than 0.7 mm. The reinforcement bars in structures shall be placed and supported by use of precast spacer blocks to ensure required cover between the reinforcement bars and the shutters. Unless otherwise shown or approved, the minimum cover of concrete to reinforcing steel shall be as in **Table 4.3**.



Table 4.3
Minimum Cover of Concrete to Reinforcement Steel

Condition of Placement	Minimum cover (mm)
Structures exposed to weather, backfill or submerged but accessible. - DB 17 and smaller bars	40
Structures not exposed to weather or not in contact with ground - beams, girders and columns principal reinforcing steel, ties, stirrups and spirals	40
Upper-structure of buildings - beams, girder, columns and slabs without finishing - slabs with finishing	30 20
Sub-structure of buildings: - beams, girders, columns, and slabs - footing	40 50

d. Splicing of Reinforcements

The number of splices shall be kept to a minimum. Location and length of lap splices shall be in accordance with "IS Standards" (IS-456-2000 / SP-34).

e. Tolerance for Placing Reinforcing Steel

Unless otherwise required by the Engineer-in-Charge, reinforcement shall be placed within the following tolerances:

- (a) For effective depth of 200 mm or less \pm 5 mm
- (b) For effective depth more than 200 mm \pm 15 mm

The overall shall, in no case, be reduced by more than one-third of specified cover or 5 mm whichever is less.

4.5.3.3 Consistency of RCC

The concrete, which will flow sluggishly into the forms and around the reinforcements without any segregation of coarse aggregate from the mortar, shall be used. The consistency shall depend on whether the concrete is vibrated or hand tamped. It shall be determined by slump test as prescribed in mandatory test. The slumps of concrete for different types of RCC works shall be given in Table-4.4, unless otherwise specified.



Table-4.4
Limit of Slump for Reinforced Concrete

Sr. No	Work	Slump (in mm) Vibrators	
		Used	Not used
1	Mass concrete in R.C.C. foundation footings, and retaining walls.	10-25	80
2.	Beams, slabs and columns, simply reinforced.	25-40	100-125
3.	Thin R.C.C. section or section with congested steel	40-50	125-150

4.5.4 Form Work

a. Centring and Strutting

Props used for centring shall be steel, timber posts, ballies or any other material approved by Engineer-in-Charge. In no case ballies shall be of diameter less than 100 mm measured at mid length and 80 mm at thin end. Maximum permissible spacing shall be 1.2 m centre to centre. Ballies shall rest squarely on wooden sole plates of 40mm thickness and minimum bearing area of 0.1 sq.m laid either on ground or on 40x40 cm brick masonry pillars in mud mortar of height not exceeding 40 cm. Double wedges shall further be provided between the sole plates and the wooden props so as to facilitate tightening and easing of shuttering without jarring the concrete. In case brick masonry pillar of adequate section are used instead of props, wooden sole plates shall be provided at the top of pillars and double wedges inserted between the sole plate and the bottom of shuttering.

b. Shuttering

The shuttering shall have smooth and even surface and the joints shall not permit leakage of cement grout. Timber used shall be well seasoned, free from loose knots, projecting nails, splits or other defects that may mar the cement surface of concrete. It shall not be so dry as to absorb water from the concrete and swell and bulge, or so green or wet as to shrink after erection. Species of timber that are not affected appreciable by its contact with water shall be used. The timber shall be accurately sawn and planned on the sides and the surface coming in contact with concrete. For exposed concrete faces, timber for shuttering shall be wrought on all faces in contact with concrete.

Wooden formwork with metal sheet lining of steel plates stiffened by steel angles shall also be permitted. Where metal forms are used, all bolts and nuts shall be countersunk and well ground to provide a smooth plane surface. The chamfers, beveled edges and moulding shall be made in the formwork itself. Opening for an clamps and other fittings connected with services shall be provided in the shuttering as directed by the Engineer-in-Charge. As for as practicable, clamps shall be used to hold the forms together. Where use of nails is unavoidable minimum number of nails shall be used and these shall be left projecting so that they can be easily withdrawn. Use of double head nails shall be performed.



c. Surface Treatment for Shuttering

The surfaces of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution, raw linseed oil, form oil of approved manufacturer or any other approved material (such as polythene/polyethylene sheets), to prevent adhesion of concrete to form work. Soap solution, for the purpose shall be prepared by dissolving yellow soap in water to get the consistency of paint. Inside surface of forms shall be thoroughly cleaned before application or any of the materials mentioned above. Release agents shall be applied strictly in accordance with the manufacturer's instruction and shall not be allowed to come in contact with any reinforcement. Re-use of the shuttering shall be permitted only after the inside surface has been thoroughly cleaned in the manner described above.

Contractor shall give the Engineer-in-Charge due notice before placing any concrete in the forms to permit him to inspect and accept the form work as to its strength alignment and general fitness, but such inspection shall not relieve the Contractor of his responsibility for safety of workman, machinery, materials and for results obtained.

d. Removal of Form Work

No formwork of any part thereof shall be removed without prior approval of the Engineer-in-Charge. The formwork shall be so removed as not to cause any damage to concrete due to shock or vibration. In a slab and beam construction, sides of beam shall be stripped first, then the under sides of slab and lastly the underside of the beam. Formwork must be so designed that they can be stripped in the order required i.e.

- a) Shutters to vertical (non load bearing) faces e.g. column boxes, beam sides, wall forms,
- b) Shutters forming soffits to slab, horizontal and inclined which carry only light load, e.g. slab, roofs, floors and canopies etc.
- c) Soffit shutters carrying heavy load e.g. beam and girder bottoms.
- d)

The whole of the formwork should be planned and a definite scheme of operation worked out. In no circumstances should forms be struck until the concrete reaches strength of atleast twice the stress of which the concrete may be subjected at the time of striking. Where possible the formwork should be left longer as it would assist curing. Forms should be eased carefully in order to prevent the load being suddenly transferred to concrete. The period that shall elapse after the concrete has been laid, before easing and removal of centring and shuttering is undertaken shall be as given in **Table -4.5**.



Table -4.5
Minimum period of Removal of Form works

Type of formwork	Minimum period before striking formwork
Vertical formwork to columns, walls and beams	15-24 h
Sofit formwork to slabs (props to be refixed immediately after removal of formwork)	3 days
Sofit formwork to beams (props to be refixed immediately after removal of formwork)	7 days
Props to slab spanning upto 4.7m	7 days
Props to slab spanning over 4.7 m	14 days
Props to beam and arches spanning upto 7 m.	14 days
Props to beams and arches spanning over 7 m	21 days

Notes:

1. For rapid hardening cement, 3/7 of the above period will be sufficient in all cases except for vertical sides of slabs, beams and columns which should be retained for atleast 24 hours.
2. In case of cantilever slabs and beams, the centering shall remain till structures for counter acting or bearing down have been erected and have attained sufficient strength.
3. Proper precautions should be taken to allow for the decrease in the rate of hardening that occurs with all cements in cold weather.
4. Work damaged through premature or careless removal of forms shall be reconstructed.

4.6 Measurement and Payment

4.6.1 Measurements and Payment for Concrete

4.6.1.1 Measurements for Concrete

The concrete work under the following categories shall be measured separately:

- a) From foundation to plinth level
- b) From plinth level to all heights
- c) Concrete work at the parapet shall be measured together with the corresponding work in the wall of the storey next below.

The consolidated cubical contents shall be calculated net nearest to 0.01 cu.m. Concrete laid in excess, of the sections shown in the drawing unless directed by the Engineer-in-Charge shall not be measured.



Pre-cast cement concrete solid articles shall be measured separately and shall include use of moulds, finishing the top surfaces even and smooth with wooden trowel, before setting in position in cement mortar (1 cement: 3 coarse sand).

No deduction shall be made for:

- a) Ends of dissimilar materials (e.g. joists, beams, posts, girders, rafters, purlins, trusses, corbels, step etc.) upto 500 sq.cm in section.
- b) Opening upto 0.1 m² or as specified.
- c) Volume occupied by pipes, conduits, sheathing etc. not exceeding 100 sq. cm each in cross sectional area.
- d) Volume occupied by reinforcements

4.6.1.2 Payment for Concrete

Payment for concrete works shall be made at Unit Rates tendered in the Bill of Quantities. The Unit rate shall include the cost for carrying out all the required operations including the cost of labour, materials equipment, tools and plants, and incidentals, etc , but excluding reinforcement and form work, necessary to complete the work.

4.6.2 Measurements and Payment for Formwork

4.6.2.1 Measurement for Formwork

Formwork shall be measured separately (i) upto foundation and plinth and (ii) above for each of the items as per Bill of quantities. All measurement shall be taken of the area of shuttering in contact with the concrete surface. Dimensions of formwork shall be measured correct to 10mm.

No deductions from the shuttering due to the openings/obstructions shall be made if area of such opening/obstructions does not exceed 0.1 sq.m. Nothing extra shall be paid for forming.

4.6.2.2 Payment for Form works

Payment for form work which includes centering and strutting for all heights, shall be paid separately at Unit Rates tendered for the items specified in Bill of Quantities. Where it is not specially stated in the description of the item that formwork shall be paid for separately, the rate of the R.C.C. item shall be deemed to include the cost of formwork.

The Unit rate for form work shall include the cost of labour, materials, tools and plants and all incidentals required for all operations including supporting the members until the concrete is cured, set and hardened as required. No separate payment shall be made for items such as form releasing agent, connections, provisions for openings and other items required for completion of the work unless specified otherwise.

4.6.3 Measurement and Payment for Reinforcements

4.6.3.1 Measurement for Reinforcement

Measurement for reinforcing bars will be made for actual lengths of reinforcement bars including permissible hooks, bends and splices will be measured. The weight of reinforcing bars will then be calculated for each size of bar from the unit weight as stated on the certified copies of manufacturer's reports, which the Contractor shall submit to the Engineer-in-Charge or



otherwise standard weights per metre for each size of bars as provided in the Steel Tables shall be used.

Before starting concreting, the Contractor shall make sure that the measurements of reinforcing bars placed in position have been recorded and that the Engineer-in-Charge has certified the correctness of the reinforcement used.

4.6.3.2 Payment for Reinforcements

Payment for reinforcements shall be made at the unit rate per kg tendered in the Bill of Quantities, which shall include the entire cost of supply, taxes, handling, storage, cutting, bending, placing, wire clips, ties, separators and any other fastening devices.

No separate payment will be made for the following, which shall be included in the quoted unit price:

- (a) Wire for tying reinforcement.
- (b) Any additional reinforcement or splices required when Contractor's casting sequence differ from construction joints shown on the drawings
- (c) Any reinforcement steel placed by the Contractor for his own convenience in addition to those shown on the drawings.
- (d) Devices like steel chairs, hangers, spacers, small spacer concrete blocks, other supports, ties and anchor rods etc. used to maintain reinforcing steel in position.
- (e) Any reinforcing steel delivered for testing.
- (f) Carrying out tests for checking butt welds to replace lapping/ splicing of reinforcing bars.
- (g) Carrying out tests to verify quality of steel reinforcement to be used as required and directed by the Engineer-in-Charge.

5.0 STEEL WORK

5.1 Scope of Work

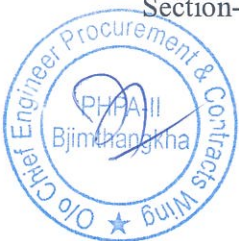
This clause shall include all works in connection with structural steel works like steel column, beams, plates, etc as shown in the Drawings or as specified hereafter and / or as directed by the Engineer-in-Charge. The work shall consist of supply of all materials, transportation, fabrication, erection, storage, painting, inspection, and quality control including loading and unloading, protection from damages and all other allied works as required.

5.2 Submission

At least **thirty (30) days** prior to commencing the work, the Contractor shall submit to the Engineer-in-Charge the following documents for his approval:

Complete shop drawings supported by structural computations of all structural steel work showing sizes, type and grade of metal, method of assembly, hardware and anchorage or connection with the main structures.

