PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (PHPA-I), BHUTAN

BIDDING DOCUMENT

FOR

Balance finishing and architectural works of Powerhouse Utilities & Pothead Yard buildings

(NIT No. PHPA-I/SE(C&P)/146-03/2025)

July, 2025

CONTENTS OF THE DOCUMENT

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SECTION I

NOTICE INVITING TENDER

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY, BHUTAN
NOTICE INVITING TENDER (NIT No. PHPA-I/SE(C&P)/146-03/2025)

Sealed item rate bids are hereby invited for and on behalf of Punatsangchhu-I Hydroelectric Project Authority (PHPA-I) from experienced and financially sound bidders from Bhutan and India fulfilling the eligibility criteria specified in the Bidding Document for the Work ***"Balance finishing and architectural works of Powerhouse Utilities & Pothead Yard buildings"***.

Eligibility Criteria

The participating bidders shall fulfil the following criteria:

1.1.1 Have average turnover of Nu. /Rs. **7.50 *million or more*** of any 3 years of last 7 years preceding the last date of submission of Bid.

1.1.2 Have valid trade license and BCTA's/CDB's rregistration certificate as ***Medium Class*** *(W3)* category for Bhutanese bidders and ***Class IV*** (Building & Road) category for Indian Bidders issued by concerned Authority.

1.1.3 Have latest income tax clearance Certificates. If such Clearance Certificate is not being issued by the concerned Authority, a certified photocopy of the latest income tax return shall be submitted by the Bidder.

1.1.4 Bidders should have experience of having successfully completed building works during the last 7 years preceding the last date of bid submission with the following value:

Three similar works each of value not less than **3.0 million**
OR
Two similar works each of value not less than **4.5 million**
OR
One similar work of value not less than **7.5 million**

Bidders must submit the Completion Certificate issued by previous client(s) for the above similar works executed by them. Such Certificate shall indicate the value, date and the site of works, and shall specify whether they were satisfactorily completed.

1.1.5 Bidders shall submit from the Bank or Financial Institutions in Bhutan/India showing evidence of access to or availability of credit line of at least for Nu. /Rs. **3.0 million**

The prospective bidders may purchase the Bidding Document from the O/o SE(C&P), PHPA-I, Bjimthangkha, Wangdue w.e.f **31.07.2025** to **29.08.2025** on payment of a non-refundable fee of Nu. /Rs. **2000** (two thousand) only in the form of a cash warrant or bank draft drawn in favor of PHPA-I, payable at the Bank of Bhutan (Bajo/Thimphu). The bidders can also download the Bidding Document from PHPA-I website (*www.phpa1.gov.bt/tender*) at free of cost.

Any corrigendum/addendum/errata in respect of this tender shall be made available only at the mentioned website. ***PHPA-I reserves the right to reject any or all the bids without assigning any reason thereof.***

-sd-
Superintending Engineer (C&P)

Contract Wing ★ PHPA-I, Bjimthangkha ★

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SECTION II

INSTRUCTIONS TO BIDDERS

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INSTRUCTION TO BIDDERS

AWARD OF CONTRACT 11

GENERAL

1 Introduction

Sealed item rate bids are invited for and on behalf of the Punatsangchhu-I Hydroelectric Project Authority (PHPA-I) from experienced & financially sound Bidders from Bhutan and India for the Work as described in the Bid Data Sheet (BDS).

2 Scope of Work

The scope of works shall be as specified in Section VII - General Technical Specifications.

3 Eligible Bidders

3.1 The participating Bidders shall fulfil the following criteria:

3.1.1 Have average turnover of Nu. /Rs. **7.50 *million or more*** of any 3 years of last 7 years preceding the last date of submission of Bid.

3.1.2 Have valid trade license and BCTA's/CDB's registration certificate as ***Medium Class*** (W3) category for Bhutanese bidders and Class ***IV*** (Building & Road) category for Indian Bidders issued by concerned Authority.

3.1.3 Have latest income tax clearance Certificates. If such Clearance Certificate is not being issued by the concerned Authority, a certified photocopy of the latest income tax return shall be submitted by the Bidder.

3.1.4 Bidders should have experience of having successfully completed building works during the last 7 years preceding the last date of bid submission with the following value:

Three similar works each of value not less than **3.0 million**

OR

Two similar works each of value not less than **4.5 million**

OR

One similar work of value not less than **7.5 million**

Bidders must submit the Completion Certificate issued by previous client(s) for the above similar works executed by them. Such Certificate shall indicate the value, date and the site of works, and shall specify whether they were satisfactorily completed.

3.1.5 Bidders shall submit from the Bank or Financial Institutions in Bhutan/India showing evidence of access to or availability of credit line of at least for **Nu./Rs. 3.0 *million.***

3.2 A Bidder shall not have a conflict of interest. Any 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:

3.2.1 they have at least one controlling partner in common; or

3.2.2 they receive or have received any direct or indirect subsidy from either party; or

3.2.3 they have the same authorized legal representative for purposes of this Bid; or

3.2.4 they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Employer regarding this Bidding process; or

3.2.5 A Bidder participating in more than one Bid in this Bidding process shall result in the disqualification of all Bids: or

3.2.6 A Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Employer as Project Manager for the Contract implementation; or

3.2.7 A Bidder or any of its affiliates employs or otherwise engages a close relative of a civil servant who either is employed by the Employer or has authority over the Bidder or its affiliates or over the Bid. For the purposes of this Sub-Clause, a close relative is defined as immediate family which includes father, mother, brother, sister, spouse, and own children.

3.3 Government-owned enterprises shall be eligible only if they can establish that they:

3.3.1 are legally and financially autonomous,

3.3.2 operate under commercial law, and

3.3.3 are not a dependent agency of the Employer.

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

3.5 A Bidder shall be excluded if:

3.5.1 as a matter of law or official regulation, Bhutan prohibits commercial relations with the country in which the firm is constituted, incorporated or registered; or by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Bhutan prohibits any import of goods or contracting of Works or services from that country in which the firm is constituted, incorporated or registered or any payments to persons or entities in that country.

3.5.2 he is insolvent or is in receivership or is a bankrupt or is in the process of being wound up, or has entered into an arrangement with his creditors; or

3.5.3 his affairs are being administered by a court, judicial officer, or appointed liquidator; or

3.5.4 he has suspended business or is in any analogous situation arising from similar procedures under the laws and regulations of his country of establishment; or

3.5.5 he has been found guilty of professional misconduct by a recognized tribunal or professional body; or

3.5.6 he has not fulfilled his obligations with regard to the payment of taxes, social security or other payments due in accordance with the laws of the country in which he is established or of the Kingdom of Bhutan; or

3.5.7 he is or has been guilty of serious misrepresentation in supplying information required for any prior registration with the Employer or the Construction Development Board of Bhutan; or

3.5.8 he has been convicted of fraud and/or corruption by a Competent Authority; or

3.5.9 he has not fulfilled his Contractual obligations with the Employer in the past; or

3.5.10 he has been debarred from participation in public procurement by any Competent Authority as per law: or

3.5.11 Any successful bidder in the earlier tenders failed to sign the contract agreement with PHPA-I within the prescribed time period.

4 Number of Bid per Bidder

Each Bidder shall submit only one Bid. A Bidder who submits or participates in more than one Bid (other than as a Sub Contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

5 Signatory Authority for Submission of Bid

5.1 Signatory Authority of the submission of Bids shall be as follows:

5.1.1 In the case of a proprietary firm, the Bid shall be signed by the Proprietor.

5.1.2 In the case of a Limited Company or Corporation, the Bid shall be signed by an authorized person holding the Power of Attorney for signing the Bid. A Power of Attorney (in original) shall accompany the Bid.

5.1.3 Bid documents are not transferable.

6 Cost of Bidding

Bidders shall bear all costs associated with the preparation and submission of their Bids and the PHPA-I will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding process.

7 Site Visit

7.1 Bidders are advised to visit the site to verify, examine and obtain all key information including materials inventory available with PHPA-I that may be necessary for preparing the Bid. The costs of visiting the Site shall be at the Bidder's own expense.

7.2 A 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.

BIDDING DOCUMENT

8 Contents of Bidding Document

8.1 The Bidding document is as stated below and should be read in conjunction with any corrigendum/modification issued to this document:

8.1.1 Notice Inviting Tender (NIT)

8.1.2 Instructions to Bidders (ITB)

8.1.3 Bidding Data Sheet (BDS)

8.1.4 General Conditions of the Contract (GCC)

8.1.5 Special Conditions to Contract (SCC)

8.1.6 General Technical Specifications (GTS)

8.1.7 Forms

8.1.8 Bill of Quantities

8.1.9 Drawings

8.1.10 Any other document as forming part of the Bid.

8.2 Bidders are expected to carefully examine the contents of all the above documents.

Failure to comply with the requirement of Bid submission will be at Bidder's own risk. Bids which are not substantially responsive to the requirement of the Bidding document will be rejected. Prior to the last date of submission of the Bid, the Employer may, for any reason whatsoever, modify the Bid by issuing a corrigendum/addendum, which will become a part of the Bidding document. No modification of Bid shall be permissible after last date of submission, whatsoever may be the reason.

PHPA-I may at its discretion extend the deadline for submission of Bid, if considered necessary.

9 Clarification of Bidding Document

9.1 Any prospective Bidder requiring any clarifications of the Bidding Document ***may notify PHPA-I in writing to the address mentioned in BDS, not later than 15 days prior to the date of bid submission***. If required, PHPA-I will issue a clarification in writing not later than **10 days** prior to the deadline for submission of the Bid. All such clarification shall form part of the Bidding Document and shall accompany Bidder's Bid. Written copies of PHPA-I's response (including a description of the enquiry but without identifying its source) shall be uploaded on PHPA-I's website (www.phpa1.gov.bt).

9.2 Bidders or their official representatives may attend a pre-bid meeting, if any, which will take place at the time and place stated in BDS.

10 Amendment of Bidding Document

10.1 At any time but not later than 10 days prior to the deadline for submission of Bids, the PHPA-I may, for any reason, whether at its own initiative or in response to a clarification requested by prospective Bidders, modify the Bidding Document by the issuance of a Corrigendum/Addendum through PHPA-I's website.

PREPARATION OF BID

11 Language of Bid

Bid prepared by the Bidder and all correspondence and documents relating to the Bid exchanged by the Bidder and the PHPA-I shall be written in the English language only.

12 Documents Comprising the Bid

12.1 Bid to be prepared and submitted by the Bidder shall comprise the following: -

12.1.1 Complete Bidding document, forms, schedules used thereto duly filled in and signed wherever required without altering the formats.

12.1.2 Bid Security in accordance with clause 16 of ITB. The Bids which do not contain the required Bid Security will be summarily rejected.

12.1.3 Valid Trade license and latest Tax Clearance Certificate & Pre-Contract Integrity Pact Statement.

12.1.4 Abstract programme for completing various works in MS Excel or MS Project ;

12.1.5 List of Machinery, Equipment, tools and Manpower proposed to be deployed;

12.1.6 Site organization proposed for this work;

12.1.7 Methodology proposed to be adopted for this work;

12.1.8 Any other relevant material/information.

12.2 For Bid submissions, the bidders may refer to the eligibility criteria and other mandatory data prior to submission of bids.

13 Bid Price

13.1 Unless stated otherwise in the Bidding Document, the Contract shall cover the entire scope of work as described in Clause 2 of ITB, based on the schedule of unit rates/prices submitted by the Bidder. For any item in the Bill of Quantities (BoQ) where the Bidder has not entered a rate or price, or has quoted zero, the Bidder shall nonetheless be required to execute the item. However, no separate payment shall be made by PHPA-I for such items, and the cost shall be deemed to be included in the rates/prices quoted for other items in the BoQ.

13.2 Bidders are advised to quote rate for all the items in the BoQ. Materials inventory available with PHPA-I shall be handed over to the successful bidder in good conditions during the executing period. The list of materials inventories available with PHPA-I along with their rates are reflected at **Annex-B** of **General Information - Site Conditions** (Section IV).

13.3 In accordance with the BDS, the rates quoted by the Bidder may be subjected to adjustment during the performance of the Contract as per the provisions of Clause-64 of GCC.

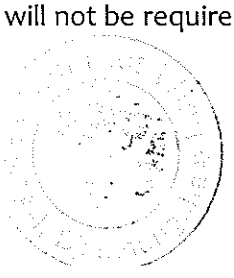
14 Currencies of Bid and Payment

The unit rate shall be Nu/Rs, and the payment shall be made in currencies of Bid.

15 Bid Validity Period

15.1 Bids shall remain valid for acceptance for a period specified in the BDS.

15.2 In exceptional circumstances, prior to expiry of the original Bid validity period, the PHPA-I may request the Bidder for a specified extension in the period of validity along with the validity of Bid Security. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiting his Bid Security. A Bidder agreeing to the request will not be required/



nor permitted to modify his Bid but will be required to extend the validity of his Bid security correspondingly. The provision of ITB Clause 16.3, regarding discharge and forfeiture of Bid security shall continue to apply during the extended period of Bid validity.

16 Bid Security

16.1 Bidders shall furnish as part of their Bid, a Bid Security in original, denominated in the currency and amount specified in BDS in a separate sealed envelope.

16.1.1 Any Bid not accompanied by Bid Security of specific value and validity shall be rejected by PHPA-I as *non-responsive.*

16.1.2 The Bid Securities of the unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder furnishing the Performance Security and signing the Contract Agreement, in any event, not later than 30 days after the expiry of the validity of the Bid.

16.2 Bid Security shall be in any of the following forms:

16.2.1 Demand Draft issued by any Financial Institution of Bhutan/India and drawn in favor of **Punatsangchhu-I Hydroelectric Project Authority** payable at Bank of Bhutan (Wangdue) and State Bank of India, Jaigaon. If the demand draft validity is less than the bid security validity, PHPA-I shall encash the said draft after opening of the bid prior to expiry of its validity.

16.2.2 Unconditional Bank Guarantee (BG) issued by any Financial Institution of Bhutan or State Bank of India or any other Scheduled Bank in Bhutan/India and pledged in favour of the **Punatsangchhu-I Hydroelectric Project Authority.** The Proforma for Bank Guarantee shall be in accordance with the Proforma for bid security (Form 2) enclosed at Section-VII of this Bidding Document.

16.3 Bid Security is liable to be forfeited if:

16.3.1 Bid is withdrawn during the period of its validity, after opening of Bids.

16.3.2 Correction of Bid price is not accepted by the Bidder pursuant to ITB Clause 29.

16.3.3 Successful Bidder fails to sign contract agreement and furnish Performance Security within the specified time limit.

17 Bidding Condition

Bidders shall submit their Bids complying with the requirement of the Bidding Document. Any deviation from the Bidding document shall be liable for rejection.

18 Format for Submittal

Format for submittal of related information for Bid shall be as per the Section VII - Forms and shall be strictly adhered to.