Mill sheets or certificates of materials which are based on the tests performed in the steel maker or an approved independent laboratory shall be submitted to the Engineer-in-Charge.



Work schedule for shop fabrication, transportation, field fabrication, erection at the site and other necessary items related to the work.

5.3 Material for Steel Work

Except as otherwise specified, all materials in general, for the work under this clause shall be new, free from defects and imperfections and conform to the following standards or equivalent (Table-5.1):

**Table-5.1
Relevant Standards for Steel Structural Materials**

Material	Standards
Angle steel, Channel steel, H-steel	IS 800:2007 & IS 2062, IS 808
Steel plate	IS 808, 3954, 5986
Steel pipe	IS 3589, 6631
Round steel bar:	IS 1786, 432
Steel deck plate	IS 3502
Light gauge steel	IS 979
High strength bolt:	IS 3757
Medium finished bolt	BIS 1363
Welding rod	IS 6419
Stud bolt	IS 1862
Ready mixed Red oxide Paint	IS 2074

5.4 Fabrication

5.4.1 Straightening, Shaping and Cutting

The steel sections as required shall be straightened and cut as required to correct lengths measured with a steel tape. The cut ends exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length of a member. All straightening and shaping to form shall be done by pressure. Bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. A shop drawing giving complete information for fabrication of the component parts of the structure including the location, type, size, length and details of rivets, bolts or welds, shall be prepared in advance of actual fabrication and approved by the Engineer-in-Charge. The drawing shall indicate the shop and field rivets, bolts and welds. The steel members shall be distinctly marked or stenciled with paint with the identification marks as given in the shop drawings.

Great accuracy shall be observed in fabrication of various members so that these can be assembled without being unduly packed, strained or forced into position and when built up, shall be true and free from twist, kinks, buckles or open joints. Wooden or metal sheet templates shall be made to correspond to each member and rivet holes shall be marked accurately on them and drilled. The templates shall be laid on the steel members and holes for riveting and bolting marked on them. The ends of the steel members shall also be marked for cutting. All stiffeners shall be formed by pressure and where practicable, the metal shall not be cut and welded in making these.



5.4.2 Making Holes

Holes shall be drilled with a bit at right angles to the surfaces, and shall not be made or enlarged by burning holes. All bolt holes shall be clean-cut without any burrs or ragged-edges resulting from drilling. When loose bolt holes are employed, the shape of loose bolt holes shall be shown on the drawings or as directed by the Engineer-in-Charge. Diameters of holes provided for insertion of bolts shall be as in Table-5.2.

Table-5.2

Nominal diameter of Bolt (D)	Diameter of Bolt Hole
More than 20 mm	D + 1.5 mm
Not more than 20 mm	D+ 1.0mm

5.4.3 Assembly

Before making holes in individual members for fabrication, the steel work intended to be riveted or bolted together shall be assembled and clamped properly and tightly so as to ensure close abutting or lapping of the surfaces of the different members. All stiffeners shall bear tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or dressed true and straight and fitted close together. Web plates of girders which have no cover plates, shall have their ends flush with the tops of angles unless otherwise required. The web plates, when sliced, shall have clearance of not more than 5mm. The erection clearance for cleated ends of members connecting steel to steel shall preferably be not greater than 1.5mm. The erection clearance at the ends of beams without web cleats shall not be more than 3mm at each end but where for practical reasons, greater clearance is necessary suitably designed seating shall be provided.

Butt joints of struts and compression members depending on contact for stress transmission shall be accurately machined and close-buttet over the whole section. Connecting angles or channels shall be fabricated and placed in position with great accuracy so that they are not unduly reduced in thickness by machining. The ends of all bearing stiffeners shall be machined on ground to fit tightly both at top and bottom.

5.4.4 Bolting

The nominal length of the bolt shall be the distance from the underside of the head to the further end of the shank. The nominal diameter of the bolts shall be the diameter at the shank above the screwed threads. Bolts, nuts and washers shall be thoroughly cleaned and dipped in double boiled linseed oil, before use. All bolt heads and nuts shall be hexagonal unless specified otherwise. The screw threads shall conform to IS- 1363 and the threaded surface shall not be tapered. The bolts shall be of such length as to project at least two clear threads beyond the nuts when fixed in position and these shall fit in the holes without any shake. The nuts shall fit in the threaded end of bolts properly.

Where necessary, washers shall be tapered or otherwise suitably shaped to give the heads and nuts of bolts a satisfactory rearing. The threaded portion of each bolt shall project through the nut at least one thread. In all cases where full bearing area of the bolt is to be developed, the bolt shall be provided with a washer of sufficient thickness under the nut to avoid any threaded portion of the bolt being within the thickness of the parts bolted together. Where there is risk of the nuts being removed or becoming loose due to vibration or reversal of stresses, these shall be



secured from slackening by the use of lock-nuts, spring washers or cross-cutting as directed by the Engineer-in-Charge.

5.4.5 Welding

Welding shall be done by electric process as per IS-816 and IS-823. Gas welding shall not be permitted. Welding shall be done as shown in the shop drawings, which should clearly indicate various details of the joint to be welded, type of welds, shop and site welds as well as the types of electrodes to be used. Symbol for welding on plans and shop drawings shall be according to IS-813.

As far as possible every effort shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions on scaffolding, etc apart from the aspect of economy. The max. diameter of electrodes for welding any work shall be as per IS-814 and Appendix-B of IS-823. Joint surfaces which are to be welded together shall be free from loose mill scale, rust, paint, grease or other foreign matter, which adversely affect the quality of weld and workmanship.

5.5 Erection

Steelwork shall be hoisted and erected in position carefully, without any damage to itself, other structure and equipment and injury to workmen. The method of hoisting and erection, proposed to be adopted by the Contractor, shall be got approved from the Engineer-in-Charge. The Contractor, however, shall be fully responsible for the work being carried out in a safe and proper manner without unduly stressing the various members. Proper equipment such as derricks, lifting tackles, winches, ropes, etc shall be used.

The work may be erected in suitable units as may be directed by the Engineer-in-Charge. Fabricated members shall be lifted at such points as to avoid the deformation or excessive stress in members. The structure or the part of it placed in position shall be secured against overturning or collapse by suitable means. During execution, the steel work shall be securely bolted or otherwise fastened and when necessary, temporarily braced to provide for all loads to be carried safely by the structure during erection including those due to erection equipment and its operations. The steelwork shall be placed in proper position as per approved drawing. Final riveting or permanent bolting shall be done only after proper alignment has been obtained.

Trusses shall be lifted only at the nodes and shall not be slinged at the apex, as it will develop compression stresses in the bottom tie member. They shall be lifted by sling at two mid-points of rafters, which shall be temporarily braced by a wooden member of a suitable section. After the trusses are placed in position, purlins and wind bracing shall be fixed as soon as possible. The end of the truss, which faces the prevailing winds, shall be filled with holding down bolts, and the other end kept free to move.

5.6 Measurement and Payment

5.6.1 Measurement and Payment for Structural Steel

Measurement for payment of structural steel shall be based on weight in kg. Quantity shall be computed according to the approved shop drawings. All materials including high strength bolt, stud bolt, anchor bolt, medium finished bolt, deckplate and other steel parts shall be measured. Weight of grout mortar, rust resistance paint and other materials which are not steel but



necessary for the work shall not be counted in the quantity. Scraps produced at manufacturers or site during the fabrication of steel member except bolt holes shall not be included in the quantity.

Payment for structural steel shall be made at the relevant unit prices in the Bill of Quantities. The unit prices shall include all labour, materials, tools, construction equipment and any other incidental costs for shop fabrication, transportation, storage, erection, field retouch painting, inspection, quality control and other auxiliary works such as mortar grout, scaffoldings, preparation of surfaces of embedded parts, required shattering etc., to do the work as specified under this chapter, shown in the Drawings or as directed by the Engineer-in-Charge.

No separate payment shall be made for supply, preparations and application of rust resistant paint, galvanization and coating. All costs and efforts therefor shall be included in the unit prices. Anchors and other provisions required to attach metal parts temporarily to concrete shall not be measured for payment and will not be paid for.

5.6.2 Measurement and Payment for Roof Sheeting

The length and breadth of the roof shall be measured correct to 10 mm. Area shall be worked out in sq.m correct to two places of decimal. The superficial area of roof coverings shall be measured on the flat without allowance for laps and corrugations. Portion of roof coverings overlapping ridge or hip etc. shall be included in the measurements of the roof. Measurements shall be taken on the flat and not girth. No deduction in measurement shall be made for opening up to 0.4 sq.m. For any opening exceeding 0.4 sq.m in area, deduction in measurements for the full openings shall be made and in such cases the labour involved in making these openings shall be paid for separately. Cutting across corrugation shall be measured on the flat and not girth.

Payment for colour coated Galvanized sheet shall be made as per the unit rate in the Bill of Quantities. The Unit rate shall include the cost of all the materials and labour involved in all the operations and all the fittings & fixtures required for fixing of colour coated Galvanized sheet as directed and approved by Engineer-in-Charge.

The cost of the ridges / hips, gutters and wind ties shall be paid for separately as per the BoQ rates.

5.6.3 Measurement and Payment for Hardware Accessories

Measurement and Payment of the hardware accessories shall be made as per the BOQ rates. The rate shall include the cost of materials, screws and labour involved in all operations infixing in position, etc.

6.0 PAINTING AND POLISHING

6.1 Scope of Works

The Scope of works under this clause shall comprise of performance of all works necessary for finishing of walls both interior and exterior surfaces of plaster and painting, varnishing and /or French Polishing over wood work, structural and other miscellaneous steel items, external surfaces of the pipes, roof drains, service water pipes and other ferrous and non-ferrous metal items, etc.



The Scope of Works shall also cover for supply of all materials, labour, equipment, tools and plants, and all other incidentals etc as needed for performance of the work as per specification and / or direction of the Engineer-in-Charge.

6.2 General Requirement

Painting/ varnishing, etc shall not be started until the Engineer-in-Charge has inspected the items of work to be painted/ varnished, etc and satisfied himself about their proper quality and given his approval to commence the finishing works.

Painting/ varnishing, etc except the priming coat, shall generally be taken up in hand after practically finishing all other work. The rooms shall be thoroughly swept out and the entire building cleaned up at least one day in advance of the painting work being started. Painting of external surface should not be done in adverse weather conditions.

The Contractor shall provide all safety measures for the workmen and others as per standard practices and requirements and / or direction of the Engineer-in-Charge during all types of work at his own cost and responsibility. However, approval given by the Engineer-in-Charge to the Contractor's methods and equipment shall not relieve the Contractor of his full responsibility for a proper and safe execution of works, or of liability for injuries to, or death of persons, or any obligations under this Contract.

The Contractor shall also undertake all precautions to prevent damage, disfiguration or straining to work of other trades or other installations.

6.3 Submission

At least **fifteen (15)** days prior to commencement of finishing works, the Contractor shall submit the schedule, sequence and methodology of works, to the Engineer-in-Charge for approval. He shall also submit color samples, distempers and paints, etc with their specifications, to the Engineer-in-Charge for approval.

6.4 Standards and Codes

All distemping and painting/ varnishing works and the materials therefor, production, procedures of works, curing and testing, etc shall conform to the '**Specifications for Building and Road Works, 2025**: Royal Govt. of Bhutan' and /or relevant Indian Standards and Guidelines.

6.5 Materials

6.5.1 General

Materials for painting and varnishing, etc shall be highest grade products of well-known approved manufacturers and shall be delivered to the site in original sealed containers, bearing brand name, manufacturer's name and colour shade with labels intact and seal unbroken, in sufficient quantity. All materials shall be subject to inspection and approval by the Engineer-in-Charge. It is desired that the materials of one manufacturer only shall be used as far as practicable and paint of particular shade be obtained from the single batch

All prime coats shall be compatible to the material of the surface to be finished as well as to the finishing coats to be applied. All unspecified materials such as shellac, turpentine or linseed oil shall be of the highest quality available and shall conform to the latest Standards. All such



materials shall be made by reputed recognized manufacturers and shall be approved by the Engineer-in-Charge.

All colours shall be as per painting / finish schedule and timing and matching shall be done to the satisfaction of the Engineer-in-Charge. In such cases, where samples are required, they shall be executed in advance with the specified materials for the approval of the Engineer-in-Charge.

6.5.2 Water proof Cement Paint

Water proof Cement wash shall be made from best quality white cement and lime resistant colours with accelerators, waterproofing agents and fungicides.

6.5.3 Dry /Acrylic Distemper (Washable)

Dry / Acrylic distemper of required colour conforming to IS 427 / IS:428 and of approved brand and manufacturer shall be used. The primer where used shall be cement primer or distemper primer as approved by the Engineer-in-Charge. These shall be of same manufacturer as that of distemper.

6.5.4 Varnish / French Spirit Polish

Varnish conforming to IS 347 shall be of approved manufacturer. For French polish, pure shellac conforming to IS:16 varying from pale orange to lemon yellow colour, free from resin or dirt shall be dissolved in methylated spirit at the rate of 140 gm of shellac to 1 litre of spirit. Suitable pigment shall be added to get the required shade. Ready made polish conforming to IS:348 can also be used

6.5.5 Synthetic Enamel Paint

Paint to be used for various items of work shall be of best quality, conforming to IS 1932 and shall be obtained ready mixed in sealed containers from approved manufacturer. The Contractor shall obtain the approval of the Engineer-in-Charge for the make and colour of the paint he proposes to use.

6.6 Storage

The Contractor shall arrange for safe and proper storage of all materials and tools. Paints, etc shall be kept covered at all times, and mixing shall be done in suitable containers. All necessary precautions shall be taken by the Contractor against fire hazards.

6.7 Preparation of Surface

6.7.1 Preparation of Surface over Cement Plaster

The surface of the plaster shall not be painted until it has dried completely. Trial patches shall be laid at intervals and where drying is satisfactory, painting shall be taken up in hand. Surface shall be free from all oil, grease, efflorescence, mildew, loose paint or other foreign and loose materials.

Masonry cracks shall be cleared out and patch filled with mortar similar to the original surface and uniformly textured. Where this type of resurfacing may lead to the finishing paint being different in shade from the original surfaces, the resurfaced area shall be treated with minimum one coat of cement primer which should be continued to the surrounding area for a distance of minimum 100 mm.

Surface with mildew and efflorescence shall be treated as below:



a) Mildew

All mildew surfaces shall be treated with an approved fungicide such as ammoniacal wash consisting of 7g of copper carbonate dissolved in 80 ml liquid ammonia and diluted to 1 litre with water, or 2.5 per cent magnesium silico fluoride solution and allowed to dry thoroughly before paint is applied.

b) Efflorescence

All efflorescence shall be removed from affected surfaces with a solution of muriatic acid in water (1:6 to 1:8), washed fly with clear water and allowed to dry thoroughly.

6.7.2 Preparation of Wood Surface for Varnishing / Polishing / Painting

The surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots if visible shall be covered with a preparation of red lead and glue shall be laid on while hot. Holes and indentations on the surface shall be closed with glazier's putty or wood putty conforming to IS 419. The surface shall then be given a coat of wood filler made by mixing whiting (ground chalk) in methylated spirit at the rate of 1.5 kg of whiting per liter of spirit. The surface shall again be rubbed down perfectly smooth with sand paper and wiped clean.

6.7.3 Preparation of Metal Surface for Painting

All metal surfaces shall be absolutely clean, dry and free from wax, grease and soap films. All rust and scales shall be removed by scribing or by brushing with steel wire brushes. Hard skin of oxide formed on the steel and iron surfaces, which becomes loose by rusting shall be removed.

All galvanized iron surfaces shall be pretreated with a compatible primer according to the manufacturer's direction. Any abrasion in shop coat shall be touched up with the same quality of paint as the original coat. If the surface is wet, it shall be dried before priming coat is undertaken.

6.8 Application

6.8.1 General

The method of application in each case shall be as recommended by the manufacturer. In case of selection of special shades and colour (not available in standard shades) the Contractor shall mix different shades and prepare test panels of minimum size 1 metre square as per instruction of the Engineer-in-Charge and obtain his approval prior to application of finishing paints. Proper tools and implements shall be used. Scaffoldings if used shall be independent of the surface to be painted to avoid shade differences of the freshly repaired anchor holes.

Painting shall be done by skilled labours in a workman like manner. All materials shall be evenly applied, so as to free of sags, runs crawls or other defects. All coats shall be of proper consistency. In case of application by brush, no brush marks shall be visible. The brushes shall be clean and in good condition before application of paints. All priming undercoats for painting shall be applied by brush only, and rollers, spray equipments etc. shall not be used.

No work shall be done under conditions that are unsuitable for production of good results. No painting shall be done when plastering is in progress or is drying. Application of paint which seals the surface to moisture shall only be done after the moisture on and below the surface has dried out.



All coats shall be thoroughly dry before being sand papered or before the succeeding coat is applied. Coats of painting as specified are intended to cover surfaces perfectly. In case the surface is not covered properly by applying the specified number of coats, further coats shall be applied by the Contractor when so directed by the Engineer-in-Charge.

Finished coats shall be of exact colour and shade as per approved samples and all finish shall uniform in colour and texture. All parts of mouldings and ornaments shall be left clean and true to finish.

6.8.2 Application of Painting Priming Coat

Primer for plaster / wood work / Iron & Steel surface shall be as specified below:

Table-6.1
Specifications for Primer

Sr. No.	Surface	Primer to be used
1.	Wood work (hard and soft wood)	Pink conforming for IS:3536
2.	Resinour wood and plywood	Aluminium primer conforming to IS:3585
3.	Iron, Steel and Galvanized steel	Red Oxide Zinc chromate Primer conforming IS:2074
4.	Plastered Surfaces to receive paint finish.	Cement primer conforming to IS: 109

The primer shall be ready mixed primer of approved brand and manufacture or otherwise may be mixed at site. Where primer for wood work needs to be prepared at site, it shall be prepared from a mixture of red lead, white lead and double boiled linseed oil in the ratio of 0.7 kg : 0.7 kg : 1 litre. For steel work, primer shall be mixed at site from a mixture of red lead, raw linseed oil and turpentine in the ratio of 2.8 kg: 1 Litre : 1 Litre. The specifications for the base and thinner for mixed on site primer shall be as follows and shall be of approved manufacture and brought to site in their original packing in sealed condition:

a) White Lead

The White lead shall be pure and free from adulterants like barium sulphate and whiting. It shall conform to IS:103.

b) Red Lead

This shall be in powder form and shall be pure and free from adulterants like brick dust etc. It shall conform to IS:102.

c) Raw Linseed Oil

Raw Linseed oil shall be lightly viscous but clear and of yellowish colour with light brown tinge. Its specific gravity at a temperature of 30 degree C shall be between 0.923 and 0.928. The oil shall be mellow and sweet to the taste with very little smell. The oil shall be of sufficiently matured quality. Oil turbid or thick, with acid and bitter taste and rancid odour and which



remains sticky for a considerable time shall be rejected. The oil shall conform in all respects to IS: 75. The oil shall be approved brand and manufacture.

d) Double boiled Linseed oil

This shall be more viscous than the raw oil, have a deeper colour and specific gravity between 0.931 and 0.945 at a temperature of 30 degree C. It shall dry with a glossy surface. It shall confirm in all respects to IS: 77. The oil shall be of approved brand and manufacture.

e) Turpentine

Mineral turpentine i.e. petroleum distillate which has the same rate of evaporation as vegetable turpentine (distillate product of oleoresin of conifers) shall be used. It shall have no grease or other residue when allowed to evaporate. It shall conform to IS:533.

6.8.3 Application of Waterproof Cement Paint

Waterproof Cement painting shall be applied in two coats over one coat of priming. Waterproof Cement paint shall be mixed in such quantities as can be used up within an hour of its mixing. Avoid setting or thickening of the mix . Cement paint shall be mixed in two stages. The first stage shall comprise of 2 parts of cement paint and 1 part of water stirred thoroughly and allowed to stand for 5 minutes. The second stage shall comprise adding further one part of water to the mix and stirring thoroughly to obtain a liquid of workable and uniform consistency.

Surface to be coated with cement paint shall be washed and brushed down. As soon as the moisture has disappeared, the surface shall be given one coat of paint. Care shall be taken so that the paint does not dry out too rapidly. After 4 to 6 hours, the water shall be sprinkled over the surface to assist curing and prevent cracking. After the first coat has dried (24 to 48 hours), the second coat shall be applied. However, three or more coats of water proof cement paint may be necessary to get a uniform shade. Before application of the second or subsequent coats, the surface of the previous coat shall be not be wetted. In a similar manner the finished surface shall be kept moist by occasional sprinkling with water for seven days after painting. Waterproof cement paint shall not be applied on surface already treated with white wash.

6.8.4 Application of Dry Distemper / Acrylic Distemper (Oil bound)

The dry distemper shall be of approved colour, brand and manufacturer and shall be mixed in clean water using 0.6 litre of water per kg of distemper or as specified by the manufacturer. It shall then be allowed to stand for at least 30 minutes (or if practicable over night) before use. The mixture shall be well stirred before and during use to maintain an eve consistency. Distemper shall no be mixed in larger quantity than is actually required for one day's work. The dry distemper shall be applied in two coats over one coat of priming.

Before the work is distempered, the new plastered surface shall be allowed to dry for atleast two months. Before application of the distemper, the surface shall be thoroughly brushed free from mortar droppings and other foreign matter and sand papered smooth. Pitting in plaster if any shall be made good with plaster of pairs mixed with the colour to be used. The surface shall than be rubbed down again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The patched surface shall be allowed to dry thoroughly before the regular coat of distemper is applied.



A priming coat of whiting (white chalk, mixed with solutions of gum dissolved separately in hot water @ 2 kg of gum and 0.4 kg of copper sulphate per cum of whiting starry) shall be applied over the prepared surface and allowed to dry. No white washing coat shall be used as a priming coat for distemper.

After application of the priming coat, the entire surface shall be coated with the mixture of distemper uniformly, with proper distemper brushes in horizontal strokes followed immediately by vertical ones which together shall constitute one coat. The subsequent coat shall be applied only after the previous coat has dried. Two or more coats of distemper shall be applied to make the finished surface shall be even and uniform and shall show no brush marks.

Any varnish left over in the small container shall not be poured back into the stock tin, as it will render the latter unfit for use. Special fine haired brushes shall be used and not ordinary paint brushes. Brushes shall be well worn and perfectly clean.

6.8.5 Application of Varnish / French Polish

a. Application of Varnish

The varnish shall be applied in two coats over one coat of priming and shall be applied liberally with a full brush and spread evenly with short light strokes to avoid frothing. If the work is vertical, the varnish shall be crossed and recrossed and then laid off, later being finished on the upstrokes so that varnish, as it sets, flows down and eliminates brush marks, the above process will constitute one coat. If the surface is horizontal, varnish shall be applied in every direction, with light quick strokes and finish in one definite direction so that it will set without showing brush marks, in handling and applying varnish. Care should be taken to avoid forming froth or air bubbles. Brushes and containers shall be kept scrupulously clean.

Rubbing down and flating the surface shall be done after each coat except the final coat with fine sand paper. The work shall be allowed to dry away from draughts and damp air. The finished surface shall then present a uniform appearance and fine glossy surface free from streaks, blister, etc. Special fine haired varnishing brushes shall be used for the work.

b. Application of French Polish

Two coats of French polish shall be applied over one coat of priming. A pad of woolen cloth covered by a fine cloth shall be used to apply the polish. The pad shall be moistened with the polish and rubbed hard on the wood, in a series of overlapping circles applying the mixture sparingly but uniformly over the entire area to give an even level surface. A trace of linseed oil on the face of the pad facilitates this operation. The surface shall be allowed to dry and the remaining coats applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean fine cotton cloth slightly dampened with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall have a uniform texture and high gloss.