19 Signing of Bid

19.1 Bidders shall prepare one original of the documents comprising the Bid as described in ITB Clause 12, bound with the volume containing the Forms of Bid. The Bid typed or written in indelible ink and shall be signed by a person duly authorized. ***Proof of authorization shall be furnished in the form of a written Power of Attorney (in original) along with the Bid.***

All pages of the Bid and entries where amendments have been made shall be initialed by the person signing the Bid.

19.2 The complete Bid shall be without alternations or erasures, except those to accord with instructions issued by the PHPA-I, or as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person signing the Bid.

SUBMISSION OF BID

20 Sealing and Marking of Bid.

20.1 The bids shall be submitted in one original and one copy enclosed in an inner envelope, duly marking the envelopes as "original" and "copy" as appropriate.

20.2 The bids shall be submitted in a **Single-Stage : Two-Envelopes system, Techno-Commercial Bid** along with valid Bid Security (**Envelope-I**) and **Price Bid** (**Envelope-II**) enclosed together in a larger outer envelope and shall be marked as "Confidential" and shall be addressed to:

20.2.1 Superintending Engineer (Contracts & Procurement Circle), PHPA-I, Wangdue, Bhutan.

20.2.2 bear the following identification:

20.2.2.1 Bid for "..... ".

20.2.2.2 "**DO NOT OPEN BEFORE**" the date & time specified in Bidding Data Sheet.

20.2.3 The inner envelopes shall clearly identity the envelope number and the contents of the envelopes detailed as under:

a) **Envelope- I**

i. Valid Bid Security

ii. Duly filled Proforma forms

iii. Complete Bidding document specified under Clause 12 along with all amendments as mentioned in ITB Clause 10 except Price Bid

iv. Envelope shall be superscribed as "Techno-Commercial Bid".

b) **Envelope - II**

i. Duly filled price/rate of items in the BoQ

ii. Envelope shall be superscribed as "Price Bid".

20.2.4 If the outer envelope is not sealed and marked as above, PHPA-I shall assume no responsibility for the misplacement or premature opening of the Bid.

21 Deadline for Submission of Bids.

21.1 The Bids must be submitted within the time and date specified in BDS.

21.2 PHPA-I may, at its discretion, extend the deadline for submission of Bids by issuing an amendment, in which case all rights and obligations of the PHPA-I and the Bidders previously subject to the original deadline shall thereafter be subject to the new deadline, as extended.

22 **Late Submission of Bid**

Any Bid received by the PHPA-I after the deadline for submission of Bids prescribed by the PHPA-I in ITB Clause-21 shall be returned unopened (outer envelope shall be opened to know the Bidder's address).

23 **Modification and Withdrawal of Bid**

23.1 Bidders may modify or withdraw their Bid before the deadline for submission of Bid by giving modification or withdrawal notice in writing to PHPA-I.

23.2 Bidder's modifications or notice of withdrawal shall be prepared, sealed and clearly marked as "Modification" or "Withdrawal" as appropriate and delivered/submitted prior to deadline for submission of Bid in accordance with ITB Clause 21.

23.3 No Bid will be modified after the deadline for submission of the Bid. Withdrawal of the Bid between deadline for submission and expiry of Bid validity will result in forfeiture of Bid Security pursuant to ITB Clause 16.3.

24 **Bidding Document**

Entire set of Bidding Document shall be submitted after filling it wherever required & signing each page as a token of acceptance of all terms & conditions of the Bidding Document. No portion of the Bidding Document shall be retained by the Bidder.

BID OPENING AND EVALUATION

25 **Bid Opening**

25.1 PHPA-I shall open the Techno-Commercial Bids, including modifications made pursuant to ITB Clause 23, in the presence of the Bidders or their authorized representatives who may choose to attend at a time & place mentioned in the BDS.

25.2 Envelopes marked "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to ITB Clause 23, shall not be opened.

25.3 The Bidder's name, modifications, withdrawals, presence or absence of Bid Security and other such details as considered appropriate will be announced at the time of opening Techno-Commercial Bids. The record of the Bid opening including information disclosed will be preserved for office records.

25.4 The **"Price Bid"** (Envelope II) of only those bidders whose Techno-Commercial bids have been ascertained to be substantially responsive to the requirement of the Bidding Document shall be opened later. The date, time and venue for the opening of the price bids shall be notified separately to the eligible and technically qualified bidders, who wish to be present.

26 **Confidentiality of Bid**

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 PHPA-I in the process of examination, clarification, evaluation, comparison of Bids, and in decisions concerning Award of Contract, may result in the rejection of his Bid.

27 Clarification of Bid

To assist in the examination, comparison and evaluation of Bid, the PHPA-I may ask Bidders for clarification of the Bids, including a breakdown of unit rate. But no change in price or substances of Bid will be sought, agreed or permitted except as required to confirm the correction of arithmetic errors discovered by PHPA-I in the evaluation of Bids. The request for clarification and its response shall invariably be in writing.

28 Determination of Responsiveness

28.1 Prior to the detailed evaluation of the Bid, it will be determined whether each Bid:

28.1.1 has been properly signed;

28.1.2 is accompanied by required bid security;

28.1.3 is substantially responsive to the requirements of the Bidding Document;

28.2 A substantially responsive document is one which conforms to all the terms, conditions & specifications without material deviation or reservation which:

28.2.1 affects in any substantial way the quality or scope of the Work;

28.2.2 limits in any substantial way the scope of Work;

28.2.3 is inconsistent with the Bidding Document;

28.2.4 affects unfairly the competitive position of other Bidders.

28.3 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 Bid liable to disqualification.

29 Corrections of Errors in Bid

29.1 The price bids shall be checked by the Employer for any arithmetic errors in computation and summation. Errors will be corrected by the Employer as follows:

29.1.1 where there is a discrepancy between the rate in figures and words, the rate in words will govern; and

29.1.2 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 unless in the opinion of the Employer, there is an obvious misplacement of the decimal point in the unit rate in which case the total amount as quoted shall govern and the unit rate shall be corrected.

29.1.3 if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected.

29.1.4 If the Bidder does not quote for any item, it is presumed that he will execute the quantity mentioned in the BoQ free of cost and he has covered the price of this item in rate of other items quoted by him.

29.2 If the Bidder does not accept the corrected amount of Bid, his Bid will be rejected and the Bid security will be forfeited.

30 Evaluation and Comparison of Bid

30.1 PHPA-I will only evaluate and compare the Bids determined to be substantially responsive.

30.2 In evaluating Bids, PHPA-I will determine, for each Bid, the Evaluated Bid Price by adjusting the Bid Price as follows:

30.2.1 making any correction for errors;

30.2.2 making an appropriate adjustment for any discount and;

30.2.3 making an appropriate adjustment for acceptable quantifiable variations or deviations.

30.3 If the Bid price of the lowest evaluated Bid appears abnormally low or seriously unbalanced (below 20% of the estimated value), PHPA-I may ask 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. However, if PHPA-I decides to accept the abnormally low or the Bid with serious unbalanced rates after considering the above, the Bidder shall increase the Performance Security from 10% up to a maximum of 30% of the initial Contract Price; or

Alternatively, the PHPA-I may require the successful Bidder to deposit the difference between the PHPA-I's estimate and Contract Price in the form of cash warrant/BG in addition to 10% Performance Security.

30.4 If the prices of all Bids are abnormally high (above 20% of the estimated value), PHPA-I may seek justification from the Bidders for the high rates and if necessary, negotiate with the lowest evaluated Bidder or may reject the Bid if considered to be abnormally higher than the estimated cost.

30.5 PHPA-I reserves the right to accept or reject any variation, deviation or alternative offers. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the Bidding Document or otherwise result in the accrual of unsolicited benefits to PHPA-I shall not be taken into account in Bid evaluation.

30.6 PHPA-I will carry out a detailed technical evaluation of the Bids to determine whether the technical aspects are in accordance with the requirements. To reach to such determination, PHPA-I will examine and compare the technical aspects of the Bid s on the basis of the information provided by the Bidders.

30.7 Supplied overall completeness and compliance with the General Technical Specifications and Drawings as specified in Section VI- General Technical Specification; suitability of the Works/ Services offered in relation to the environmental and climatic conditions prevailing at the Site.

The Bid that does not meet minimum acceptable standards of completeness, consistency and detail will be rejected as non-responsive.

30.8 All other considerations being equal, preference shall be given to the Bhutanese bidder to allocate the work.

31 Qualification of the Bidder

31.1 PHPA-I shall determine to its satisfaction whether the Bidder selected is having the lowest evaluated responsive Bid, meet the terms of the qualification requirements stipulated in the BDS and have the capacity and capability to perform the Contract.

31.2 The determination shall be based upon an examination of the documentary evidence, including the authenticity of the Bidder's qualifications and capacity & capability submitted by the Bidder.

AWARD OF CONTRACT

32 Award Criteria

PHPA-I will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding Document and has been evaluated as the lowest Bid.

33 PHPA-I's Right to accept any Bid and or to reject any or all Bids

PHPA-I reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids, at any time before award of the Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the PHPA-I's action.

34 Notification of Award

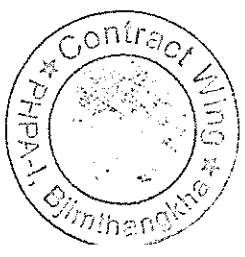
34.1 Prior to the expiry of the Bid validity period prescribed or any extension thereof, PHPA-I will notify the successful Bidder in writing that his Bid has been accepted.

34.2 This notification letter shall be issued to the successful Bidder by the PHPA-I in Form (hereinafter and in the Conditions of Contract called the "Letter of Award") in duplicate and will state the sum that PHPA-I will pay to the successful Bidder in consideration of the execution, and completion of the Works by the successful Bidder as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

35 Performance Security

35.1 Within 15 days of the issue of the letter of award by PHPA-I, but not later than the date of the signing of the Agreement, the successful Bidder shall furnish to the PHPA-I, a Performance Security in the form of a Bank Guarantee or Demand Draft for an amount equal to **10%** of the Contract Price.

35.2 Performance Security provided by the successful Bidder in the form of a Bank Guarantee or Demand Draft shall be in favour of PHPA-I issued by any Financial Institution in Bhutan/India. Bank Guarantee shall be on the Proforma (Form 3) attached at section-VII of this bidding document.



36 Signing of the Contract

36.1 Upon submission of the Performance Security as per ITB Clause 35, and within 30 days of issue of the Letter of Award, the successful Bidder or his authorized representative shall attend the office of the ***Superintending Engineer (C&P Circle), PHPA-I, Bjimthangkha, Bhutan*** for the signing of the Contract Agreement on a date and time mutually agreed upon, or as specified in the Letter of Award.

36.2 In case the successful Bidder fails to sign the Contract Agreement within the deadline specified above, it shall lead to cancellation of the award and forfeiture of Bid Security.

SECTION III

BID DATA SHEET

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BID DATA SHEET

The following Bid Data for the Work to be procured shall amend and/or supplement the Clauses in the Instruction to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in the ITB.

ITB Clause Reference	Data
General	
1. Name of work	**Balance finishing & architectural works of Powerhouse Utilities and Pothead Yard buildings.**
3.5. A Bidder shall be excluded if	If the Contract has been terminated by the PHPA-I due to fundamental breach of Contract by the Contractor in last 2 ***years*** prior to submission of the Bid.
Bidding Document	
9.1. Clarification on Bidding Document	Employer's address for clarification *in writing:* *Superintending Engineer (C&P),* *Punatsangchhu-I Hydroelectric Project Authority (PHPA-I),* *Bjimthangkha, Wangdue* *Email: secontracts@phpa1.gov.bt or Ph# 02-471575*
9.2. Pre-bid Meeting	Not applicable
Preparation of Bids	
13. Bid Price	Price quoted by Bidder shall remain firm & not subject to adjustment during the performance of Contract.
14. Currency of Bid and Payment	Currencies of Bid shall be *Ngultrum (Nu.)/ Rupee (Rs.)*
15. Bid Validity Period	The bid shall remain valid up to **120 days** from the deadline for submission of a bid or as extended.
16. Bid Security	Bid Security amount is Nu./Rs. **196,000.00** and shall remain valid for **30 days** beyond the validity period of the Bids, as extended, if applicable, in accordance with ITB Sub-Clause 16.2
Submission of Bids	
20. Sealing and Marking of Bids	The Employer's address for the purpose of Bid submission is: *Superintending Engineer (C&P), PHPA-I, Bjimthangkha, Wangdue, Bhutan.*

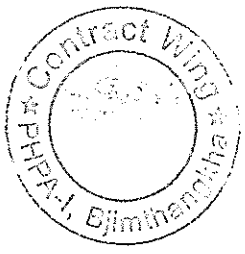
21. Deadline for bid submission	The deadline for submission of bids shall be on **29.08.2025** at **1300 Hrs. (BST).** Bids shall be received at the office of **SE(C&P), PHPA-I, Bjimthangkha, Wangdue, Bhutan** OR **Liaison Office, PHPA-I, Phuentsholing, Chhukha, Bhutan**
Bid opening and Evaluation	
25. Bid opening	Bid opening shall take place on **01.09.2025** at **1430 Hrs. (BST)** in the O/o Superintending Engineer (C&P), PHPA-I, Bjimthangkha, Wangdue, Bhutan
30. Evaluation and Comparison of Bids & 31. Qualification of the Bidder	The following qualification requirement has to be met by the Bidder: **Financial** 1. Average turnover for any 3 years of last 7 years preceding the last date of bid submission shall be equal to **Nu./Rs. 7.50 million or more.** 2. The Bidder must have credit line facilities in the relevant form from any Banks or Financial Institutions in Bhutan/India for at least **Nu./Rs. 3.0 million** **Technical** 1. Bidders should have experience of having successfully completed building works during the last 7 years, preceding the last date of bid submission with the following value: Three similar works each of value not less than **3.0 million** **OR** Two similar works each of value not less than **4.5 million** **OR** One similar work of value not less than **7.5 million** Bidders must submit the Completion Certificate issued by previous client(s) for the above similar works executed by them. Such Certificate shall indicate the value, date and the site of works, and shall specify whether they were satisfactorily completed.

Contract Wing PHPA-I, Bjimthangkha

	a. The essential construction equipment to be made available for the Contract by the Bidder. Bidder is required to furnish the document to prove the ownership of the equipment. In case of hire, the agreement/consent letter along with the proof of ownership with the leaser shall be submitted. 2. The skilled and experienced manpower required for the timely and quality execution of the work to be made available for the Contract by the Bidder shall be: a. One Diploma Engineer (Civil) with minimum of 3 years work experience in similar field. b. One Site Supervisor with minimum 3 years of experience in similar works. CV of the personnel shall be submitted.

SECTION IV

GENERAL INFORMATION - SITE CONDITIONS



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GENERAL INFORMATION - SITE CONDITIONS

1 INTRODUCTION ABOUT PUNATSANGCHHU-I HYDROELECTRIC PROJECT

Punatsangchhu-I Hydro Electric Project (1200 MW) (PHEP-I) (See Fig. 1) is a run-of-river (RoR) project situated on left bank of Punatsangchhu River in Wangdue Phodrang Dzongkhag (district) in Central Bhutan. Further downstream in India, Punatsangchhu is known as Sunkosh River and is a tributary in the Brahmaputra River system.