6.8.6 Application of Paints over Steel Work.

In general, painting work shall be in accordance with IS: 1477 (Part I & II) (Latest Revision). Surface of steel work to be painted shall be thoroughly cleaned of all grease, oil, dirt, rust, foreign matter like cement splashing, etc. by suitable solvent and mild rubbing with abrasive paper/hand scrapping to the full satisfaction of the Engineer-in-Charge. Cleaning with solvents/scrapping shall be limited to the affected area only.



In case where the existing primer is removed while cleaning the surface damaged portions shall be provided with a coat of wash or etching primer on suitable chemical pre-treatment solutions and another coat of red oxide, zinc chromate primer. The payment for red oxide primer will be made as per item of Bill of Quantities.

After the surface is prepared in a manner described above, the primer coat shall be dry cut without scratching or in any way damaging the primer coats and clean the surfaces from dust.

Over this dry surface apply an optimum coat of undercoating (synthetic enamel paint) by spray with minimum brush marks. Allow the film to dry hard, wet rub, cutting down to a smooth finish (ensuring that at no place the undercoat is completely removed). Allow the water to evaporate.

Finishing coats shall consist of two coats of synthetic enamel paint of approved colour and brand. Additional finishing coat, if found necessary shall be applied to ensure properly uniform glossy surface. The total dry film thickness of each shall be not less than 25 microns.

The paint shall be applied by brushing/spraying. Spraying shall be adopted with prior approval of Engineer-in-Charge generally on large surface areas. Paints shall be stirred frequently to keep the pigment in suspension. Paint shall be ready mixed in original sealed containers as packed by the paint manufacturers and no thinners shall be permitted. No painting shall be done in frosty/foggy rainy weather or when humidity is high enough to cause condensation on the surface to be painted. Paint shall not be applied when the temperature of the surface to be paint is 5°C or lower.

Contractor shall provide and use sufficient number of drops, clothes, covers, tarpaulins and other screens to protect adjacent surfaces and shall remove all splatter and stains from such surfaces. The Contractor shall also protect his own work. Any and all damage to adjacent work or any part of the premises due to painting carelessness or accidental performance of the Contractor shall be repaired or made good at the Contractor's expense.

Painting shall be discontinued when exposed to rain and dust storm and shall not commence until the surfaces are perfectly dry and clean. Wherever practicable, surfaces shall be painted when under shade or when temperature is falling.

6.9 Scaffolding

Wherever scaffolding is necessary, it shall be erected on double supports tied together by horizontal pieces, over which scaffolding planks shall be fixed. No ballies, bamboos or planks shall rest on or touch the surface being washed. For all exposed masonry, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces.

In case of special type of brick work, scaffolding shall be got approved by the Engineer-in-Charge in advance. Where ladders are used, pieces of old gunny bags shall be tied on their tops to avoid damages or scratches to walls. For white washing the ceiling, the proper stage scaffolding shall be erected.

6.10 Clean Up

All furniture, fixtures, glazing, floor, etc shall be protected by covering during finishing work. The Contractor, upon completion of white / colour washing, distemping or painting, etc. shall remove all marks and make good surfaces, where paint has been spilled or spattered, including all equipment, fixtures, glass, fittings, etc., to the satisfaction of the Engineer-in-Charge.



6.11 Acceptance Criteria

- i. All finished surfaces shall be uniform and pleasing in appearance.
- ii. The colour, texture, etc. shall match exactly with approved samples.
- iii. All stains, splashes and splatters of white / colour wash, distemper or paint shall be removed from surrounding surfaces

6.12 Measurement and Payment

Measurement and payment for each of the finishing work shall be made separately at the unit rates based upon the area measured in sq.m, except when otherwise stated. Small articles not exceeding 0.1 sq.m of painted surfaces where not in conjunction with similar painted work shall be enumerated.

Painting up to 15 cm in width or in girth and not in conjunction with similar painted work shall be given in running metres. Components of trusses, and similar work shall, however be given in sq. metres irrespective of the size or girth of members.

In measuring painting, polishing etc. of plastering / wood work or steel work etc., the coefficient as mentioned in Table (Page 351) in the **Specifications for Building and Road works, 2025** will be adopted.

Painting of rain water, soil, waste, vent and water pipes etc shall be measured in running metres of the particular diameter of the pipe concerned. Piping of specials such as bends heads, branches, junctions, shoes etc. shall be included in the length and no separate measurements shall be taken for these or for painting brackets, clamps etc.

The unit rates shall include the cost of material, labour, treatment, tools and all other allied works/ operations necessary for performance of the finishing works, complete as per specification and / or direction of the Engineer-in-Charge.

7.0 FENCING WORKS

7.1 Fencing with iron angle posts

The spacing of posts shall be 3.0m centre to centre of the posts, unless otherwise specified. The minimum length of posts shall be 1.8 m or as specified in the description of the item and that of struts being minimum 2.0 m. Spacing of struts: Every 15th, last but one end post and corner post shall be strutted on both sides and end post on one side only.

7.2 Fixing of posts and struts

Pits 45 x 45 cm and 75 cm deep or as directed shall first be excavated, true to line and level to receive the posts. In case of struts pits 70 x 45 x 75 cm deep or as directed shall be excavated to suit the inclination of the strut so that it is surrounded by concrete by not less than 15 cm at any point. The portion of the posts and struts to be embedded in concrete shall be coal tarred two coats before fixing while the visible portion shall also be coal tarred two coats unless otherwise specified after fixing barbed wire. Struts shall be fixed to posts by means of spikes of suitable size. The pits shall be filled with a layer



of 15 cm thick cement concrete 1:5:10 (1 cement: 5 fine sand: 10 graded stone aggregate 40 mm nominal size). The posts and struts shall then be placed in the pits, the posts projecting 1.2 m or to the specified height above ground, true to line and position and cement concrete 1:5:10 filled in up to 15 cm for posts and 25 cm for struts below ground level to the top of the concrete so that the posts are embedded in the cement concrete block of size 45 x 45 x60 cm and struts in block of size 70 x 45x 50 cm. The concrete in foundations shall be watered for at least 7 days to ensure proper curing. The remaining portions of pits shall be filled up with excavated earth and the surplus earth disposed off as directed by the Engineer and site cleared.

7.3 Fixing of mesh

The mesh shall be stretched and fixed to posts by means of G.I. staples in case of R.C.C posts and to the iron angle posts it shall be fixed by appropriate welding. The mesh shall be fixed at every 30 cm or as directed by the Engineer. The mesh shall be painted with aluminium paints unless otherwise specified or directed. Before the paint is applied the mesh shall cleaned off any rust, etc.

7.3.1 Measurement:

The length and breadth of the mesh shall be measured correct to a cm for the finished work and area calculated correct to two places of decimal from centre to centre of the posts.

7.3.2 Rate:

The rate shall be in sq.m of the wire mesh fixed to post including fixing of post, staples etc. complete but excluding the cost of posts, struts, and excavation, concrete in foundations for which separate payments shall be made under respective items.

7.4 Fixing of barbed wire:

The barbed wire shall be stretched and fixed in number of rows as specified and diagonals, the bottom row shall be 15 cm above ground and the rest at 20 cm centre to centre. The diagonals, if any shall be stretched between adjacent posts from top wire of one post to the bottom wire of the 2nd post. The barbed wire shall be fixed to posts by means of G.I. staples.

7.4.1 Measurement:

The length of each wire shall be measured correct to a cm for the finished work, from centre to centre of the posts.

7.4.2 Rate:

The rate shall be in running metres of barbed wire fixed, longitudinal/diagonal including fixing of post, coal tarring but excluding the cost of posts, struts, and excavation, concrete in foundations for which separate payments shall be made under respective items.



SECTION VI – FORMS



PROFORMA FOR AGREEMENT

[The successful Bidder shall fill in this form in accordance with the instructions indicated]

THIS AGREEMENT MADE the _____ day of _____ BETWEEN Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) _____ of (Mailing address of PHPA-II) _____ (hereinafter called "the PHPA-II") of the one part and (Name of Contractor) _____ of (Mailing address of Contractor) _____ (hereinafter called "the Contractor") of the other part.

WHEREAS the PHPA-II is desirous that *[Insert Name of work]* (Herein after referred to as "the Work") should be executed by the Contractor AND WHEREAS by a Letter of Award No. _____ dated _____ the PHPA-II has accepted a Bid by the Contractor for the execution and completion of such Works AND WHEREAS the Contractor has agreed to undertake such work and furnish a performance security pursuant to the Clause 36 of the section 'Instructions to Bidders.'

NOW THIS AGREEMENT WITNESSETH as follows;

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz;
 - a) The Agreement
 - b) The Letter of Award
 - c) Corrigendum/Amendments, if any
 - d) Documents furnished by bidder
 - e) Notice Inviting Tender (NIT)
 - f) Instructions to Bidders (ITB)
 - g) Bid Data Sheet (BDS)
 - h) General Conditions of the Contract (GCC)
 - i) Special Conditions of Contract (SCC)
 - j) Technical Specifications (TS)
 - k) Bill of Quantities
 - l) Drawings



- m) Any other documents as forming part of the contract
- 3. The aforesaid documents shall be taken as complementary and mutually explanatory of one another.
- 4. In consideration of the payment to be made by the PHPA-II to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the PHPA-II to execute and complete the Works in conformity, in all respects, with the provisions of the Contract.
- 5. The PHPA-II 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 time and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused their respective common Seals to be hereunto affixed (or have hereunto set their respective hands and Seals) the day and year first above written.

SIGNED, SEALED AND DELIVERED

By the said

By the said

Name _____

Name _____

on behalf of the Contractor in the presence of:

on behalf of the PHPA-II in the presence of

Name _____

Name _____

Address _____

Address _____



PROFORMA FOR BANK GUARANTEE FOR PERFORMANCE SECURITY

[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated]

To

The Punatsangchhu-II Hydroelectric Project Authority,
_____ (Address of PHPA-II)

WHEREAS (Name and Address of Contractor) _____ (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute (Name of Contract and Brief Description of Works) _____ (hereinafter called "the Contract").

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

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

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of Rs./Nu. _____ (Amount of Guarantee) (in words to be inserted by the Guarantor), representing the percentage of the Contract Price, specified in the Contract, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Rs./Nu. _____ (Amount of Guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

This guarantee is valid until the date of 30 days after issuing of the Completion/Taking over Certificate.

SIGNATURE AND SEAL OF THE GUARANTOR



PROFORMA FOR BANK GUARANTEE FOR BID SECURITY

[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated]

To

The Punatsangchhu-II Hydroelectric Project Authority

_____ (Insert Address of PHPA-II)

WHEREAS, (Insert name of Bidder) _____ (hereinafter called "the BIDDER") has submitted his bid dated (_____ for the work of (Name of Contract) _____ (hereinafter called "the Bid").

KNOW ALL MEN by these presents that we (Insert name of Bank) _____ of (Name of Country) _____ having our registered office at _____ (hereinafter called "the Bank") are bound unto the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) in the sum of _____ for which payment well and truly to be made to the PHPA-II the Bank binds himself, his successors and assigns by these presents.

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

THE CONDITIONS of this obligation are;

- i) If the Bidder withdraws his Bid during the period or bid validity.
- ii) Correction of Bid Price is not accepted by the bidder.
- iii) Successful bidder fails or refuses to execute the Contract.
- iv) Successful bidder fails or refuses submit acceptable performance security.

We undertake to pay to the PHPA-II up to the above amount upon receipt of its first written demand, provided that in its demand the PHPA-II will note that amount claimed by it is due to it owing to the occurrence of one or more of the four conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date..... after the closing date for submission of bids as stated in the Invitation to Bid or as extended by you at any time prior to this date, notice of which extension to the Bank being hereby waived, and any demand in respect thereof should reach the Bank not later than the above date.