The installed capacity of the project is 1200 MW (6 units of Francis Turbines X 200 MW each) and would utilize design head of 338.0 m. It is the first project under the 10,000 MW Hydropower Development Initiative undertaken by the Royal Government of Bhutan (RGoB) and the Government of India (GoI).

The Powerhouse is located about 95 Km from Thimphu. Paro is the nearest airport (about 125 Km). The nearest railway station is Hasimara on Siliguri- Alipurduar Broad Gauge line of NEF Railway. The Project area can be approached from Bagdogra Airport near Siliguri via Phuentsholing- Simtokha (near Thimphu) -Dochula (about 425 Km). The Project area can also be approached from Gelephu in Central Southern Bhutan.
Punatsangchhu-I Hydroelectric Project Authority (PHPA-I) is an autonomous body set up for implementation of the Project.

2 POWERHOUSE AND POTHEAD YARD

PHEP-I has an underground Powerhouse with Machine Hall of size 236.9 m (L) x 22.9 m (W) x 53.0 m (H) to house 6 Units of 200 MW for generation of 1200 MW, and Transformer Hall of size 215.7 m (L) X 14.3 m (W) X 26.3 m (H). The Powerhouse Complex includes 4 utilities buildings, 2 in each hall, one at each end, to house various electro-mechanical equipment, control rooms, stores etc. The Machine Hall can be accessed through Main Access Tunnel (MAT) of length approx. 750 m.

PHEP-I has also a surface type Pothead Yard approx. 197.0 m (L) x 39.0 m (W) along with pothead yard building.

3 BACKGROUND OF FINISHING AND ARCHITECTURAL WORKS

The finishing and architectural works are to be carried out in the four buildings (Annexe Building & Auxiliary Buildings of Machine Hall and Annexe Building & Auxiliary Buildings of Transformer Hall) inside the Powerhouse Complex and at the Pothead Yard buildings of PHPA-I **(Building drawings are attached for reference).**

Now, it is the required to complete the balance finishing and architectural work of the utilities buildings inside Powerhouse & Pothead Yard building **(Annex-A)** and it is also

required to be make functional the washrooms & toilets for the preservation & O&M officials/Contracting agencies.

Annex-A

SN	Description	Remarks
	Pothead Yard Building	
A	**Pothead Yard Building**	
1	***Plumbing Works***	***Incomplete***
2	Rabsey-cornice works	Completed
3	***Flooring & wall Tiles - toilet***	***Incomplete***
4	***Poly Carbonate sheet- Rabsey***	***Incomplete***
5	SS Railing	Completed
6	Hand Railing	Completed
7	Roof over Rabsey	Completed
8	Septic tank & soak pit	Completed
9	***Putty & Painting at Toilets***	***Incomplete***
	Powerhouse Building	
B	**Machine Hall Auxiliary Bay Building**	
1	Floor & wall tiles-toilet	Completed
2	Paraquet flooring	Completed
3	Granite -staircase & landing	Completed
4	Stone Texture tiles	Completed
5	Hand Rail	Completed
6	Plumbing Works	Completed
7	Rabsey frame	Completed
8	Cornice-FRP	Completed
C	**Machine Hall Annex Bay Building**	
1	***Kota Stone***	***Incomplete***
3	***Lift wall tiles***	***Incomplete***
4	***Vitrified Tiles***	***Incomplete***
5	Granite - staircase & landing	Completed
6	***SS Railing***	***Incomplete***
7	Hand Railing	Completed
8	***Plumbing Works***	***Incomplete***

Contract Wing ☆ PHPA-I, Bjimthangkha ☆

9	***Balustrade***	***Incomplete***
10	Rabsey frame	Completed
11	***Floor & wall tiles-toilet***	***Incomplete***
12	AAC wall works	Completed
13	***Plastering***	***Incomplete***
14	***Putty & painting***	***Incomplete***
15	Timber work & roof over Rabsey	Completed
D	**Transformer Hall Annex Bay Building**	
1	Lift wall tiles	Completed
2	Floor & wall tiles-toilet	Completed
3	Granite-staircase & landing	Completed
4	***Plumbing works***	***Incomplete***
5	SS Railing	Completed
6	Hand Railing	Completed
E	**Transformer Hall Auxiliary Bay Building**	
1	Granite -Staircase & landing	Completed
2	SS railing	Completed
3	Tiles	Completed
4	AAC Wall Works	Completed
5	***Plastering***	***Incomplete***
6	***Putty & Painting***	***Incomplete***
7	Rabsey frame & balustrade	Completed

4 OVERALL OBJECTIVE

The scope of work in the present tender includes all balance finishing and architectural works in the four buildings (Annexe Building & Auxiliary Buildings of Machine Hall and Annexe Building & Auxiliary Buildings of Transformer Hall) inside the Powerhouse Complex and the Pothead Yard building of PHEP-I.

5 HVAC SYSTEM

The HVAC installed in Powerhouse will govern the existing site conditions, which are summarized as follows:

a) Ambient Temperature: 24 °C to 30 °C
b) Humidity: 55 % ± 5 %
c) Rainfall: Nil
d) Exposure to Direct Sunlight: Nil

6 IMPLICATIONS FOR BIDDER

The Bidder needs to give specific consideration to this aspect and verify for themselves the details during the site visit to ensure that the supplied product is conveniently and safely brought to the actual location and constructed/assembled / erected, with explicit provision for safe and convenient handling / removal during O&M and the entire lifespan of the structure(s) and even thereafter.

7 SITE VISIT

Each bidder, at the bidder's own responsibility and risk is advised to visit and examine the jurisdictions of work and its surroundings and obtain all information that may be necessary for preparing the bid for entering into a contract for successful completion of the work in all respects as per specifications & conditions of the contract. The costs of said visit shall be at the bidder's own expense.

The client makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it and the Bidder confirms that it shall have no claim whatsoever against the client in this regard.

8 SCOPE OF CLIENT:

The client shall supply electricity supply to Powerhouse. The bidder shall make all arrangement for distribution of electricity within the working area. The electric energy consumed by the bidder shall be measured by a suitable energy meter installed at the supply point and the cost thereof shall be paid by the bidder 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

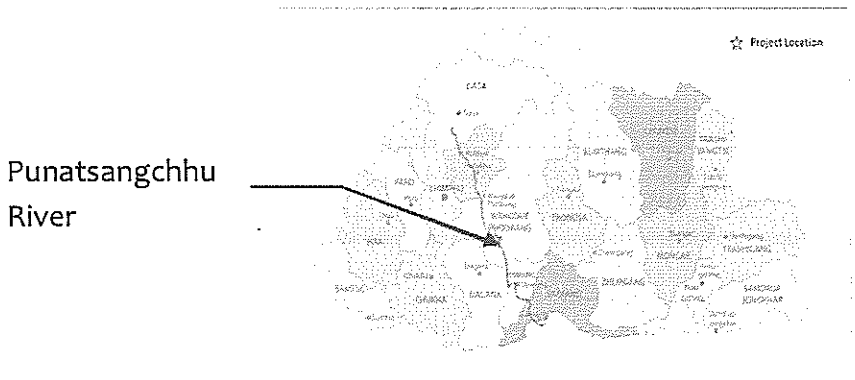


Figure 1: Location of Project

9 WATER SUPPLY SYSTEM

The bidder shall be fully responsible for the arrangement of necessary facilities for water supply at the Site.

10 SCOPE OF WORKS

Scope includes supply, construction, erection, testing of flooring tiles, plastering, painting, plumbing, sanitary work, structural steel work etc. as per Annexure-A in the four buildings (Annexe Building & Auxiliary Buildings of Machine Hall and Annexe Building & Auxiliary Buildings of Transformer Hall) inside the Powerhouse Complex and the Pothead Yard buildings of PHEP-I within the specified time schedule.

The Scope of Works covered under this clause shall comprise of all architectural and finishing works including supply of all construction materials, equipment, tools and plants, labour (skilled or un-skilled), etc. as would be required for construction as shown in the Drawings and as specified herein and / or as directed by the Engineer-in-Charge. The scope shall also include any other allied item/works required for the successful completion of this work.

10.1 SUPPLY OF PARTIAL MATERIALS INVENTORY BY PHPA-I

The bidder shall quote for full work as per the BoQ. However, PHPA-I shall supply partial inventory, to the extent available. The rate of these inventory supplied by PHPA-I shall be deducted from the running bills of the agency as per the details given. The list of materials inventory available with PHPA-I along with the rates are deductible as enclosed at **Annex-B.**

Rates of materials inventory available with PHPA-I **Annex-B**

Sl#	Description of works	Unit	Quantity Available with PHPA-I	PHPA-I Rate (Nu./Rs.)	Refer BoQ Sl. No.
1	Vitrified Tiles(600mmX600mm)	Sqm	328	727	1
2	External Clad Tiles(600mmX300mm)	Sqm	34	687	2
3	Wall Tiles(600mmX300mm)	Sqm	42	687	2
4	Lift Well Tiles (450mmX300mm)	Sqm	299	687	3
5	Kota Stone	Sqm	54	823	4
6	MS Plate 12mm	Kg	1960	67.5	13
7	MS Plate 6mm		1000		
8	TMT Fe500 Bar 10mm	Kg	1223	61.5	
9	TMT Fe500 Bar 12mm	Kg	2403		
10	ISMB 250	Kg	299.0	81	

11	MS Rectangle Hollow Section 150x100x3mm	Kg	1806	92.88	
12	MS Rectangle Hollow Section 100x75x3mm		907		
13	MS Rectangle Hollow Section 100x50x3mm		253		
14	MS Rectangle Hollow Section 75x50x3mm		852		
15	MS Square Hollow Section 25x25x3mm		86		
16	MS Square Hollow Section 100x100x3mm		354		
17	MS Square Hollow Section 150x150x3mm		261		
18	Kitchen Sinks Sink-1 No Waste coupling-1 No Waste pipe : 1 No	No.	1	2905	**18.1**
19	European type Water Closet Single PCS commod-1 no Hand Faucet with pipe & hook-1 No Connection Pipe: 1 No Angel cock : 2 No	No.	2	4240	**18.3**
20	Ceramic Wash Basin-Counter top-fullset Table top basin -1 No Basin mixture -1 No Bottle trap-1 No Angel cock-2 No Connection pipes-2 Nos Waste coupling-1 No	No.	4	4885	**18.4**
21	Urinal Urinal-1 No Bracket-1 set Spreader-1 No Connection pipe: 1 No Angel cock : 1 No	No.	4	3110	**18.6**
22	Urinal Partition-Glass	No.	4	5000	**18.7**
23	Toilet Roll Holder	No.	15	625	**18.9**

24	Soap Dish with Brackets	No.	6	375	**18.10**
25	Towel Rail	No.	24	475	**18.11**
26	PPR End Cap 25mm	No.	10	217	**18.12.1**
27	PPR Pipe 16mm	m	50	138	**18.12.2**
28	PPR Elbow 16mm	No.	238	142	**18.12.2**
29	Reducer Socket 110 x 75mm	No.	3	300	**18.13/18.14**
30	PVC Floor Trap Inlet 110mm	No.	8	160	**18.15**
31	PVC Coupler 75mm	No.	16	75	**18.20**
32	PVC Coupler 110mm	No.	15	120	**18.21**
33	PVC P Trap	No.	18	450	**18.22**
34	CP Brass Mixer Non-Telephonic 15mm	No.	2	3525	**18.27**

The bidder is suggested to maintain the same Colour/Shade/Pattern/Texture for the remaining inventory being procured by bidder to the extent possible and obtain prior approval of Engineer-in-Charge (EIC). The work shall be executed to the satisfaction of Engineer-in-Charge (EIC).

The required works shall be executed in accordance with technical specifications of specifications for Building & Road Works 2024 and Electrical works 2024 or latest editions of Royal Govt. of Bhutan with the approval of the Engineer-in-Charge. All the work shall be completed to the satisfaction of Engineer-in-Charge.

11 MATERIAL FOR CONSTRUCTION

The material for construction for finishing and architecture work shall be similar to existing inventory of PHPA-I and material confirming to appropriate BS/IS code.

12 TESTING AND QUALITY CONTROL

The bidder 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.

If EIC instructs the Contractor to carry out test not specified in the Specifications, the Contractor carry out the such tests at his own cost.

13 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 bidder shall provide and maintain minimum one first aid facilities at the work site.

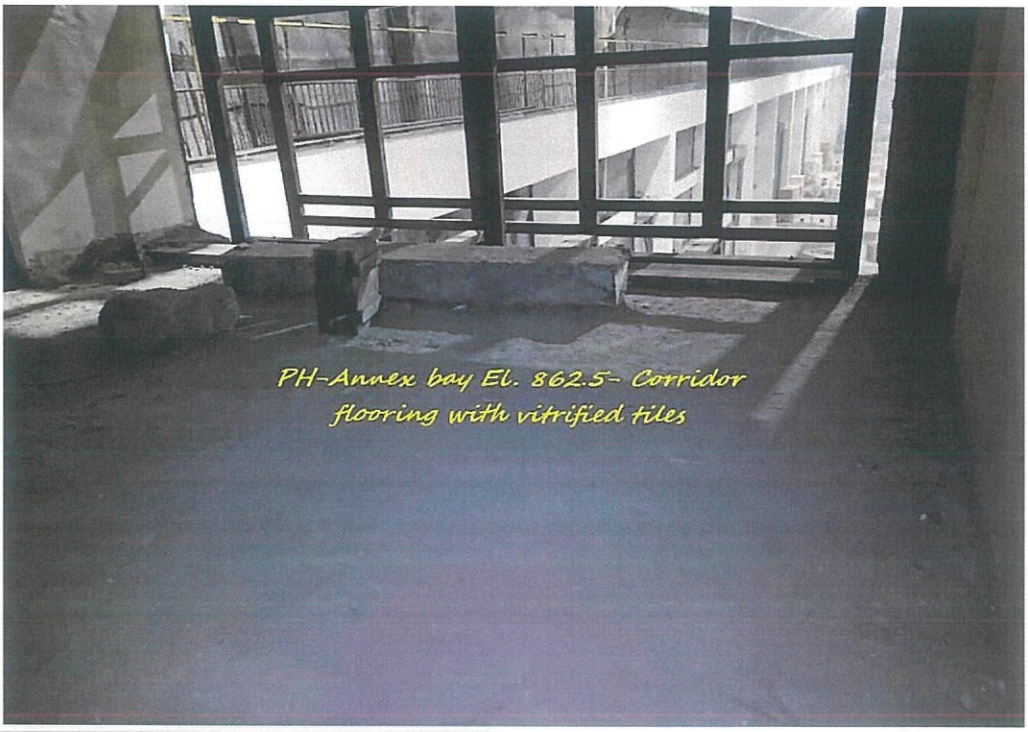
14 FINAL CLEAN-UP

Upon the Completion of Works, the bidder 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.