PROFORMA FOR BANK GUARANTEE FOR MOBILISATION ADVANCE

[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated]

1. In consideration of the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) *(which expression shall unless repugnant to the subject or context include its administrators, successors and assigns)*, (hereinafter called the "Employer") having agreed to make advance payment to *(Name and full address of the Contractor)* _____ (hereinafter called "the Contractor(s)", *(which expression shall unless repugnant to the subject or context or meaning thereof include its successors, administrator, executors and permitted assigns)*, whose bid for *(Name of the Contract)* _____ has been accepted and to whom the acceptance of the bid has been communicated by a Letter of Award and who is required to execute a formal agreement on conditions of production of a Bank Guarantee for Nu/ INR.....(Both in figures and words). we, the _____ *(Insert name of Bank)* hereinafter referred to as "the Bank") do hereby undertake promise and guarantee payment to the Employer on demand all the amounts advanced by the Employer to the said Contractor.
2. The Bank further agrees that;
 - a) The Employer shall have the fullest liberty without affecting in any way the liability of the Bank under the Guarantee or Indemnity, from time to time, to vary any of the terms and conditions of the said Contract or to extend time for performance by the said Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or the securities available to the Employer and the Bank shall not be released from its liability under these presents by any exercise by the Employer of the Liberty with reference to the matters aforesaid or by reason of time being given to the said Contractor or any other forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of a releasing the Bank from its such liability.
 - b) These presents shall be governed by and constructed in accordance with Bhutanese laws.



- c) the Bank hereby declares that it has the power to issue this Guarantee and the undersigned has full power to do so.
 - d) It shall not be necessary for the Employer to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Employer may have obtained or obtain from the Contractor, shall at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealized.
 - e) The Guarantee herein contained shall remain in full force and effect, during the period that would be taken for the performance of the terms and conditions of the said Contract, Letter of Award and the Agreement which is to be executed as aforesaid and that it shall continue to be enforceable until all the dues of the Employer have been duly paid and its claims satisfied and discharged and till the Employer discharges the Guarantee in writing or until _____ whichever is earlier.
3. The Bank lastly undertakes not to revoke this Guarantee until all the dues of the Employer have been duly paid except with the previous consent of the Employer in writing.

Dated the _____ Day of _____ 20__

[Here affix the Common Seal of the Bank]



PRE-CONTRACT INTEGRITY PACT

[This agreement should be a part of the tender document, which shall be signed and submitted along with the tender document]

1. General:

Whereas(Name of head of the procuring agency or his/her authorized representative, with power of attorney)representing the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II), hereinafter referred to as the “**Employer**” on one part, and(Name of bidder or his/her authorized representative, with power of attorney) representing M/s.....(Name of firm), hereinafter referred to as the “**Bidder**” on the other part hereby execute this agreement as follows:

2. Objectives:

Whereas, the Employer and the Bidder agree to enter into this agreement, hereinafter referred to as IP, to avoid all forms of corruption or deceptive practice by following a system that is fair, transparent and free from any influence/unprejudiced dealings in the **bidding process**¹ and **contract administration**², with a view to:

- 2.1 Enabling the Employer to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works or goods or services; and
- 2.2 Enabling bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices.

3. Scope:

The validity of this IP shall cover the bidding process and contract administration period.

4. Commitments of the Employer:

The Employer Commits itself to the following:-

- 4.1 The Employer hereby undertakes that no officials of the Employer, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favor or any material or immaterial benefit or

¹ Bidding process, for the purpose of this IP, shall mean the procedures covering tendering process starting from bid preparation, bid submission, bid processing, and bid evaluation.

² Contract administration, for the purpose of this IP, shall mean contract award, contract implementation, un-authorized sub-contracting and contract handing/taking over.



any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process and contract administration.

- 4.2 The Employer further confirms that its officials shall not favor any prospective bidder in any form that could afford an undue advantage to that particular bidder in the bidding process and contract administration and will treat all Bidders alike.
- 4.3 Officials of the Employer, who may have observed or noticed or have reasonable suspicion shall report to the head of the employing agency or an appropriate government office any violation or attempted violation of clauses 4.1 and 4.2.
- 4.4 Following report on violation of clauses 4.1 and 4.2 by official (s), through any source, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings shall be initiated by the Employer and such a person shall be debarred from further dealings related to the bidding process and contract administration.

5. Commitments of Bidders

The Bidder commits himself/herself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of the bidding process and contract administration in order to secure the contract or in furtherance to secure it and in particular commits himself/herself to the following :-

- 5.1 The Bidder shall not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favor, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Employer, connected directly or indirectly with the bidding process and contract administration, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding process and contract administration.
- 5.2 The Bidder shall not collude with other parties interested in the contract to manipulate in whatsoever form or manner, the bidding process and contract administration.
- 5.3 If the bidder(s) have observed or noticed or have reasonable suspicion that the provisions of the IP have been violated by the procuring agency or other bidders, the bidder shall report such violations to the head of the procuring agency.

6. Sanctions for Violation:

The breach of any of the aforesaid provisions shall result in administrative charges or penal actions as per the relevant rules and laws.



- 6.1 The breach of the IP or commission of any offence (forgery, providing false information, mis-representation, providing false/fake documents, bid rigging, bid steering or coercion) by the Bidder, or any one employed by him, or acting on his/her behalf (whether with or without the knowledge of the Bidder), shall be dealt with as per the terms and conditions of the contract and other provisions of the relevant laws, including Debarment Rules.
- 6.2 The breach of the IP or commission of any offence by the officials of the procuring agency shall be dealt with as per the rules and laws of the land in vogue.

7. Monitoring and Administration:

- 7.1 The respective procuring agency shall be responsible for administration and monitoring of the IP as per the relevant laws.
- 7.2 The bidder shall have the right to appeal as per the arbitration mechanism contained in the relevant rules.

We, hereby declare that we have read and understood the clauses of this agreement and shall abide by it.

The parties hereby sign this Integrity Pact at (place) _____ on (date) _____

(Affix
Legal
Stamp)

(Affix
Legal
Stamp)

Employer_____

Bidder/Representative_____

CID: _____

CID: _____

Witness: _____

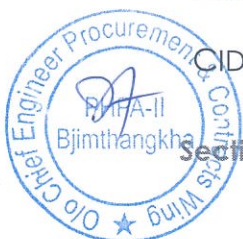
Witness: _____

Name: _____

Name: _____

CID: _____

CID: _____



SECTION VII – BILL OF QUANTITY (BoQ)



BLANK

Bill of Quantity/ Schedule of Rate

Name of Work: Restoration Work of Control Room on Northern Portal of Highway Tunnel

A-CIVIL WORK						
SL. No.	Item Description	Unit	Quantity	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu.)
1.0	(PCC-M25) 1:1:2 (1 cement : 1 sand : 2 graded crushed rock 20 mm nominal size Providing and laying in position plain cement concrete excluding the cost of centering and shuttering - All work upto plinth level.	Cu.m	1.00			
2.0	(RCC-M25) 1:1:2 (1 cement : 1 sand : 2 graded crushed rock 20 mm nominal size Providing & laying in position reinforced cement concrete excluding the cost of centering, shuttering and reinforcement - all work upto plinth level	cu.m	1.00			
3.0	Providing & fixing centering and shuttering (formwork) using Timber, including strutting, propping etc. and removal of formwork - Foundations, Footings and all works upto Plinth Level, etc. Foundations, Footings, All works upto Plinth Level, etc.	sq.m	2.00			



SL. No.	Item Description	Unit	Quantity	Rate in Figure (Nu.)	Rate in Words (Nu.)	Amount (Nu.)
4-0	Providing & fixing Thermo-Mechanically Treated reinforcement bar (Yield Strength 500 MPa) for R.C.C work including cutting, bending, binding and placing in position complete	kg	200.00			
5-0	QUARRY & FOREST PRODUCTS - SAND	cu.m	16.25			
	Sub Total (A)					
B - DRAINAGE WORKS						
1.0	Providing & fixing semicircular/ half round Poly Vinyl Chloride (PVC) roof gutter of 180mm dia 3.04m long, including fittings (brackets, bolts, nuts, washer, end cap, tee end cap etc) excluding the cost of pipes.	m.	32.00			
2.0	Providing & fixing P.V.C soil waste and vent pipes, single or double socketed, including pipe clip complete (75mm dia)	m.	30.00			
	Sub Total (B)					



Sl. No.	Item Description	Unit	Quantity	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu.)
C - STEEL WORKS						
1.0	ISMC 100 FOR BRACINGS Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and appl. priming coat of red lead paint	Kgs.	579.60			
2.0	ISMC 100 FOR BRACINGS Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and appl. priming coat of red lead paint	Kgs.	358.80			
3.0	Chain-link mesh 2.5mm (12 SWG) x 50mm Providing & fixing G.I chain-link mesh including fixing of post or struts, G.I staples (excluding the cost of posts/struts, earthwork, concrete etc.)	Sqm.	153.00			
4.0	ISMC 100 FOR TIE Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and appl. priming coat of red lead paint	Kgs.	634.80			



SL. No.	Item Description	Unit	Quantity	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu.)
5.0	ISMC 100 FOR PURLIN Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and appl. priming coat of red lead paint	Kgs.	1,150.00			
6.0	ISMC 100 FOR RAFTER Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and appl. priming coat of red lead paint	Kgs.	323.84			
7.0	ROOF PLATES (CHEQUERED PLATE) Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and appl. priming coat of red lead paint	Kgs.	8,635.00			
8.0	Extra for Galvanised Iron/ Pre - Painted Galvanised Iron (PPGI)/ Pre-Painted Galvalume (PPGL)/ sheets Extra for Providing & fixing curved C.G.I/PPGI/PPGL sheet in roofing	sq.m	81.25			



Sl. No.	Item Description	Unit	Quantity	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu.)
9.0	GUSSET PLATE - 1	Kgs.	9.18			
	GUSSET PLATE - 2	Kgs.	2.51			
	GUSSET PLATE - 3	Kgs.	5.81			
	GUSSET PLATE - 4	Kgs.	4.93			
	GUSSET PLATE - 5	Kgs.	6.96			
	GUSSET PLATE - 6	Kgs.	6.64			
	GUSSET PLATE - 7	Kgs.	5.60			
	GUSSET PLATE - 8	Kgs.	6.57			
	GUSSET PLATE - 9	Kgs.	6.96			
	GUSSET PLATE - 10	Kgs.	2.48			
	GUSSET PLATE - 11	Kgs.	5.58			
10.0	POST/STRUT	Kgs.	2.37			
	Steel work riveted or bolted, in built up sections, trusses, frame-works, including cutting, hoisting, fixing and appl. Priming coat of red lead paint	Kgs.	10.77			
		Kgs.	5.48			
		Kgs.	11.64			
		Kgs.	8.60			
		Kgs.	13.09			
11.0	MS FLATS 50X8	Kgs.	24.78			
12.0	MS FLATS 50X6	Kgs.	19.18			



SL. No.	Item Description	Unit	Quantity	Rate in Figure (Nu.)	Rate in Words (Nu)	Amount (Nu.)
13.0	ISA 50X50X6 CLEAT ANGLE	Kgs.	4.5			
14.0	MS PLATE 300X300X10	Kgs.	70.65			
15.0	Steel plate for SAND FILLING	Kgs.	596.6			
16.0	Miscellaneous works (i/e Lighting, Plumbing, Drainage work) Lumpsum	Kgs.	50.00			
	Sub Total (C)					
D - PAINTING WORKS						
1.0	Providing & applying one coat of primers - Cement primer	sq.m	464.05			
2.0	Providing and applying finishing coats - High gloss synthetic enamel/for steel & wood work, two coats on new work	sqm.	464.05			
	Sub Total (D)					
E - FENCING WORKS						
1.0	FENCING - Providing & fixing G.I barbed Wire Netting including fixing of post or struts, G.I staples, coal tarring in case of ballies complete (posts/struts, earthwork, concrete paid separately)	m.	36.00			



SL. No.	Item Description	Unit	Quantity	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu.)
2.0	FENCING - Providing & fixing G.I chain-link mesh including fixing of post or struts, G.I staples (excluding the cost of posts/struts, earthwork, concrete etc.)	sqm.	36.00			
3.0	FENCING - Steel work in single section including cutting, hoisting, fixing and applying priming coat of red lead paint	kgs.	147.00			
4.0	FENCING - Providing and laying in position plain cement concrete excluding the cost of centering and shuttering - All work upto plinth level 1:1:2 (1 cement: 1 sand: 2 graded crushed rock 20 mm nominal size	cu.m.	2.32			
5.0	FENCING - Earth work in excavation over areas, depth >300mm, width >1.5m, area >10 Sq.m on plan, including disposal of excavated earth within 50m lead and 1.5m lift & disposed soil to be neatly dressed	cu.m.	5.10			
	Sub Total (E)					
	GRAND TOTAL (A+B+C+D+E)					



Total Amount (In Words): Nu/Rs.....