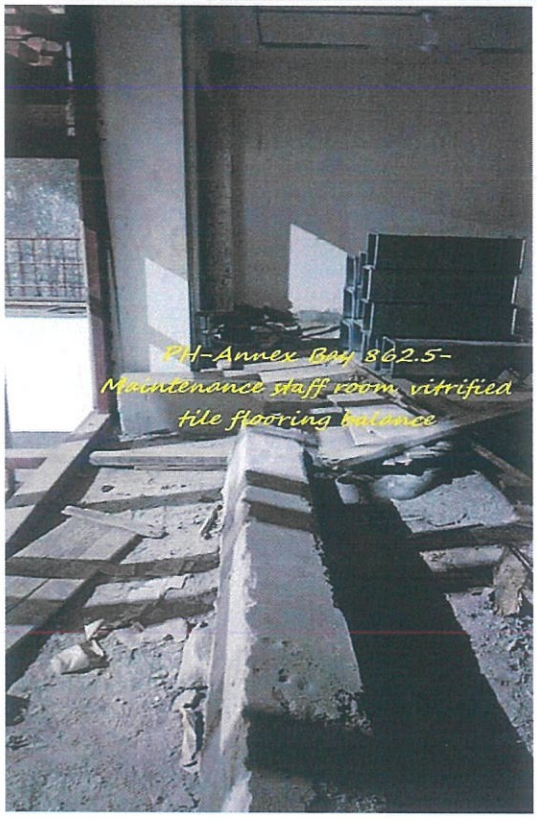
15 PHOTOGRAPHS/PICTURES

I. Works to be executed

Contract Wing
PHPA-I, Bjimthangkha



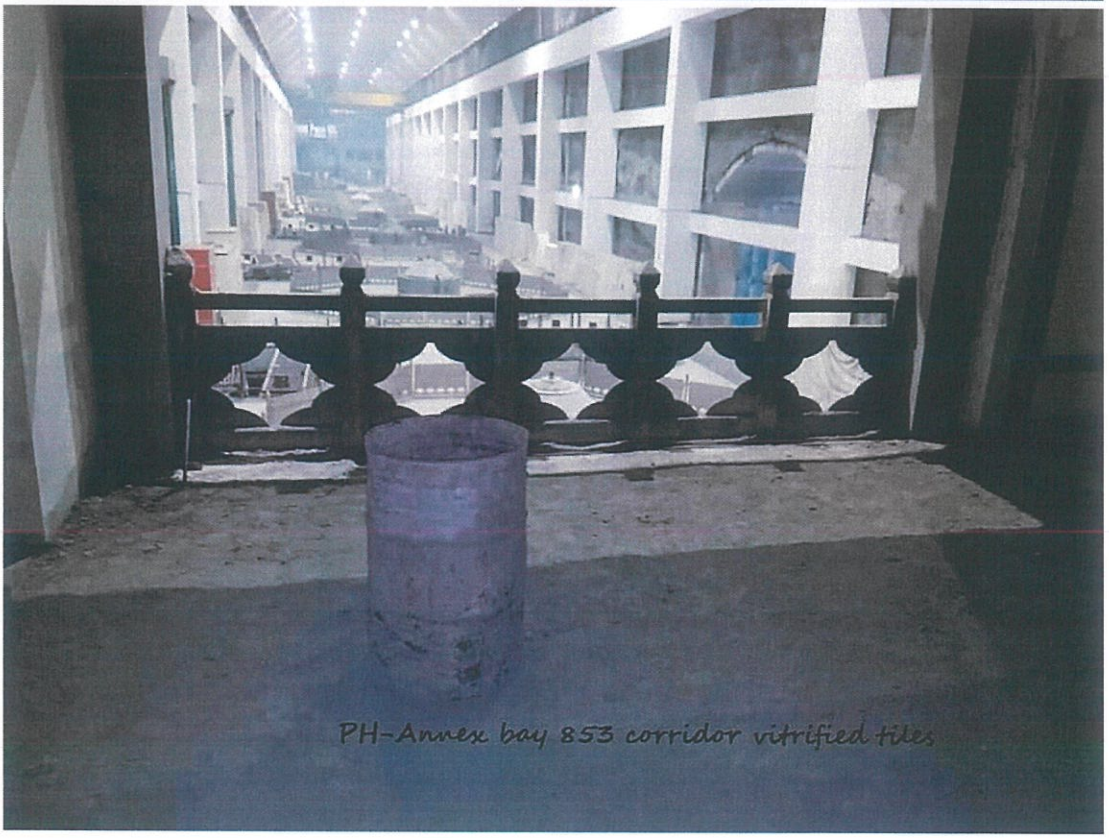
PH-Annex bay El. 862.5- Corridor flooring with vitrified tiles



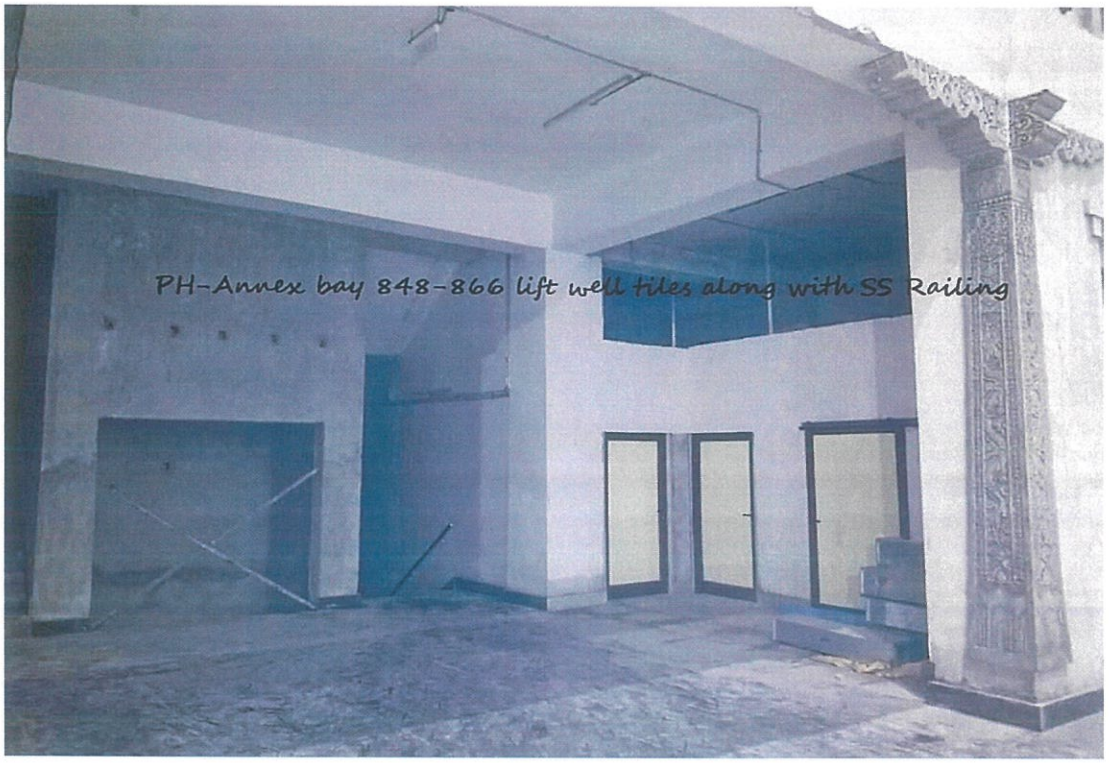
PH-Annex Bay 862.5- Maintenance staff room vitrified tile flooring balance

Contract Wing
PHPA-I, Bjimthangkha

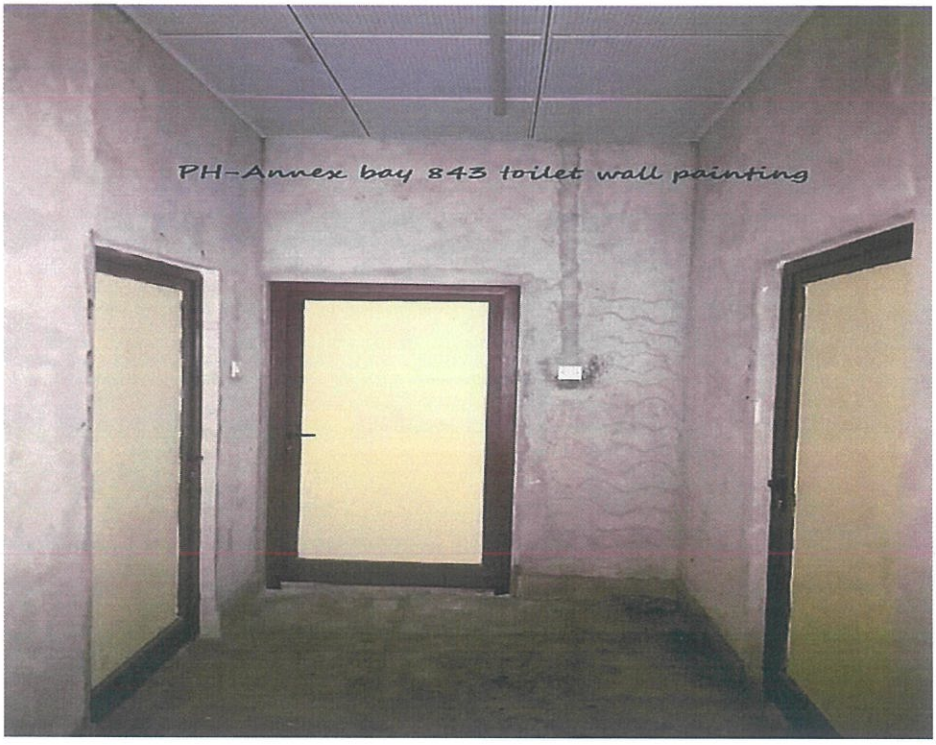
PH-Annex bay 857.5 - Corridor vitrified tiles



PH-Annex bay 853 corridor vitrified tiles



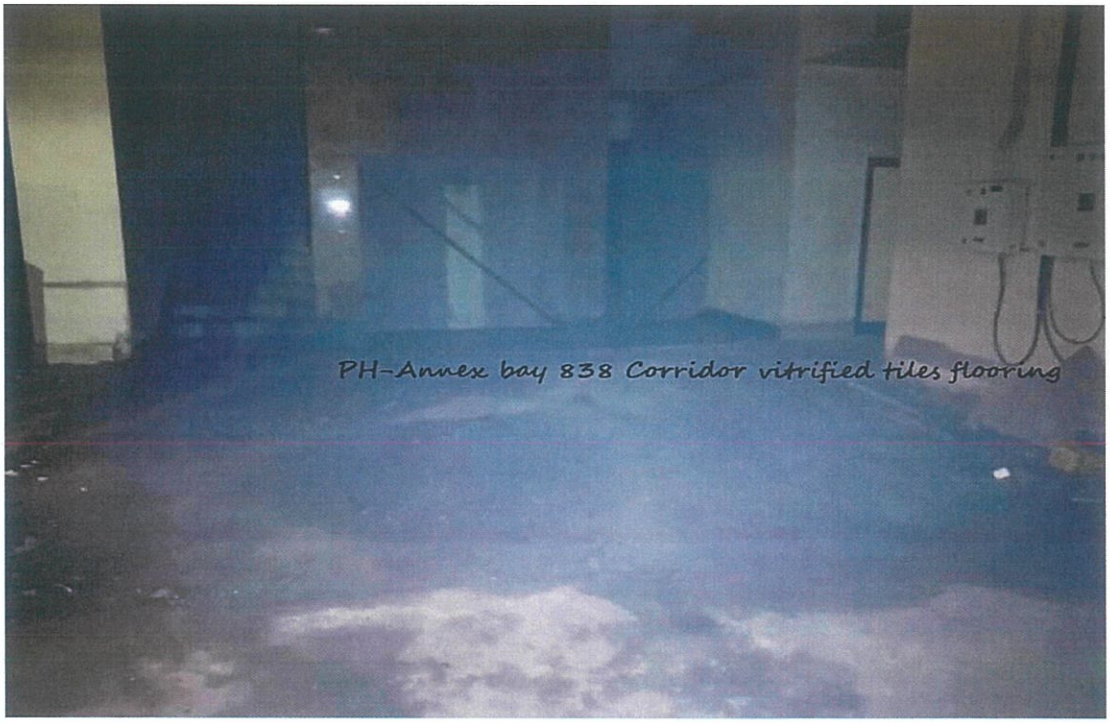
PH-Annex bay 848-866 lift well tiles along with SS Railing



PH-Annex bay 843 toilet wall painting

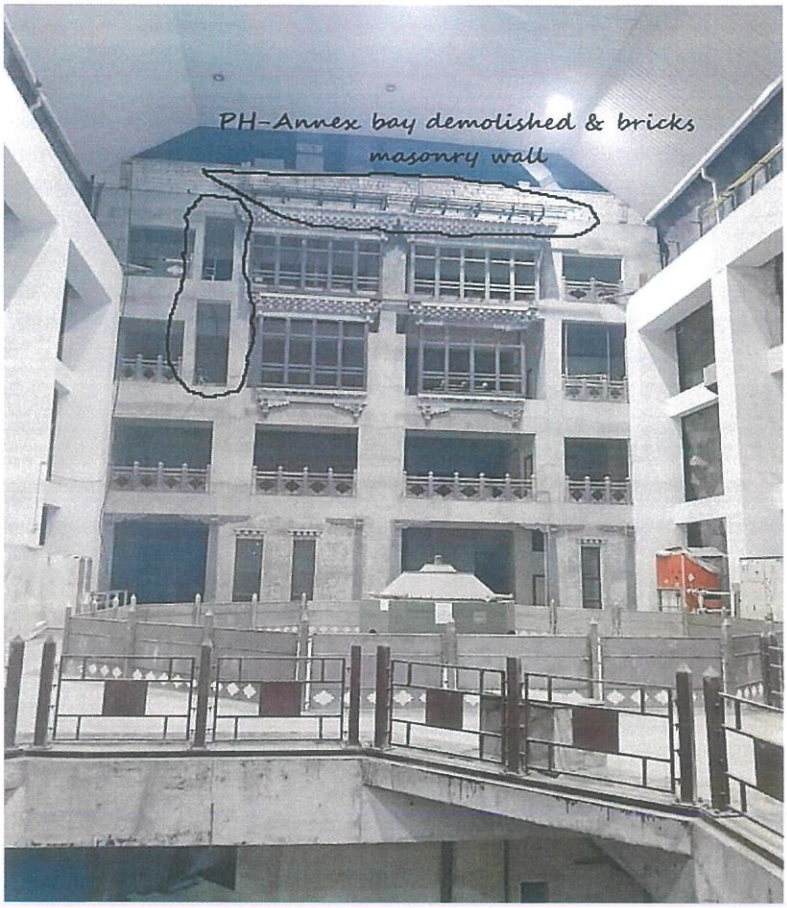
Contract Wing
PHPA-I, Bjimthangkha

PH-Annex bay 843 Corridor vitrified tiles



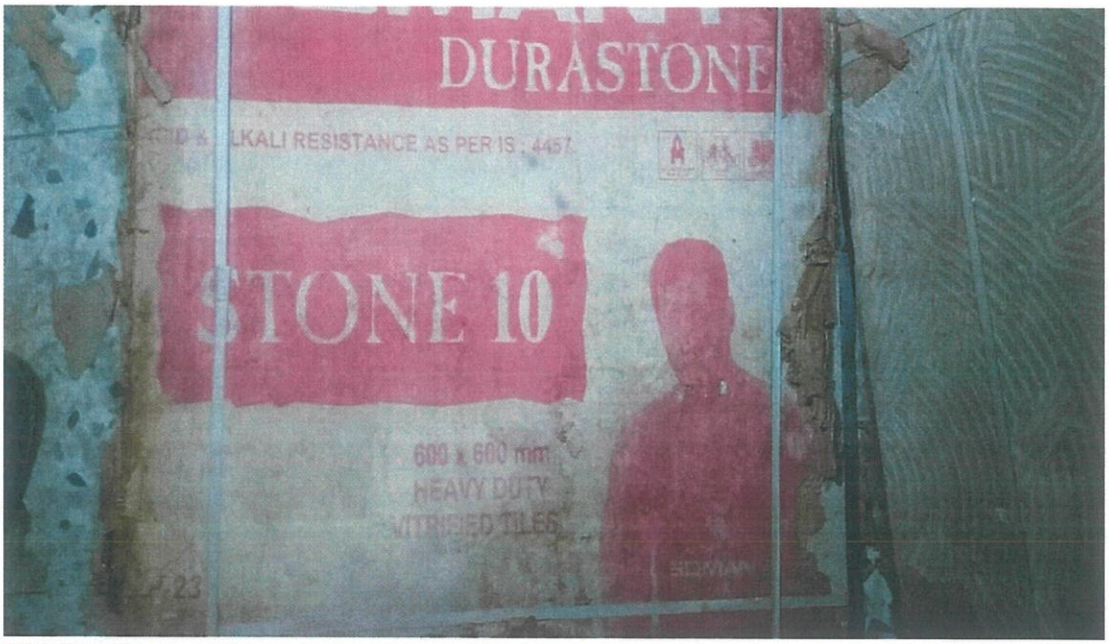
PH-Annex bay 838 Corridor vitrified tiles flooring