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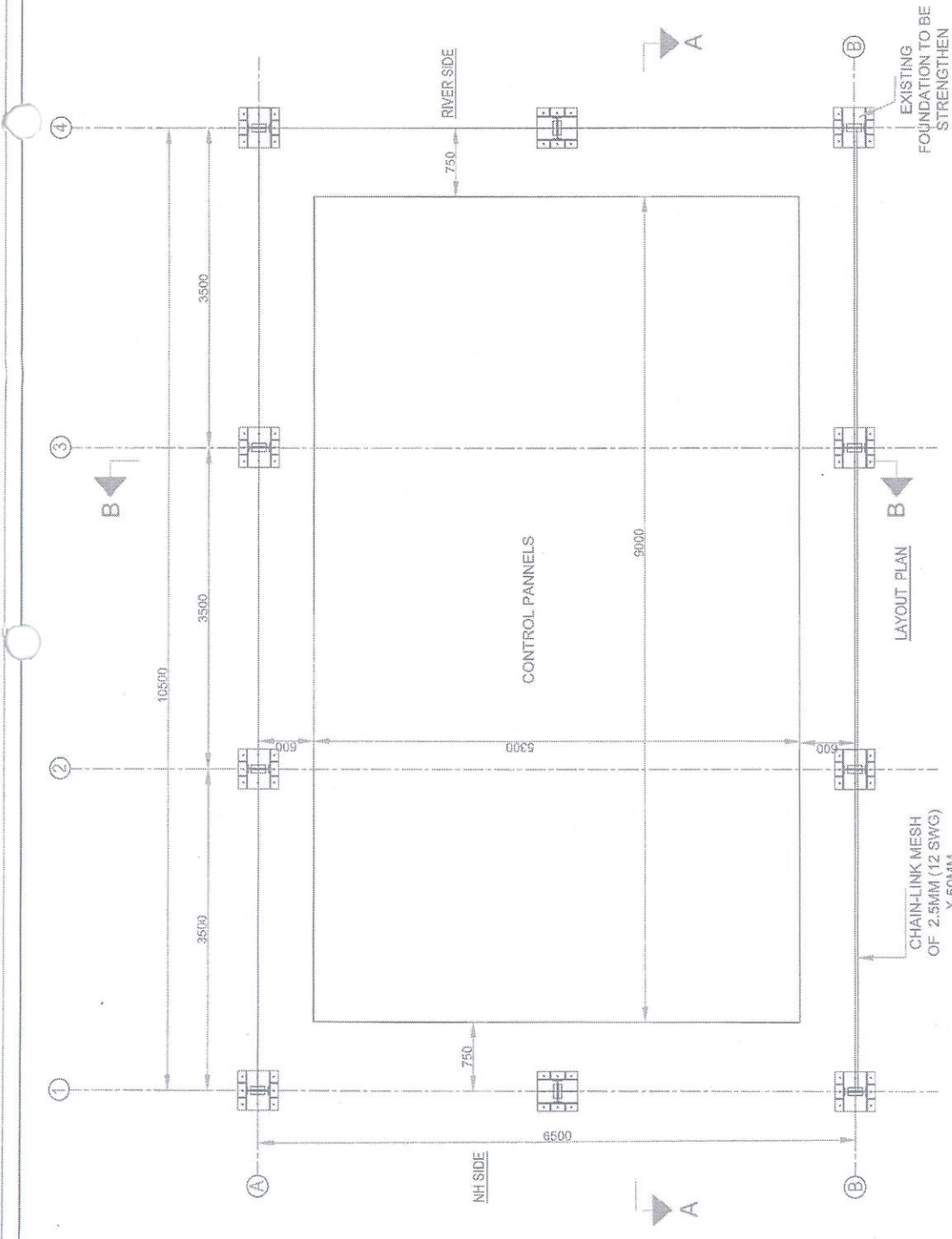
SECTION VIII - DRAWINGS



CP-21

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND ELEVATIONS IN METERS UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THIS DRAWING SHOWS LAYOUT PLAN FOR RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL.
4. ALL DETAILS/DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED-RELATED DRAWINGS BEFORE STARTING THE WORK. DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
5. ALL STRUCTURAL STEEL SHALL CONFORM TO IS 900:2007 & IS 2002.
6. DIMENSIONS OF STEEL SECTION SHALL BE AS PER IS 900:1965.
7. ALL FABRICATION AND ERECTION OF STEEL WORKS SHALL CONFORM TO IS 900.
8. THE EXISTING FOUNDATION SHALL BE STRENGTHEN WITH STIFFENERS PLATES AS SHOWN IN DRAWING FOLLOWED BY EMBEDDING IN CONCRETE AS SHOWN IN DRAWINGS.
9. THE EXISTING ISRB 250 SECTION SHALL BE USED FOR COLUMNS OF STEEL STRUCTURE.
10. WELDING SHALL CONFORM TO IS 816 PERMISSIBLE STRESSES IN WELD SHALL CONFORM TO IS 816 (LATEST).
11. ALL WELDING SIZES ARE 6 MM WITH MINIMUM LENGTH OF 100 MM & ALL STIFFENERS PLATES ARE 10MM THICK UNLESS SPECIFIED.
12. STRUCTURAL STEEL SHALL BE MILD STEEL CONFORMING TO IS 2002 GRADE-A.
13. PROPER CONNECTION OF ISMB WITH BASE SHALL BE ENSURED.
14. ALL THE METALLIC STRUCTURES SHALL BE PAINTED AS PER IS 14422: 1987.
15. FOR TRUSS AND TOP PLATE REFER SEPARATE DRAWINGS.
16. CHAIN-LINK MESH OF 2.5MM (12 SWG) X 50MM SHALL BE PROVIDED TOWARDS HILL SIDE.
17. THIS DRAWING HAS BEEN PREPARED BASED ON PHIPA-I LETTER NO. PHIPA-I/IC(DAM)/JC-1197-11/22/2344 DATED 25.07.2024.



Sheet 1 of 7

PUNATSANGCHHU-J HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-II H.E. PROJECT (BHUTAN)
 RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL
 LAYOUT PLAN

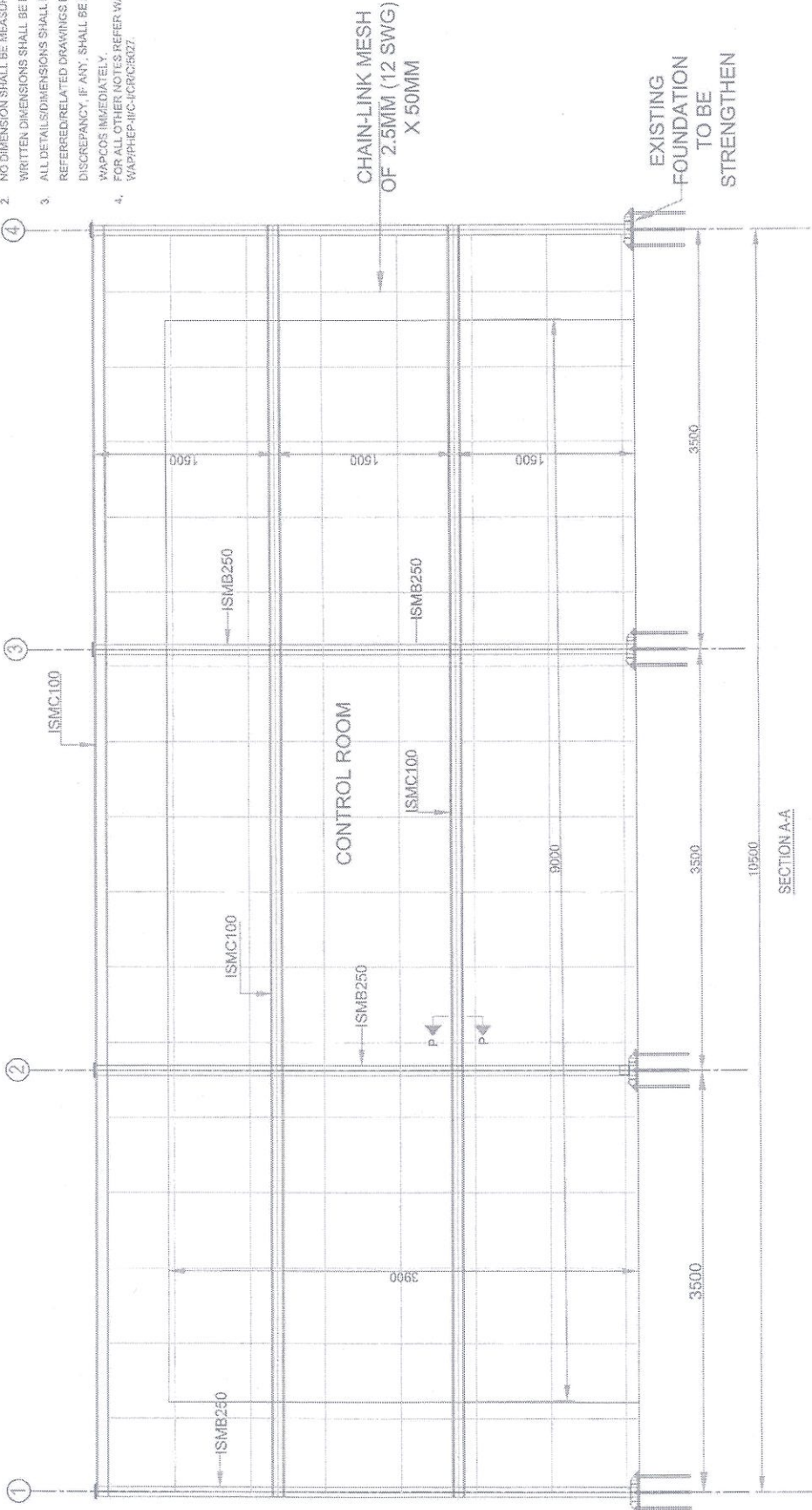
Drawn by LAUT KR. CHALSHARY	Designed & Checked by S. K. J. SHARAN KUMAR	Approved by K. BELEN
PROJECT OFFICE: BJIMTHANGKHA BHUTAN, FEB-2025		DRG. NO.: WAP/PHEP-I/IC-ICORC/5027



CP-22

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. ALL DETAIL/DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED RELATED DRAWINGS BEFORE STARTING THE WORK. DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
4. FOR ALL OTHER NOTES REFER WAPCOS DRAWING NO. WAP/PH/EP-III-ICRC/027.