Contract Wing
PHPA-I, Bjimthangkha



Contract Wing
PHPA-I, Bjimthangkha

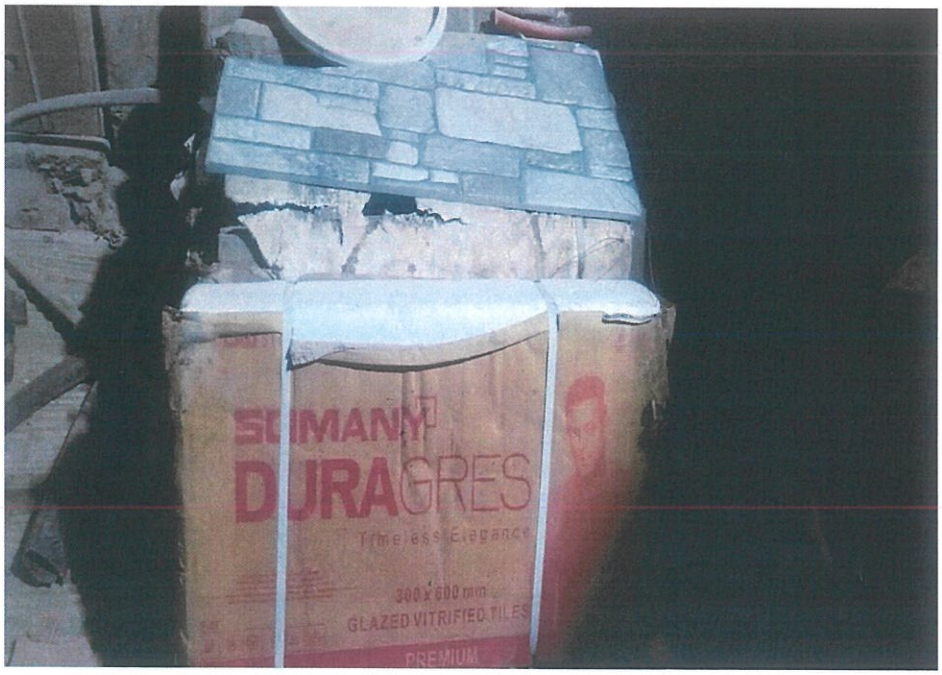
II. Flooring tiles available with PHPA-I



➢ **Room /bath room flooring, Acid & Alkali resistance tiles 600x600**

- **Gold, vitrified tiles 600x600 room flooring**

- **Room flooring, 600x600**



- **External cladding wall tiles 300x600**

- **Lift well tiles 300x450**

SECTION V

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS AND INTERPRETATIONS

1 Definitions

1.1 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:

1.1.1 'PHPA-I'/ 'Project Authority' means the Punatsangchhu-I Hydroelectric Project Authority and the legal successor in title to the PHPA-I who will employ the Contractor.

1.1.2 "RGoB" means the Royal Government of Bhutan.

1.1.3 "BDS" means Bid Data Sheet.

1.1.4 "Tender/Bid, tenderer/bidders" means synonymous throughout this Contract document.

1.1.5 'Contractor'/ 'Supplier' means the person or persons, firm or company, group of firms or Joint Venture, whose bid has been accepted by the PHPA-I and includes the Contractor's personal representatives, successors and permitted assigns.

1.1.6 Employer/Department/Authority shall mean Punatsangchhu-I Hydroelectric Project Authority and include duly authorized representative or any other person empowered or any other person empowered on behalf of PHPA-I to discharge all or any of its function.

1.1.7 Accepting Authority shall mean the Managing Director of Punatsangchhu-I Hydroelectric Project Authority or his authorized nominee.

1.1.8 "Engineer-in-Charge" (EIC) means the Engineer-in-Charge appointed from time to time by the PHPA-I and notified in writing to the Contractor to act as the Engineer-in-Charge for the purposes of the Contract.

1.1.9 "Engineer-in-Charge's Representative" means any Engineer or assistant of the Engineer-in-Charge appointed from time to time by the PHPA-I 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.

1.1.10 "Works" shall include both Permanent Works and Temporary Works.

1.1.11 "Temporary works" means all temporary works of every kind required in or about the execution or maintenance of Works.

1.1.12 "Permanent Works" means the permanent works to be executed and maintained in accordance with the Contract.

1.1.13 "Contract" means the Conditions Governing the Contract, Technical Specifications, Drawings, priced Bill of Quantities, Letter of Award and the Contract Agreement.

1.1.14 "Contract Price" means the aggregate price payable to the Contractor as specified in the Contract at the time of award.

1.1.15 "Constructional Plant", "Plant and Equipment" or "Machinery" means and include plant, equipment, machinery, tools, appliances, 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.

1.1.16 "Specifications" means the Technical Specifications and other Specifications referred to in the Bidding Documents and any modification thereof or addition thereto or deletion therefrom as may, from time to time, be furnished/ decided by PHPA-I and/or submitted by the Contractor and approved in writing by the Engineer-in-Charge.

1.1.17 "SBRW" shall mean the latest 'Specifications for Building and Road Works' of the Ministry of Infrastructure and Transport, RGoB, Thimphu.

1.1.18 "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-I and/or submitted by the Contractor and approved in writing by the Engineer-in-Charge.

1.1.19 Special conditions to Contract referred to in these conditions shall mean relevant schedule(s) annexed to these tender documents or the standard schedule mentioned in Section V with amendments thereto, if any.

1.1.20 "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-I 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.

1.1.21 "Approved" means approved in writing, including subsequent written confirmation of previous verbal approval and "approval" means approval in writing, including as aforesaid.

1.1.22 "Director (Technical)" means the Chief of Engineering of the Works or his successor and to whom the Engineer-in-Charge reports.

1.1.23 "Managing Director" means the Technical and Administrative head of the Project.

1.1.24 "GoI" means Government of India.

1.1.25 "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.

1.1.26 "Manufacturer" means the party proposing to design and/or manufacture the equipment and materials as specified complete or in part.

1.1.27 "Letter of Award" means the letter from the PHPA-I conveying acceptance of the bid subject to such reservations as may have been stated therein.

1.1.28 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.

1.1.29 "Day" means a day from midnight to midnight.

1.1.30 "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.

1.1.31 "Week" means seven consecutive days.

1.1.32 "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.

1.1.33 "Ngultrum" means Bhutanese Currency.

1.1.34 "Rupee" means Indian Currency

1.1.35 Words in singular number shall include the plural number and vice-versa where the context so requires. "He" shall include "She" and vice-versa.

1.1.36 "Cost" means 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.

1.1.37 The "Goods" means all the equipment/machinery's accessories and/or other materials, etc. which the Contractor is required to supply to PHPA-I under the scope of Contract for execution of all works in totality.

1.1.38 "Services" means services ancillary to the supply of Goods such as transportation and insurance and any other incidental services such as installation, performance of on-site erection, testing, painting, commissioning for the supplied goods, training and other such obligations of the Contractor covered under the Contract.

1.1.39 Retention money & security deposit are synonymous.

1.1.40 Defects Liability Period means the period of validity of warranties given by the Contractor commencing at the completion of the Works or a part thereof, if separate completion of the Works for such part has been provided in the Contract, during which the Contractor is responsible for defects with respect to the Works

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

2 Duties and Powers of Engineer-in-Charge and Engineer-in-Charge's Representative(s)

2.1 The Engineer-in-Charge shall carry out such duties in issuing decisions, Certificates and orders as are specified in the Contract.

2.2 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.

2.3 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 Delegation of Power 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:

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.

2.4 If the Contractor is 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.

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 favor of the Contractor's bankers of any money due or to become due under this Contract, without the prior written consent of the PHPA-I.

4 Sub-letting

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, Employees or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, employee 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

5 Language and Law

5.1 The Contract documents shall be drawn up in English. All correspondence and documents relating to the bid, exchanged by the bidder and the PHPA-I, shall be submitted in the prescribed form in English. All supporting documents and printed literature in connection with the bid shall be preferably in English.

The law to which the Contract is to be subject and according to which the Contract is to be construed shall be the law for the time being in force in Bhutan and within the jurisdiction of Thimphu courts.

5.2 ***Documents Mutually Explanatory***

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 (Forms).

6 Drawings

6.1 ***Custody of Drawings***

The drawings shall remain in the sole custody of the Engineer-in-Charge, but 2 copies thereof shall be furnished to the Contractor free of charge. The Contractor shall make and provide at his own expense, any further copies required by him.

6.2 ***One copy of drawings to be kept on site***

One copy of 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.

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

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.

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 defects in the design of or specifications for the Works which are discovered when reviewing the Bidding Document 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 Specifications for Building and Road Works (latest) or I.S. Code 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 9.00 AM and 5.30 PM on working days and urgent correspondence at any time on all days.

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-I in the Proforma annexed, with such modification as may be necessary.

10 Performance Security

10.1 For the due performance of the Contract, the Contractor shall furnish to the PHPA-I a Performance Security in the form of Bank Guarantee/Demand Draft. The amount of the Bank Guarantee/Demand Draft shall be ***10% of the Contract Price***. The bank guarantee/demand draft shall be issued by any Financial Institutions in Bhutan/India. The cost of complying with the requirements of this Clause shall be borne by the Contractor unless the Contract otherwise provides.

10.2 The proceeds of the Performance Security shall be payable to PHPA-I 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 issue of completion certificate.

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.

10.5 Performance Security shall not be refunded till the Contractor produces NOC from all concerned including the Labour and Environmental officers. As soon as the work is virtually complete, the Contractor shall apply for the Clearance Certificate to the Labour/Environmental Officer under intimation to the Engineer-in-Charge. On receipt of the said communication, the Engineer-in-Charge shall write to the Labour/Environmental Office to intimate if any complaint is pending against the Contractor in respect of the work. If no complaint is pending on record after completion of the work and/or no communication received from the Labour/Environmental Officer to this effect till 6 months after the date of completion, it will be deemed to have received the Clearance Certificate and the security deposit will be released if otherwise due.

11 Inspection of Site

The Contractors are advised to inspect and examine 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. The costs of visiting the site shall be at the bidder's own expense.

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 stated in the priced Bill of Quantities and the Schedule of Rates, if any, which Bid rates 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/completion and maintenance of all the permanent works.

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.

14 Programme to be furnished

14.1 Within a period of 15 days, the Contractor shall, after the acceptance of his Bid by PHPA-I, submit to the Engineer-in-Charge for his approval, 2 copies of the detailed **Construction Programme** in MS Excel or MS Project showing the order of sequence and procedure in which

he proposes to carry out the Works. The Contractor's programme shall conform to the total time period and completion of the work specified in Clause-40 hereof. The Contractor shall thereafter revise the programme on monthly basis (if required) and submit to the Engineer-in-Charge by first week of following month.

14.2 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.

14.3 The programme shall cover activities on the Site and procurement and delivery activities.

14.4 The programme shall be orderly and realistic to meet this requirement and should include a chart of the principal quantities of Work forecast for monthly execution, and a schedule of payments expected to be made to the Contractor by the PHPA-I.

14.5 The Contractor shall promptly advise the Engineer-in-Charge of any occurrence requiring substantial revision of the programme, giving a detailed explanation of the cause of the revision, and shall furnish a revised programme within 15 days of such occurrence.

14.6 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-40 hereof.

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

14.8 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.

14.9 The Contractor shall have to obtain prior approval of the Engineer-in-Charge for the sequence of construction which he proposes to adopt.

15 Contractor's Superintendence

15.1 The Contractor shall provide all necessary superintendence during execution of the work and as long thereafter as may be necessary for proper fulfilling of the obligations under the Contract.

15.2 The Contractor shall immediately after receiving letter of award, intimate in writing to the Engineer-in-Charge the name, qualification, experience, age, address and other particulars along with Certificates of the Site Engineer to be the In-Charge of the work.

15.3 The Engineer-in-Charge shall within 15 days of receipt of such communication intimate in writing his approval or otherwise of Site Engineer of the Contractor.

15.4 Any such approval may at any time be withdrawn and in case of such withdrawal the Contractor shall appoint another such Site Engineer according to the provisions of this Clause. Decision of the EIC shall be final and binding on the Contractor in this respect.

15.5 Such Site Engineer shall be appointed by the Contractor soon after receipt of the approval from Engineer-in-Charge and shall be available at site within 15 days of start of work.

15.6 The Site Engineer shall on receiving reasonable notice from the Engineer-in-Charge present himself to the Engineer-in-Charge and/or at the site of work, as required, to take instructions. Instructions given to the Site Engineer shall be deemed to have the same force as if these have been given to the Contractor. The Site Engineer representative and/or the Contractor or his responsible authorized agent shall be available at site as well as during recording of measurement of works and whenever so required by the Engineer-in-Charge by a notice as aforesaid and shall also note down instructions conveyed by the Engineer-in-Charge or his designated representative in the site order book and shall affix his signature in token of noting down the instructions and in token of acceptance of measurement.

15.7 If the Engineer-in-Charge, is convinced that no such Site Engineer or agent is effectively appointed or is effectively attending or fulfilling the provision of this Clause, then the decision of the Engineer-in-Charge as recorded in the site order book and measurement recorded in Measurement Books shall be final and binding on the Contractor.