SECTION A-A



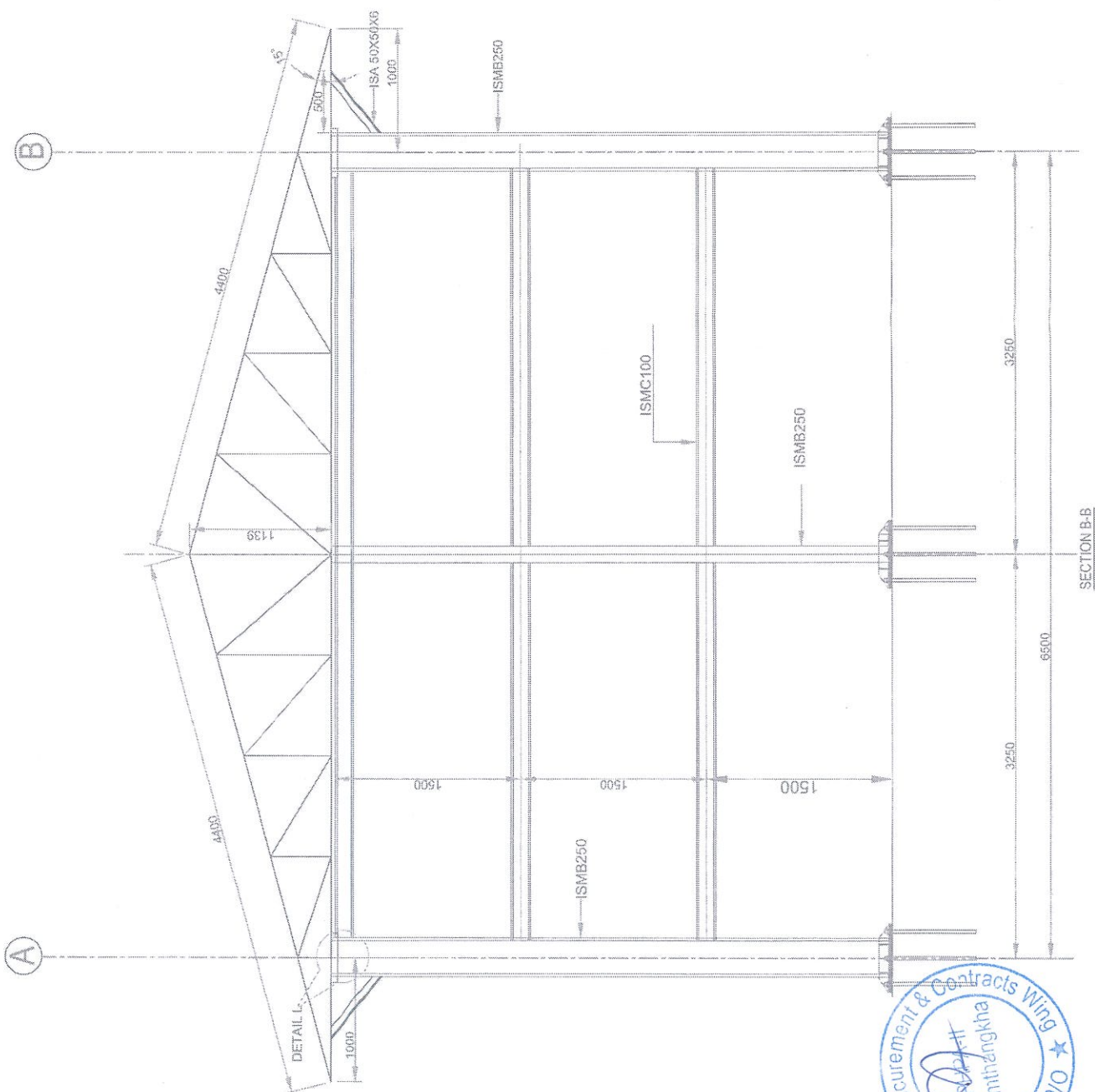
Sheet 2 of 7

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)	
CONSULTANTS WAPCOS (A GOVT. OF INDIA UNDERTAKING)	
PUNATSANGCHHU-II H.E. PROJECT (BHUTAN) RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL I-SECTION	
Drawn by LALU KR CHANDIARY PROJECT OFFICE, BIMTHANGKHA BHUTAN, FEB 2025	Designed & Checked by SHRAWAN KUMAR K. LELAM
Approved by DRG. NO.: WAP/PH/EP-III-ICRC/028	

CP-23

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. ALL DETAILS/DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED RELATED DRAWINGS BEFORE STARTING THE WORK. DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
4. ISA 50X50X6 SHALL BE WELDED FOR BRACING OF CANTILEVER PROJECTIONS ON BOTH SIDES.
5. FOR ALL OTHER NOTES REFER WAPCOS DRAWING NO. WAP/PEP-IJC-IFRC/05027



Sheet 3 of 7

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS
 (A GOVT. OF INDIA UNDERTAKING)

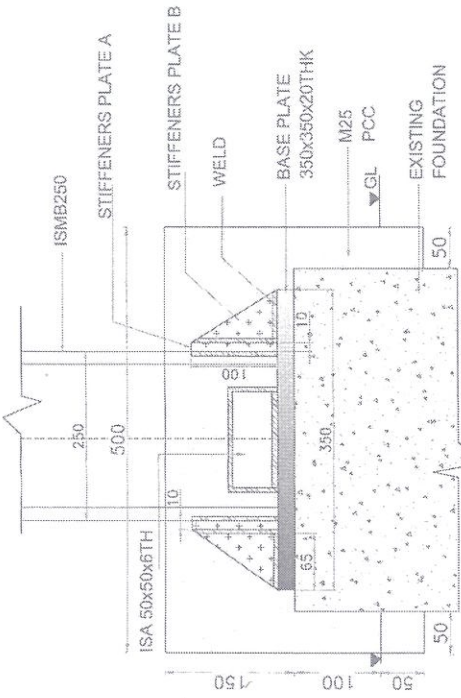
PUNATSANGCHHU-II H.E. PROJECT (BHUTAN)
 RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL

CROSS SECTION

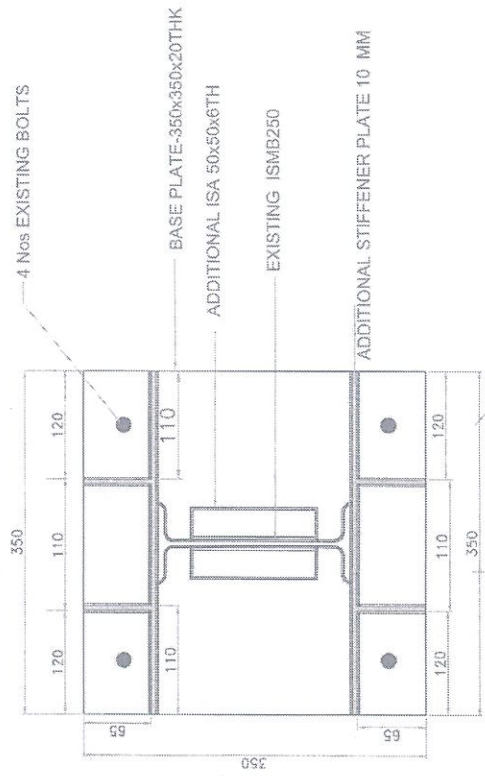
Drawn by LALIT KR. CHAUDHARY	Designed & Checked by S. JAYAN KUMAR	Approved by K. ISLAM
PROJECT OFFICE, PUNATSANGCHHU-II BHUTAN, FEB. 2025		DRG. NO.: WAP/PEP-IJC-IFRC/05029

NOTES

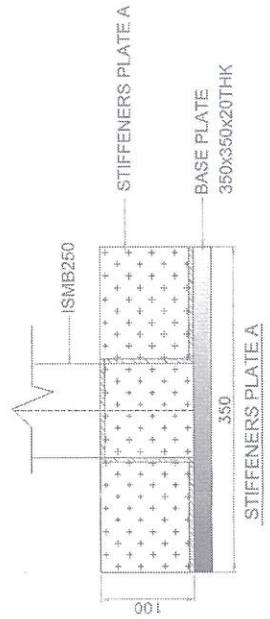
1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THIS DRAWING SHOWS CONNECTIONS DETAILS FOR STEEL STRUCTURE.
4. ALL DETAILS/DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED RELATED DRAWINGS BEFORE STARTING THE WORK, DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
5. THIS DRAWING HAS BEEN PREPARED BASED ON VENDORS DRAWINGS AS MENTIONED UNDER REFERENCES.
6. FOR TRUSS AND TOP PLATE REFER SEPARATE DRAWINGS.
7. EXISTING FOUNDATION BOLTS SHALL BE RECHECKED/REPAIRED.
8. THE EXISTING FOUNDATION SHALL BE STRENGTHEN WITH STIFFENERS PLATES AS SHOWN IN DRAWING FOLLOWED BY EMBEDDING IN M25 CONCRETE AS SHOWN IN DRAWINGS.
9. MINOR CHIPPING SHALL BE DONE TO EXISTING FOUNDATION FOR PROPER BONDING BETWEEN LAYERS.



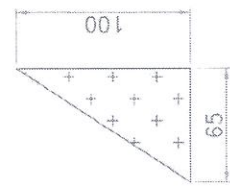
STIFFENERS PLATE WELDING DETAILS



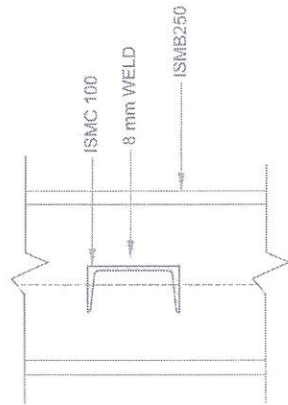
BASE PLATE PLAN



STIFFENERS PLATE A



STIFFENERS PLATE B



SECTION P-P

Sheet 4 of 7

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-II H.E. PROJECT (BHUTAN)
RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL

FOUNDATION DETAILS

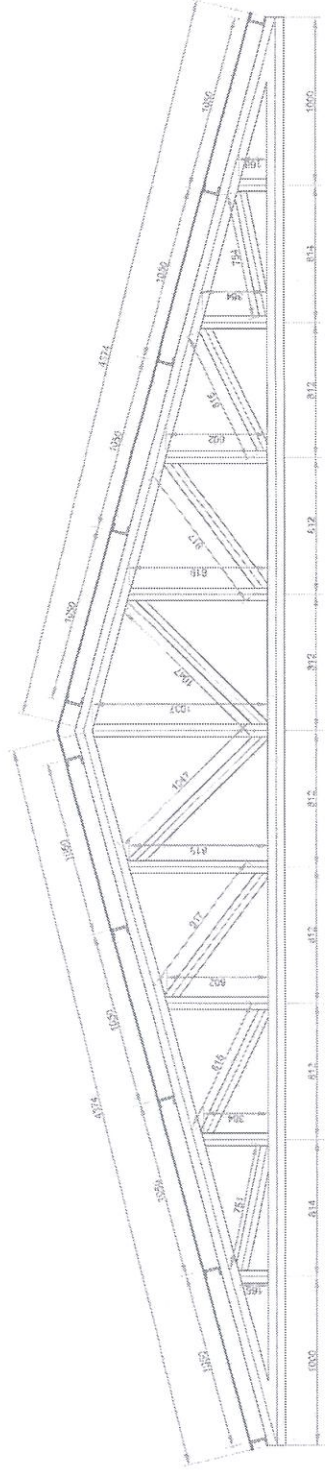
Drawn by LALIT K. CHAUDHARY PROJECT OFFICE BUKTHANGKHA BHUTAN, FEB 2025	Designed & Checked by SHRAWAN KUMAR K. ISLAM DRG. NO.: WAP/PIEP-IPC-ICR/CRS030
Approved by K. ISLAM	Approved by SHRAWAN KUMAR



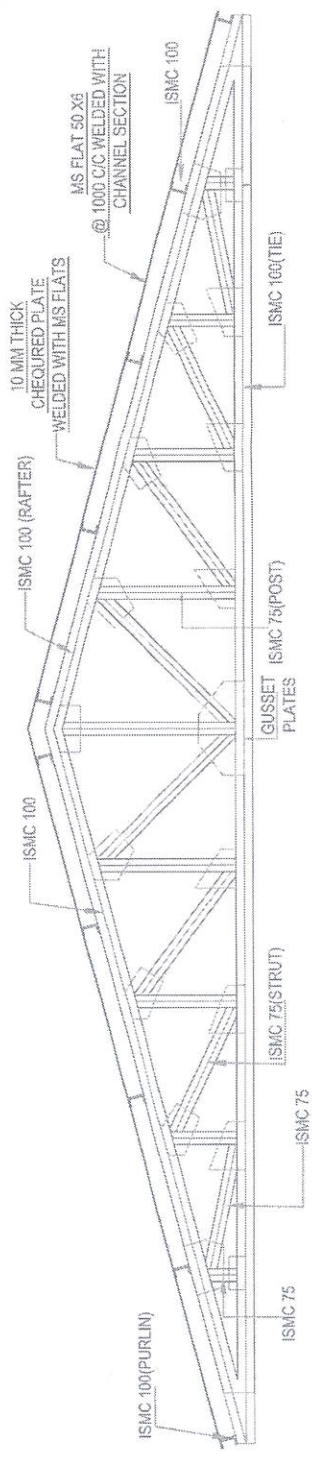
CP-25

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THIS DRAWING SHOWS TRUSS DETAILS.
4. ALL MEMBERS OF TRUSS JOINT SHALL BE IN WELDING.
5. ALL DETAILS/DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED RELATED DRAWINGS BEFORE STARTING THE WORK, DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
6. ALL WELDING SIZES ARE 6MM WITH MINIMUM LENGTH OF 100 MM.
7. DISTANCE MARKED IN THE DRAWING ARE CENTER LINE DISTANCES OF CHANCEL SUCTIONS MINOR APPROXIMATION OF MEMBERS CAN BE DONE DURING FABRICATION.



S. NO.	ITEM	SECTION
1.	BASE PLATE (EXISTING)	350 MM X 50 MM X 20 MM
2.	ANCHOR BOLT (EXISTING)	4 NOS. BOLT
3.	COLUMN	ISMB 250
4.	BRACINGS	ISMC 100
5.	PURLINS	ISMC 100
6.	RAFTER	ISMC 100
7.	TIE	ISMC 100
8.	POST	ISMC 75
9.	STRUT	ISMC 75
10.	ROOF PLATES	10 MM THICK
11.	GUSSET PLATE	8 MM
12.	BATTENS	ISMC 100
13.	WELD THICKNESS AND LENGTH (MIN.)	6 MM THICK, 100 MM LONG



SHEETS OF 7

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-II H.E. PROJECT (BHUTAN)

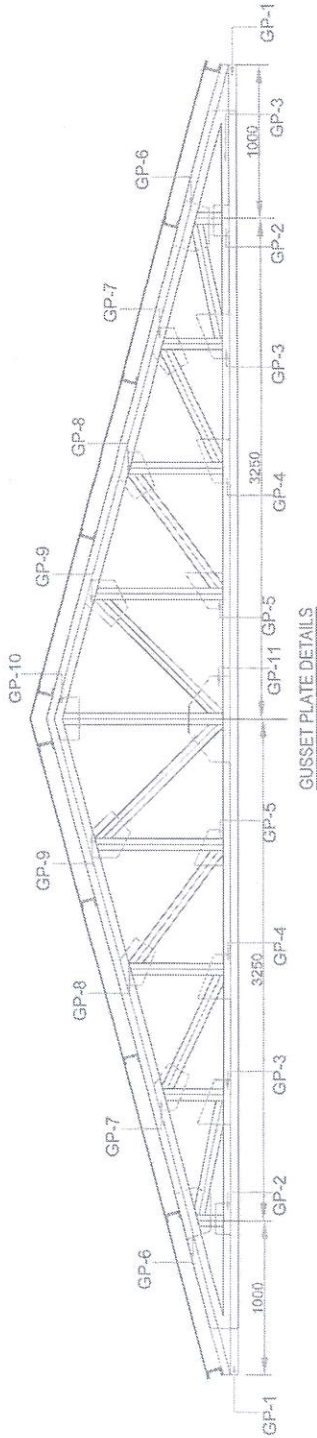
RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL
TRUSS DETAILS

Drawn by LALIT R. CHANDRA PROJECT OFFICE, BIJIMTHANGKHA BHUTAN, FEB 2025	Designed & Checked by SHRAWAN KUMAR DRG. NO.: WAP/PHEP-II/C/R/02/5031
Approved by K. ISLAM	



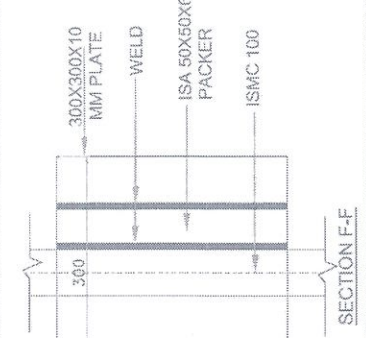
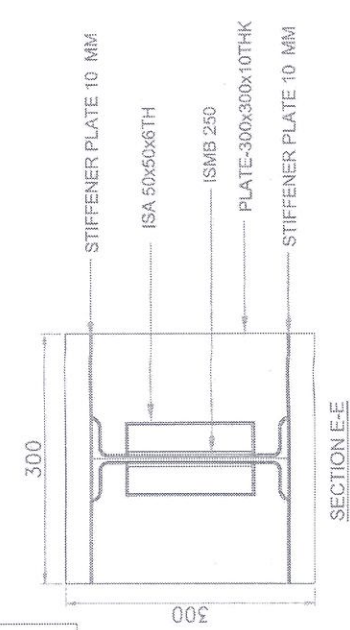
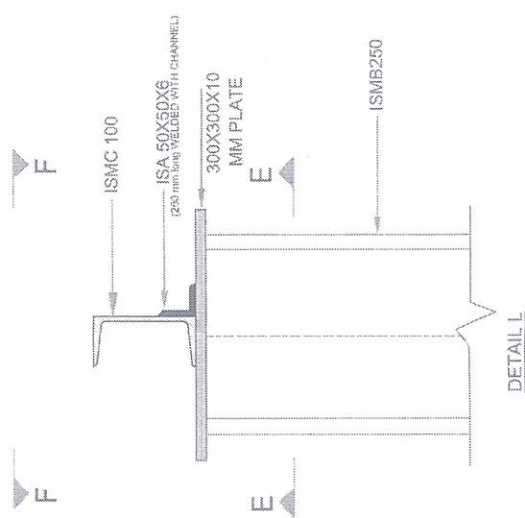
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THIS DRAWING SHOWS GUSSET PLATE DETAILS.
4. ALL DETAILS/DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED RELATED DRAWINGS BEFORE STARTING THE WORK. DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
5. ALL WELDING SIZES ARE 6 MM WITH MINIMUM LENGTH OF 100 MM.
6. DIMENSIONS OF GUSSET PLATE MAY BE ADJUSTED AS PER SITE CONDITIONS.



GUSSET PLATE DETAILS

GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11



Sheet 6 of 7

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS
 (A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-II H.E. PROJECT (BHUTAN)
 RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL

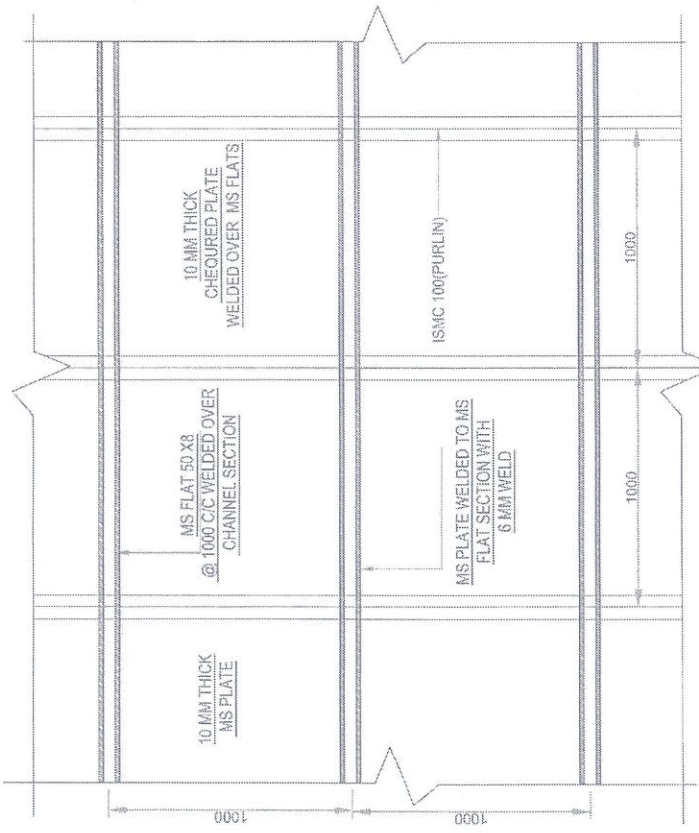
TRUSS FIXING DETAILS

Drawn by: LAUT PHECHUNHARY
 Designed & Checked by: SHIBKAM KUNJAR
 Approved by: K. B. S. M.

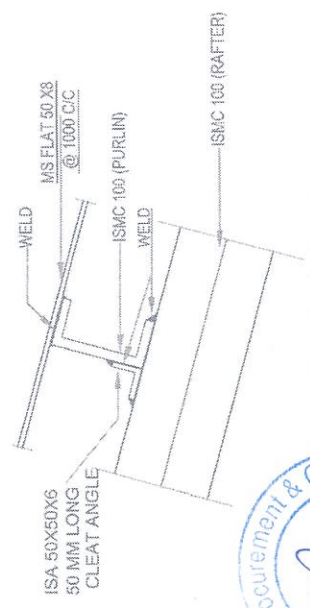
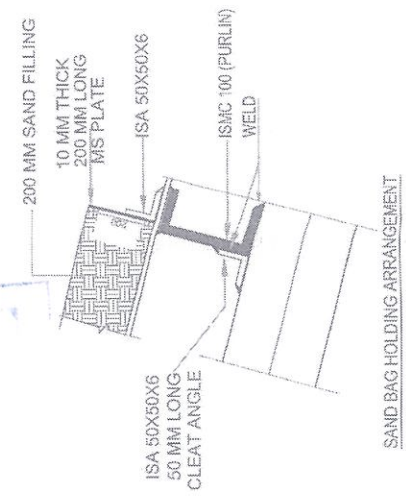
PROJECT OFFICE: BILTHANGKHA
 BHUTAN, FEB 2025
 DRG. NO.: WAP/PEP-I/IC-IC/5032





NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THIS DRAWING SHOWS ROOF PLATE DETAILS.
4. ALL DETAIL DIMENSIONS SHALL BE CHECKED ALONG WITH THE REFERRED/RELATED DRAWINGS BEFORE STARTING THE WORK. DISCREPANCY, IF ANY, SHALL BE BROUGHT TO THE NOTICE OF WAPCOS IMMEDIATELY.
5. PURLINS SHALL BE WELDED WITH RAFTERS WITH 50 MM LONG CLEAT ANGLE ISA 50X50X6 WITH WELD.
6. ALL WELDING SIZES ARE 6 MM WITH MINIMUM LENGTH OF 100 MM.
7. PROVISION OF 200 MM SAND FILLING IS KEPT ON ROOFING PLATES TO MINIMIZE THE IMPACT OF FALLING STONES.



FIXING DETAILS OF MS PLATE (10 MM THK.) WITH AND MS FLAT



 CONSULTANTS WAPCOS (A GOVT. OF INDIA UNDERTAKING)	
PUNATSANGCHHU-II HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)	
PUNATSANGCHHU-II H.E. PROJECT (BHUTAN)	
RESTORATION OF CONTROL ROOM AT HIGHWAY TUNNEL ROOF PLATE DETAILS	
Drawn by  LALIT K. CHAUDHARY PROJECT OFFICE, BJIMTHANGKHA BHUTAN, FEB 2025	Designed & Checked by  SHEKHAR KUMAR DRG. NO.: WAP/PEP-IIC-HCRC/6033
Approved by  K. ISLAM	

Sheet 2 of 7

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