15.8 In case the Site Engineer of the Contractor does not discharge his duties satisfactorily, the Engineer-in-Charge shall have full powers to suspend the work and Contractor shall be held responsible for the delay so caused to the work.

16 Contractor's Employees

16.1 The Contractor shall provide its employees on the Site in connection with the execution and maintenance of the Works:

16.1.1 only such technical assistants as are skilled and experienced in their respective trades and such sub-agents competent to give proper supervision to the work they are required to supervise, and

16.1.2 such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

16.1.3 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.

17 Setting out

17.1 The Contractor shall be responsible for 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.

17.2 The Contractor shall ensure the correctness thereof and shall carefully protect and preserve all bench marks, pegs and other things used in setting out the Works.

18 Watching and Lighting

18.1 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.

18.2 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 owners/occupiers of the adjacent property and of the public and shall remain responsible for any accidents that may occur on account of his failure to take proper and timely precautions.

19 Care of Works

19.1 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.

19.2 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 Clauses 19.5 & 19.6 of this Clause, the Contractor, at his own cost, shall rectify such loss or damage so that the permanent works conform in every respect within provision of the Contract to the satisfaction of 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-46.

19.3 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 Clause 19.5, 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-I which sum shall be determined by the Engineer-in-Charge in accordance with Clause 47 and Clause 48.

19.4 In the event of any loss or damage which may occur or arise out of any of the risks defined in Clause 19.6, 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 Clause 19.6 the same shall be made good/rectified by the Contractor at the cost of the PHPA-I which sum shall be determined by the Engineer-in-Charge under the provisions of the Contract.

19.5 ***The PHPA-I's risks are as under:***

19.5.1 Loss or damage due to the use or occupation by the PHPA-I of any section or part of the Permanent Works except as may be provided for in the Contract.

19.5.2 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.

19.6 **Force Majeure/Excepted risks are as under:**

19.6.1 war, hostilities (whether war be declared or not), invasion, act of foreign enemies, act of public enemies.

19.6.2 riot, commotion, disorder, any epidemic/pandemic, strike or lockout by persons other than the Contractor's personnel.

19.6.3 Ionizing, radiations or contamination by radio activity from any nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly.

19.6.4 Pressure waves caused by aerial devices travelling at supersonic speeds.

19.6.5 any operation of the forces of nature against which an experienced Contractor could not reasonably have been expected to take precautions.

20 Damage to Persons and Property

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the PHPA-I 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-I, his agent, Employees 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 Employees or agents, such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the PHPA-I, its Employees or agents or other Contractors for the damage or injury.

21 Third Party Insurance

21.1 Before commencing the execution of the Works, the Contractor, but without limiting his obligations and responsibilities under Clause-20 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-I, or to any person, including any employee of the PHPA-I, by or arising out of the execution of the Works or in the carrying out of the Contract, otherwise, than due to the matters referred to in the provision to Clause- 20 hereof.

22 Accidents or Injury to Workmen

22.1 The PHPA-I 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-I, its agents or Employees. The Contractor shall indemnify and keep indemnified the PHPA-I 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.

22.2 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 24 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 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-I 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-I as a consequence of failure to give notice or failure to conform to the provisions of any Act in regard to such accidents.

22.3 ***Insurance against Accident, etc. to Workmen***

The Contractor shall insure against such liability with an insurer approved by the PHPA-I, 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-I 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.

23 Giving of Notices, Payment of Fees and Compliance with Statutes and Regulations etc.

23.1 *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 by-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.

23.2 *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 by-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-I indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or by-law.

23.3 The Contractor shall be fully responsible for compliance to any Notices, payment of any fees etc. of under this Clause.

24 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-I and the Contractor, be deemed to be the absolute property of the PHPA-I/RGoB. The Contractor should protect such findings from any damage/theft & notify immediately to the Engineer-in-Charge &/or his authorized representative.

25 Compliance with Tax laws

25.1 The Royal Government of Bhutan shall exempt taxes, levies/duties for plant, construction materials & equipment, machineries and services imported for direct use in the construction of the Project. Any procurement made under tax exemption basis shall be liable for tax payment as per the Tax Act of the Kingdom of Bhutan if disposed off in Bhutan.

25.2 Any Contractor, sub-Contractor or consultants recruited in connection with the Project will be liable for tax in Bhutan as per the Income Tax Act of the Kingdom of Bhutan, 2001. Further, such recruiting agency shall be responsible for deducting and remitting Tax Deducted at Source (TDS) as per the provision of the said Income Tax Act.

25.3 With effect from 1st July 2017, all exports (including ones to Bhutan) are 'zero rated items' under the GST regime in the GoI. Therefore, no reimbursement or costs on account of any tax implications will be admissible. However, in the situation, if the categorization is changed for exports from 'zero rated' to any other slab, the same will be applicable.

25.4 The Royal Government of Bhutan shall receive royalty from the Contractor for the timber, boulders, aggregates and other construction materials required from Bhutan for the work.

25.5 The Contractor shall obtain necessary permits and deposit royalty with local authorities for supply of such materials required for the work.

26 Interference with Traffic and Adjoining Properties

All operations necessary for the execution of the Works shall, in 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-I or of any other person. The Contractor shall save harmless and indemnify the PHPA-I 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.

27 Extraordinary Traffic

27.1 *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 increase in traffic frequency as will inevitably arise from the moving of plant and material from and to the Site, shall be limited, as far as reasonably possible to arise any unnecessary traffic congestion damage or injury which may be occasioned to such highways & bridges.

27.2 *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-I 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 Clause 27.1, then the amount certified by the Engineer-in-Charge to be due to such failure shall be paid by the Contractor to the PHPA-I.

28 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-I and their workmen and to the workmen of the PHPA-I 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-I may enter into in connection with or ancillary to the Works.

29 Upkeep of Site

29.1 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.

29.2 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 48 hours, and in the event of non-compliance by the Contractor, get the area cleaned by some other agency at the cost of 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.

30 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

31 Labour

31.1 *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 Contractor shall recruit local manpower (skilled and unskilled) and use local resources to the extent possible.

31.2 *Supply of Water*

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.

31.3 *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.

31.4 ***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 neighborhood of the Works against the same.

31.5 ***Contractor to Follow Labour and Employment Act 2007***

The Contractor shall, in respect of labour employed by him, comply with the provision of the various labour laws, Minimum Wages as per Labour ***and Employment Act 2007*** and its Rules and Regulationof RGoB and shall indemnify the PHPA-I in respect of all claims that may be made against the PHPA-I 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.

31.6 ***Observance by Sub-Contractors***

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

32 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.

MATERIALS AND WORKMANSHIP

33 Materials and Workmanship

33.1 ***Materials and Workmanship***

33.1.1 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-I other than those materials to be issued by PHPA-I, as listed under materials inventory available with PHPA-I. 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.

33.1.2 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.

33.1.3 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 30 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.

33.1.4 Any assistance that the Engineer-in-Charge can give to the Contractor for arranging the materials shall be provided on a "no responsibility basis".

33.2 ***Quality of materials, Workmanship and Tests***

33.2.1 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.

33.2.2 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.

33.2.3 The workmanship shall be of the kind described in the Contract and in accordance with the Engineer-in-Charge's instructions.

33.2.4 All the materials and the workmanship shall be subjected, from time to time, to such tests as the Engineer-in-Charge may require. 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.

33.3 ***Cost of Samples***

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

33.4 ***Cost of Tests***

Cost for any test intended by or provided for in the Contract shall be borne by the Contractor.

34 Inspections of Operations

The Engineer-in-Charge or any person authorized by him shall, at all times, have access to the Works and to all places where the 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.

35 Examination of Work Before covering up

35.1 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.

35.2 ***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.

36 **Removals of Improper Work and Materials**

36.1 ***The Engineer-in-Charge shall have power to issue instructions from time to time for:***

36.1.1 the removal from the Site, within such time 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,

36.1.2 the substitution of proper and suitable materials, and

36.1.3 the removal and proper re-execution, notwithstanding any previous test thereof or interim payment therefor, 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.

36.2 ***Default of Contractor in Compliance***

In case of default on the part of the Contractor in carrying out such instruction, as specified in Clause 36.1, the Engineer-in-Charge shall be entitled to employ and pay other persons to carry out the same and all expenses consequent 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.

37 **Suspension of Work**

37.1 The Contractor shall on the order/instructions 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 the Contractor shall during such suspension properly protect and secure the Works as is necessary in the opinion of the Engineer-in-Charge. If such suspension is:

37.1.1 provided for in the Contract, or

37.1.2 necessary for the proper execution of the Works or by reason of weather conditions or on account of any default on the part of the Contractor, or

37.1.3 necessary for the safety of the Works or any part thereof,

then, the Contractor shall not be entitled to payment of extra costs (if any) incurred by him during the period of suspension of the Works. Provided however that in the event of any suspension being ordered by the Engineer-in-Charge for reasons other than aforementioned and if each such period of suspension exceeds a continuous period of 14 days, the Contractor shall be entitled to such extension of Time for Completion of the Works as the Engineer-in-Charge may deem proper having regard to the period or periods of such suspensions and shall also be entitled to such compensation as the Engineer-in-Charge may consider to be reasonable cost incurred by the Contractor during the periods of such suspension.

37.2 If the progress of Works or any part thereof is suspended on the order of the Engineer-in-Charge for a continuous period of not less than 90 days at a time for reasons other than those referred to in sub-Clause 38.1.1, 38.1.2 or 38.1.3 of Clause 37.1 above, the Contractor may serve a written notice to the Engineer-in-Charge requiring permission within 15 days from the receipt thereof to proceed with the Works or that part thereof in regard to which progress is suspended and if such permission is not granted within the said 15 days period, the Contractor may by a further written notice served on the PHPA-I elect to treat the suspension where it affects part only of the Works as an omission of such part and where it affects the whole of the Works as an abandonment of the Contract by the Employer.

COMMENCEMENT AND DELAYS

38 Commencements of Works

The Contractor shall commence the Works on Site within a period of ***30 days*** from the date of issue of the Letter of Award.

39 Possession of Site

39.1 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, the Engineer-in-Charge in turn will issue 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.

The Contractor shall not be allowed, without any prior consent of the Engineer-in-Charge, to occupy other Government and/or PHPA-I land for temporary use.

39.2 ***Rights of Way and Facilities***

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.

39.3 The Contractor shall not be entitled for any additional payment against any delay of handing over of site up to the extent of 30 days from the date of issuance of Letter of Award.

40 Time for Completion

40.1 The period of completion of the whole of the Work shall be specified in SCC or such extended time as may be allowed under Clause-41 hereof. The period of completion shall be reckoned from 30 days of issue of the Letter of Award to the Contractor by the PHPA-I. The programme submitted by the Contractor in accordance with Clause-14 should match with the total time of completion as specified in this Clause.

40.2 The time for completion of the works shall be extended in the event of any deviations resulting in additional cost over the Contract Price. If requested by the Contractor, same shall be worked out in proportion to additional cost of the altered, additional or substituted work against original Contract Price.

41 Extension of Time for Completion

41.1 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 which results in stoppage of work and such stoppage of work is duly recorded in the hindrance register maintained by Contractor and verified by PHPA-I. The Contractor shall, within 28 days of such circumstances, or as soon thereafter as is practicable, submit to the Engineer-in-Charge, full and detailed particulars of any extension of time to which he may consider himself entitled to. The Engineer-in-Charge shall determine the period of such hindrance and accordingly notify the Contractor for time extension. 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.

41.2 The Contractor shall maintain a record of hindrances in the ***Hindrance Register*** (Form No-11) which shall be endorsed by the Engineer-in-Charge or Engineer-in-Charge's representative on monthly basis. Only such hindrances approved by Engineer-in-Charge will be taken into consideration for granting of any time extension.

41.3 ***Site Order Book*** shall be maintained at site systemically and securely by the Engineer-in-Charge or Engineer-in-Charge's Representative.

42 Shift Works

42.1 To achieve the required progress, the Work may be carried out round the clock. The period of completion and number of working days shall not be affected by the number of shifts. No extra amount on account of any shift work is payable to the Contractor.

43 Rate of Progress

43.1 To ensure proper progress during the execution of the Works, the Contractor shall complete $1/8^{th}$ of the Works before $1/4^{th}$ of the whole time allowed in the Contract has elapsed, $3/8^{th}$ of the Works before one half of such time has elapsed and $3/4^{th}$ of Works before $3/4^{th}$ of such time has elapsed.

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43.2 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 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.

44 Liquidated Damages for Delay

44.1 If the Contractor fails to achieve completion of the Works within the time prescribed by Clause-40 hereof, then the Contractor shall pay to the PHPA-I, the sum stated in SCC as liquidated damages. The PHPA-I 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.

44.2 The Liquidated Damages penalty will be charged for all delays due to the fault of the Contractor at 1% per week subject to maximum of 10% of the Contract Price.

44.3 In the event of termination of the Contract in accordance to Clause-59 of GCC, referred hereof, PHPA-I shall be entitled to recover Liquidated Damages up to 10% of the Contract price. The Performance Security shall be adjusted towards Liquidated Damages. The balance work (if any) under the Contract shall be executed in any other manner by PHPA-I by recovering the value equivalent to ***20% of balance works up to a maximum of 10% of the Contract Price*** from Contractor.

45 Certification of Completion of Works

When the whole of the Works have been substantially completed and have satisfactorily passed any final test that may be prescribed by the EIC, the Contractor may give a notice to that effect to the Engineer-in-Charge or to the Engineer-in-Charge's representatives accompanied by an undertaking to finish any outstanding work within a mutually agreed period. 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 21 days of the date of delivery of such notice either issue to the Contractor, a Certificate of Completion stating the date on which, in his opinion, the Works are substantially 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 substantial 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 21 days of completion to the satisfaction of the Engineer-in-Charge.

MAINTENANCE AND DEFECTS

46 Maintenance and Defects

46.1 *Defects Liability Period*

In these Conditions, the expression "Defects Liability Period" shall be as specified in SCC, calculated from the date of completion of the Works, certified by the Engineer-in-Charge in accordance with Clause -45 hereof.

46.2 *Execution of Work of Repair, etc.*

To the intent that the Works shall, at or as soon as practicable after the expiration of the Defects Liability Period be delivered to the PHPA-I 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-45 hereof, as soon as practicable after such date and shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer-in-Charge during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of the Engineer-in-Charge prior to its expiration.

46.3 *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.

46.4 *Remedy on Contractor's Failure to carry out Work Required*

If the Contractor fail to do any such work as aforesaid required by the Engineer-in-Charge, the PHPA-I 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.

ALTERNATIONS, ADDITIONS, OMISSIONS AND EXTRA ITEMS

47 Variations

47.1 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:

47.1.1 increase or decrease the quantity of any work included in the Contract;

47.1.2 omit or substitute any such work;

47.1.3 change the character or quality or kind of any such work;

47.1.4 change the levels, lines, positions and dimensions of any part of the work;

47.1.5 execute, additional work of any kind necessary for the completion of the works, and

47.1.6 change any specified sequence, or timing of construction of any part of the work.

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-48 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 and substituted work which the Contractor may be directed to do in the manner above specified as part of the Works, shall be carried out by the Contractor on the same conditions in all respects on which he agreed to do the main Works.

48 Determination of Price Variation

48.1 Upon certified completion of the whole Works, if reduction or increase in the total value of the work is found to be within 20% of initial Contract Price, then there shall be no change in the Contract rates for individual items of work specified in the bill of quantities irrespective of the quantum of variation in individual items.

48.2 However, if reduction or increase is found to be more than 20% of initial Contract price, the increase in payment for minus variation or decrease in payment for plus variation shall be specified based on slabs of variation in the Contract value as specified below:

Variation in Value of Works	Increase in Payment for minus variation	Decrease in Payment for plus variation
Up to 20%	Nil	Nil
Above 20% and up to 35 %	6.00%	3.00%
Above 35% and up to 60%	8.00%	4.00%
Above 60 % and up to 100%	10.00%	5.00%
Above 100%	-	5.00%

While working out the value of Works for the purpose of variation, the extra items for which new rates have been paid and payment towards price adjustment; and the adjustment towards statutory variations shall not be considered.

Illustration

a) In case of variation in value of Works by (plus) + 60 percent, the payment for (60-20) percent i.e., 40 percent of Contract value of Works shall be decreased by 4 % (four percent.). The reduction in Contract rates shall commence as soon as the value of Works executed reaches 120% of Contract Price.

b) In case of variation in value of Works by (minus) – 55 percent, the payment for (55-20) percent i.e., 35 percent of Contract value of Works shall be increased by 8% (eight percent).

48.3 No variation limit for any individual BOQ item has been specified in these GCC except for the payment due to the Contractor as detailed above. No claim for revision of rate(s) for any individual BOQ item shall be admissible irrespective of the extent to which the ordered quantity may get revised (+) or (-) during the actual execution of the Works.

48.4 Within 14 days of the date of instruction for executing varied Works and before the commencement of such Works, notice shall be given either:

a) by the Contractor to the Employer of his intention to claim extra payment or a varied rate or price, or

b) by the Engineer-in-Charge to the Contractor of the intention to vary a rate or price.

48.5 The Contractor within 14 days from the receipt of an order to execute any extra item shall submit rate analysis to the Engineer-in-Charge supported by documentary evidence of basic rates adopted therein; having regard to the cost of materials, actual wages of labour, and other operational costs. The analysis so provided by the Contractor shall form the basis for determination of rates for such extra items. Extra items of work/supply which are not provided in the Bill of Quantities shall be paid on the basis of Bhutan Schedule of Rates (BSR) after adjusting such rates for the place of Works and cost index prevailing at the time of award. If rates for such extra items are not available in BSR, the rates for such items shall be determined based on the actual expenditure relating to that item including cost of materials, fabrication/machinery handling and erection at Site plus twenty percent (20%) towards overheads including profits. The price of varied items determined by the Engineer-in-Charge shall be final and binding on the Contractor. No payment shall be made for the items of Works ordered to be omitted.

48.6 If there is delay in the agreement between Employer and the Contractor on the rate of varied Works, provisional rates @ 75% of the rates as determined by the Engineer-in-Charge shall be payable as a provisional payment till such time as the rates are finalized.

48.7 Under no circumstances, the Contractor shall at any stage suspend work on account of non-settlement of rates of such item(s).

PLANT, TEMPORARY WORKS AND MATERIALS

49 Plants, Temporary Works and Materials

49.1 ***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. He shall furnish along with the bid a list of items of all Constructional Plant and machinery which he shall be deploying on the particular job. He shall also make necessary arrangements for supplementing them at his own expense, if required to do so by the Engineer-in-Charge at the time of award of the Contract, or later on as the Work progresses.

49.2 ***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.

49.3 ***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 after obtaining written permission from the Engineer-in-Charge.

49.4 ***PHPA-I not Liable for Damage to Plant etc.***

PHPA-I 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-19 and Clause-60 hereof.

50 Approval of Materials etc. not implied

The operation of Clause-49 hereof shall not be deemed to imply any approval by the Engineer-in-Charge of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer-in-Charge.

MEASUREMENT

51 Quantities

The quantities set out in the Bill of Quantities are the approximate estimated quantities of the Work, and 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.

52 Works to be measured

52.1 Engineer-in-Charge shall, except as otherwise provided, ascertain and determine the measurement value in accordance with the Contract of work done.

52.2 All measurement of all items having financial value shall be entered in Measurement Book and/or level in the field book so that a complete record is obtained of all works performed under the Contract.

52.3 All measurements and levels shall be taken jointly by the Engineer-in-Charge or his authorized representative and by the Contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer-in-Charge and the Contractor or his representative as token of his acceptance. If the Contractor objects to any of the measurement recorded, a note shall be made to that effect with reasons and signed by both the parities.

52.4 If for any reason, the Contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge shall not entertain any claim from Contractor for any loss or damages on this account. If the Contractor or his authorized representative does not remain present at the time of such measurements after the Contractor or his authorized representative has been given a notice in writing 3 days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.

52.5 The Contractor shall, without extra charge, provide all appliances, instruments, labour and other items necessary for survey, measurement and recording of levels etc.

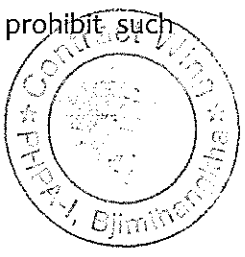
52.6 In the case of items which are not covered by specifications, measurements issued by the Ministry of Works and Human Settlement, RGoB and if for any item no such standard is available, then a mutually agreed method shall be followed.

53 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. However, the guidelines given in relevant part of Specifications of Building & Road Works (latest) published by the Ministry of Works and Human Settlement, RGoB, will prevail in case of any confusion that may arise during measurement.

54 Security Rules

The Work 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 or by the Royal Government of Bhutan. 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 Work area. If required, the Engineer-in-Charge shall have the authority to take the help of local District Administration and or local police, if it is considered absolutely necessary.

55 Foreign Personnel

55.1 The Contractor shall submit to the PHPA-I, 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 (either passport or voter identity card only will be acceptable), 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.

55.2 Any person unsuitable and unacceptable to the PHPA-I shall not be brought to Bhutan. Any person, if found unsuitable or unacceptable to the PHPA-I on a later date, shall within a reasonable time, be repatriated by the Contractor, who shall make alternative arrangements for providing a suitable replacement.

55.3 No person brought to Bhutan for the purposes of the Works shall be repatriated without the consent of the PHPA-I 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-I may give permission for such repatriation provided it is satisfied that the progress of Works shall not suffer due to such repatriation/replacement.

55.4 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-I 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 nor shall they take part in any local politics.

55.5 PHPA-I will assist the Contractor, to the extent possible, in obtaining necessary permits to travel to Bhutan and back by issuing necessary Certificates and other information required by the RGoB and other agencies.

CERTIFICATE AND PAYMENT

56 Certificate and Payment

56.1 ***Interim Payment Certificate***

The Contractor shall submit an application for interim payment, in duplicate to the Engineer-in-Charge at the end of each month in a Proforma approved by the Engineer-in-Charge. The application shall include the following items, as applicable, which shall be taken into account in the sequence listed.

56.1.1 the estimated Contract Price of the Permanent Works executed up to the end of the month in question, obtained by applying the base unit rates and prices in the Bill of Quantities to the quantities measured by the Engineer-in-Charge pursuant to Clause-52,

56.1.2 the estimated Contract value of the Permanent Works obtained as in 56.1.1, executed up to the end of the previous month.

56.1.3 the estimated Contract value at base unit rates and prices, of the Permanent Works for the month in question obtained by deducting 56.1.2 from 57.1.1.

56.1.4 an amount reflecting any changes pursuant to Clause-63 hereof.

56.1.5 any amount to be deducted on account of the repayment of Advances under the provisions set forth in Clause 56.2 and

56.1.6 any other sum to which the Contractor may be entitled under the Contract.

It may be noted that all interim payment would be treated as provisional payment.

Within 28 days of receipt of the said applications for interim payment, it shall be approved or amended such that, in the Engineer-in-Charge's opinion, the Certificate reflects the amount due to the Contractor in accordance with the Contract. In case of differences in opinion as to the value of any item, the Engineer-in-charge's view shall prevail. When the Engineer-in-Charge has determined the amount due to the Contractor, he shall issue to the Contractor a Certificate hereinafter called "Interim Payment Certificate" certifying the amount due to the Contractor, and

No Interim Payment Certificate shall be issued for a sum less than 1% of the Contract Price.

The Engineer In-Charge may make any correction or modification in any previous interim Payment Certificate which was issued by him. The Engineer In-Charge shall have authority to omit or reduce the value of such work in any Interim Payment Certificate if any work is not carried out to his satisfaction.

56.2 ***Retention Money***

56.2.1 Deduction of Retention Money amounting to **10%** (ten percent) of the amount included in any monthly Interim Payment Certificate pursuant to Clause 56.1 due to the Contractor on account of Permanent Works executed shall be made by the Engineer-in-Charge.

56.2.2 The Retention Money shall be certified due for payment after the expiration of the Defect Liability Period, notwithstanding that at such time there may be outstanding claims by the Contractor against the PHPA-I. 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-46 hereof, the PHPA-I 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, and

56.2.3 On completion of the whole of the works, the Retention Money may be substituted by a Bank Guarantee issued by any Financial Institution in Bhutan/India acceptable to PHPA-I. The Bank Guarantee on the proforma of PHPA-I form shall be valid until the issue of the Defect Liability Certificate by PHPA-I.

56.2.4 Retention Money shall not be refunded till the contractor produces a NOC from all concerned including the labour officers. As soon as the work is virtually complete the Contractor shall apply for the clearance certificate to the Labour Officer under intimation to the Engineer-in-Charge. On receipt of the said communication, the Engineer-in-Charge shall write to the Labour Office to intimate if any complaint is pending against the Contractor in respect of the work. If no complaint is pending on record till after three months after completion of the work and/or no communication received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the security deposit will be released if otherwise due.

56.3 ***Advances***

Advances for execution of the Works, if required by the Contractor, will be granted in the following cases provided that the advances spent only for the Work under the Contract.

56.3.1 *Mobilization Advance*

i. Advance to the extent of **10%** of the Contract Price can be granted for mobilization of labour, stores and workshops including camps, labour sheds, and Construction Plant, etc. for preliminary and enabling Works. The Contractor is to use the advance payment only to pay for equipment, Plant, Materials and Mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance has been used in this way by supplying copies of invoices or other documents to the project manager.

ii. The release of this advance shall be regulated and governed by the following conditions:

   a. The advance shall be interest free.

   b. The advance will be released if requested by the Contractor in writing within one month of the order to commence the work.

   c. The advance will be disbursed on the production of the irrevocable Bank Guarantee (on the Proforma in Forms) from any Financial Institution of Bhutan/India for an amount equal to the required advance payment and the BG shall be valid till the advance is fully recovered.

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 deduction shall commence in the next Interim Payment Certificate following that in which the total of all such payments to the Contractor has reached 10% of the

Contract Price until such time as the advance has been fully repaid, provided always that the entire amount of advance shall be completely deducted by the time the total of all payments to the Contractor has reached 80% of the Contract Price.

56.3.2 *Secured Advance*

The Contractor shall be entitled to Secured Advance during the execution of the work up to 75% of the assessed value of any materials which in the opinion of the Engineer-in-Charge are non-perishable, non-fragile and non-combustible and are in accordance with the Contract and which have been brought to site in connection therewith and are adequately stored and/or protected against damage by weather or other causes but which have not at the time of advance been incorporated in the Works. When materials on account of which an advance have been made under this sub-Clause are incorporated in the work, such advance shall be recovered/deducted from the next payment of the Contractor. Such Secured Advance shall also be payable on other items of perishable nature, fragile and combustible with the approval of the Engineer-in-Charge and provided that the Contractor take comprehensive insurance cover for the full cost of such materials. The decision of the Engineer-in-Charge shall be final and binding on the Contractor in this matter. No Secured Advance, shall however, be paid on high-risk materials such as glass, petrol, diesel etc.

56.3.3 *Corrections*

Since all the interim payment Certificates are issued provisionally, the Engineer-in-Charge may, by any Interim Payment Certificate, make any correction or modification in any previous Certificate (other than one purporting to be Final Payment Certificate) which shall have been issued by him and shall have power to modify or withhold any Interim Certificate if the Works or any part thereof, are not being carried out to his satisfaction.

56.4 ***PHPA-I's materials inventory***

The value of PHPA-I's materials consumed is recoverable and the deduction of its cost shall be made from the interim payments certified by the Engineer-in-Charge under the Contract. The deduction shall commence from the Interim Payment Certificate upon actual consumption of the materials.

56.5 ***Final Account***

56.5.1 Not later than 2 months after the date of issue of the Certificate of Completion of Works in pursuance of Clause-45 hereof, the Contractor shall submit a draft statement of Final Account and supporting documentation to the Engineer-in-Charge showing in detail the value of the work done in accordance with Contract, together with all further sums which the Contractor considers to be due to him under the Contract up to the date of Defects Liability Certificate (Hereinafter called the "Contractor's Draft Final Account").

56.5.2 Within 4 months after receipt of the Contractor's Draft Final Account and of all information reasonably required for its verification, the Engineer-in-Charge shall determine the value of all matters to which the Contractor is entitled under the Contract. The Engineer-in-Charge

shall then issue to the Contractor a statement (hereinafter called the "Engineer-in-Charge's Draft Final Account") showing the final amount to which the Contractor is entitled under the Contract. The Contractor shall sign the Engineer-in-Charge's Draft Final Account as an acknowledgement of the full and final value of the work performed under the Contract and shall promptly submit a signed copy (hereinafter called the "Final Account") to the Engineer-in-Charge within 30 days, failing which the Engineer-in-Charge shall consider it as accepted by the Contractor.

56.6 ***Final Certificate***

On receipt of the Final Account, the Engineer-in-Charge shall promptly prepare and issue to the Contractor a Final Payment Certificate certifying any further money due to the Contractor in respect of the Contract. Payment to the Contractor of the amount due under Final Payment Certificate shall be made by the PHPA-I within 60 days of such Certificate being issued. In the event of non-payment/ failing to collect by Contractor within the said period, no interest shall accrue to the Contractor.

57 Approval only by Maintenance Certificate

No Certificate other than the Maintenance/Defects Liability Certificate referred to in Clause-58 hereof shall be deemed to constitute approval of the Works.

58 Maintenance Certificate

58.1 The Contract shall not be considered as completed until a Maintenance/Defects Liability Certificate shall have been signed by the Engineer-in-Charge stating that the Works in all respect have been completed and maintained to his satisfaction. This Certificate shall be issued by the Engineer-in-Charge within **28** days after the expiry of the Defects Liability Period or if different periods become applicable to different sections or parts of the Works, the expiry of the latest such period, or as soon thereafter as any work ordered during such period, pursuant to Clause-46 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, using thereof or any part thereof by the PHPA-I.

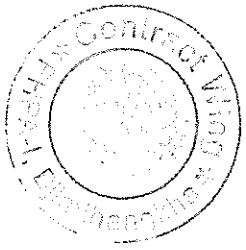
58.2 Cessation of PHPA-I's Liability

The PHPA-I 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 issuing the Maintenance/Defects Liability Certificate.

REMEDIES AND POWERS

59 Remedies and Powers

59.1 ***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 favors 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-I 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:

59.1.1 has abandoned the Contract, or

59.1.2 without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for 28 days after receiving written notice from the Engineer-in-Charge to proceed, or

59.1.3 has failed to remove materials from the site or to pull down and replace work for 28 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

59.1.4 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

59.1.5 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 14 days' notice in writing to the Contractor, enter upon the Site 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-I 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 at the risk and cost of the Contractor in accordance with Clause 44.3.

59.1.6 PHPA-I 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-I 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 the Contractor under the Contract.

59.2 ***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-I, fix and determine ex-party, 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.

59.3 **Payment after Forfeiture**

59.3.1 If the PHPA-I 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 Defects Liability Period and thereafter until the costs of execution and maintenance, damages for delay in completion, if any, and the percentage to apply to the value of work not completed, as indicated in the SCC, 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-I the amount of such excess and it shall be deemed a debt due by the Contractor to the PHPA-I and shall be recoverable accordingly.

59.3.2 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.

SPECIAL RISKS/TERMINATION

60 Special Risks/Termination of Contract

60.1 ***Special Risks***

The special risks are war, hostilities (whether war be declared or not), invasion, act of foreign enemies, and all other risks described in Clause-19.6 hereof.

60.2 ***Termination of the Contract***

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 endeavors to complete the execution of the Works. Provided always that the PHPA-I 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-68 hereof, terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.

60.3 ***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 dispatch, remove from the Site all Constructional Plant and shall give similar facilities to his sub-Contractors to do so.

60.4 ***Payment if Contract is Terminated***

If the Contract is terminated as aforesaid, the Engineer-in-Charge shall issue a Certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting & securing the Works less advance payments received in respect of Constructional Plant and materials and any other sums which at the date of termination were recoverable by the PHPA-I from the Contractor under the terms of the Contract. `

NOTICES

61 Notices

61.1 ***Service of Notices to 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 through post or hand delivery 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.

61.2 ***Service of Notice to PHPA-I or its Engineer-in-Charge***

All notices to be given to the PHPA-I or to its Engineer-in-Charge under the terms of the Contract shall be served to the Engineer-in-Charge, PHPA-I, Bjimthangkha, Wangdue.

61.3 ***Change of Address***

Either party may change these addresses through prior written notice.

DEFAULT OF PHPA-I

62 Default of PHPA-I

62.1 In the event of the PHPA-I failing to pay to the Contractor the amount due under any Certificate of the Engineer-in-Charge within 90 days after the same shall have become due under the terms of the Contract, subject to any deduction that the PHPA-I 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 30 days from the issue of such notice, for the reasons stated therein. However, if within the said period of 30 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-I has been remedied or no longer exists, then the Contractor shall not be entitled to terminate the Contract.

62.2 If the Contractor becomes entitled to terminate the Contract in terms of Clause 62.1, after expiry of the notice of 30 days, he may, notwithstanding the provisions of Clause 49.2 hereof, remove from the Site all Constructional Plant brought by him.

62.3 In the event of such termination, the PHPA-I 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-60 hereof.

CHANGES IN COSTS AND LEGISLATION

63 Increases or Decrease of Costs

63.1 If the prices of materials and/or wages of labour required for execution of the work increase/decrease, the Contractor's payment shall be adjusted for such variation as per provisions detailed below and the amount of the Contract shall accordingly be varied, subject to the condition that such variation in prices shall be available only for the work done during the stipulated period of the Contract as per Clause 40 including such period for which the Contract validity is extended under the provisions of Clause 41 of the Contract without any action under the Clause 44. Such variation in the prices of materials and labour, when due, shall be worked out based on the following provisions:

63.1.1 No price adjustment shall be allowed for the work within first 12 months of Contract. The base date for working out such variation for the Contract period exceeding 12 months shall be the last stipulated date of Bid submission including extension, if any.

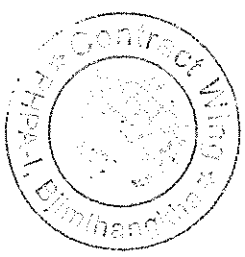
63.1.2 The cost of work on which variation will be payable shall be reckoned as 80% of the cost of work as per the bills, running or final, excluding any work for which payment is made at prevailing market rates. From this amount the value of materials supplied under Clause 56.3 of this Contract and proposed to be recovered in the particular bill, shall be deducted before the amount of compensation for price variation is worked out. In the case of materials brought to site for which any secured advance is included in the bill, the full value of such materials as assessed by the Engineer-in-Charge (and not the reduced amount for which secured advance has been paid) shall be added to the cost of work shown in the bill for operation of this Clause.

Similarly, when such materials are incorporated in the work and the Secured Advance is deducted from the bill, the full assessed value of the materials originally considered for operation of this Clause should be deducted from the cost of the work shown in the bill, running or final.

63.1.3 The compensation for escalation for material shall be worked out as per the formula given below:

Vm = 0.80 W x 0.75 x (MI-MIo)/ MIo

Where,



Vm: Variation in material cost i.e., increase or decrease in the amount in BTN to be paid or recovered.

W: Cost of work as indicated in Clause 63.1.2.

MI & MIo: Material Index (Index Number published by National Statistical Bureau) for the period under consideration and that valid on the last stipulated date of Bid submission including extension, if any (Clause 63.1.6).

63.1.4 The following principles shall be followed while working out the indices mentioned in Clause 63.1.2.

i. The compensation for price variation shall be worked out at quarterly intervals and shall be with respect to the cost of work done as per bills paid during the 3 calendar months of the said quarter. The first such payment shall be made after first 12 month of the Contract excluding the month in which the tender was accepted and thereafter at three months interval. At the time of completion of the work, the last period for payment might become less than 3 months, depending on the actual date of completion.

ii. The index (MI) relevant to any quarter/period for which such compensation is paid shall be the arithmetical average of the indices relevant to the 3-calendar month. If the period up to date of completion after the quarter covered by the last such installment of payment, is less than 3 months, the index MI shall be the average of the indices for the months falling within that period.

63.1.5 The compensation for escalation for labour shall be worked out as per the formula given below:

Vl = 0.80 W x (25/100) x (Ll-Llo)/Llo

Where:

Vl: Variation in labour cost i.e., amount of increase or decrease in BTN to be paid or recovered.

W: Cost of work as indicated in Clause 63.1.2.

Llo: Minimum daily wage in BTN. of an unskilled adult male mazdoor, fixed by the Royal Govt. of Bhutan on the last stipulated date of Bid submission including extension, if any.

Ll: Minimum wage in BTN of an unskilled adult male mazdoor, fixed by the Royal Govt. of Bhutan on the last date of the quarter previous to the one under consideration.

63.1.6 The following principles will be followed while working out the compensation as per Clause 63.1.4.

i. The price variation for labour also shall be paid at the same quarterly intervals as applicable to materials under this Clause. If such revision of minimum wages takes place during any such quarterly intervals, the compensation shall be applicable at revised rates only for work done in subsequent quarters.

ii. Irrespective of variation in minimum wages of any category of labour, for the purpose of this Clause, the variation in the rates for an unskilled adult male mazdoor alone shall form the basis for working out the compensation payable on the labour component.

iii. Subsequent Legislation

If, after the date 30 days prior to the latest date of submission of Bid for the Works, there occur in Bhutan 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 above Clause (63.1.3 & 63.1.5) 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 PHPA-I. 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 in accordance with sub-Clause 63.1.3 & 63.1.5 of this Clause.

ADDITIONAL CLAUSES

64 Bribery and Collusion

64.1 The PHPA-I shall be entitled to terminate the Contract and recover from the Contractor the amount of any loss resulting from such termination if the Contractor shall have offered or given to any person any consideration of any kind as an inducement or reward for doing, forbearing to do, any action in relation to obtaining, or in the execution of the Contract or any other Contract with the PHPA-I, or for showing favour to any person in relation to the Contract or any other Contract with the PHPA-I, or if any of the like acts shall have been done by any person employed by the Contractor or acting on his behalf (whether with or without the knowledge of the Contractor), or if the Contractor shall have come to any agreement with another Contractor or number of Contractors whereby an agreed quotation or estimate shall be offered as a bid to the PHPA-I by one or more Contractor(s).

64.2 ***In the event of such termination, the Contractor shall:***

64.2.1 proceed as provided in Clause-60.3 hereof;

64.2.2 be paid by the PHPA-I as provided in Clause-60.4 hereof, provided that any loss referred to in Clause-65.1 shall first be deducted.

65 Termination of Contract for PHPA-I's Convenience

65.1 The PHPA-I shall be entitled to terminate this Contract at any time for the PHPA-I's convenience after giving 60 days prior notice to the Contractor.

65.2 In the event of such termination, the Contractor shall:

65.2.1 Proceed as provided in the sub-Clause-60.3 hereof, and;

65.2.2 be paid by the PHPA-I as provided in sub-Clause-60.4 hereof.

66 Environment, Pollution and Noise

66.1 Subject to and without prejudice to any other provision of the Contract and the law of the land and its obligations as applicable, the Contractor shall take all reasonable precautions in connection with streams, watering, drains, water courses, underground water resources including percolating water and will prevent:

66.1.1 Silting

66.1.2 Erosion of the beds or banks

66.1.3 Pollution of the water so as to affect adversely the quality or appearances thereof or cause injury or death to animals and plants.

66.1.4 Any interference with the supply to or obstruction from such sources

66.1.5 Pollution of the water so as to affect adversely the quality thereof.

66.2 All works shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify and keep the PHPA-I indemnified from & against any responsibility for damages or in carrying out the work and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in regard or in relation to such liability. All RGoB environment protection laws will be duly implemented. The vegetation and land shall be protected from damage during the course of execution except to the barest minimum essentially required not to cause or permit any one to cause any nuisance, disturbance or pollution or inconvenience to public, employer or neighborhood of site.

67 Occupational Health and Safety

The Contractor shall comply with the Labour and Employment Act of Bhutan-2007, Regulations on Occupational Health and Safety (OHS) and Welfare-2012 or any revisions thereof. Payment towards Personal Protective Equipment (PPE) and Common Protection Measures (CPMs) as listed in BSR-2024 for worker's OHS measures at construction sites shall be released upon certification by the Engineer-in-Charge.

67.1 ***Non- compliance***

If during the performance of works under the Contract, the PHPA-I informs the Contractor that it is the opinion of the Engineer-in-Charge that the Contractor is:

67.1.1 Not conducting the work in compliance with the Contractor's Health and Safety Coordination Plan, relevant Safe Working Method Statements, relevant legislation or Health and Safety procedures provided by the RGoB from time to time, or

67.1.2 Conducting the work in such a way as to endanger the Health and Safety of Contractors employees or its Contractors' and sub-Contractors' employees, and the public.

67.1.3 Conducting the work in such a way as to risk property, plant, equipment or materials.

The Contractor shall remedy that breach of Health and safety promptly.

67.2 ***Consequences to its non-compliance***

67.2.1 The Engineer-in-Charge shall reject the Contractor's claim on worker's Occupational Health and Safety measures.

67.2.2 The Engineer-in-Charge may direct the Contractor to suspend the work until such time as the Contractor satisfies the Engineer-in-Charge that the work will be resumed in conformity with applicable health and safety provisions.

67.2.3 During periods of suspension referred to above, the PHPA-I shall not be required to make any payment whatsoever to the Contractor.

67.2.4 If the Contractor fails to rectify any breach of health and safety for which the work has been suspended, or if the Contractors performance has involved recurring breaches of health and safety, the PHPA-I may as its option terminate the work forthwith, without further obligation to the Contractor. In this event, the PHPA-I's liability shall be limited to payment for the work performed and costs incurred by the Contractor up to the time of termination or an earlier suspension of works.

SETTLEMENT OF DISPUTES

68 Arbitration

68.1 Except where otherwise provided in the Contract, all questions and disputes relating to the meaning of the specifications, design, drawings and instructions herein 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, designs, drawings, specifications, instructions, orders or 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.

68.2 If the Contractor considered any work demanded of him to be outside the requirements of the Contract, or disputes any drawings, record or decision given in writing by the Engineer-in-

Charge on any matter in connection with or arising out of the Contract or carrying out of the work, to be unacceptable, he shall promptly within 15 days request the Engineer-in-Charge in writing for written instruction or decision. There upon, the Engineer-in-Charge shall give his written instructions or decision within a period of 30 days from the receipt of the Contractor's letter.

If the Engineer-in-Charge fails to give his instructions or decision in writing within the aforesaid period or if the Contractor is dissatisfied with the instructions or decision of the Engineer-in-charge, the Contractor may, within 15 days of the receipt of Engineer-in-charge's decision, appeal to the Director (Technical), PHPA-I, who shall afford an opportunity to the Contractor to be heard, if the latter so desires, and to offer evidence in support of his appeal. The Director (Technical), PHPA-I shall give his decision within 30 days of receipt of Contractor's appeal. If the Contractor is dissatisfied with his decision, the Contractor shall within a period of 30 days from receipt of his decision, give notice to Director (Technical), PHPA-I for resolution of disputes or differences through arbitration in accordance with the rules and procedures prescribed in the SCC, failing which the said decision shall be final, binding and conclusive and not referable to adjudication by the Contractor.

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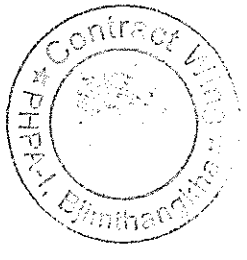
SECTION VI

SPECIAL CONDITIONS OF CONTRACT



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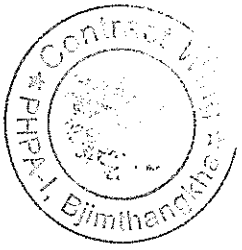
SPECIAL CONDITIONS OF CONTRACT

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 over those in the GCC.

SL	Clause Reference to GCC	Data
1	10 Performance Security	The Performance Security shall be **10%** (ten percent) of the Contract Price in the form of a Bank Guarantee (*on the proforma form of PHPA-I*) issued by any Financial Institution in Bhutan/India and shall be valid until 30 days from the date of issue of the **Certificate of Completion.**
2	21.1 Minimum amount of third-party insurance	As permissible under the policy.
3	40 Time for Completion	The work shall be completed within **12 months.** The period of completion shall be reckoned from the 30th day of issue of the Letter of Award.
4	44.2 Liquidated Damages	1.0% per week of delays subject to a maximum of 10% of the ***Contract Price.***
5	46.1 Defects Liability Period	Defects Liability Period shall be for **12 months.**
6	59.3 Payment after forfeiture	The percentage to apply to the value of the work not completed, representing the PHPA-I's additional cost for completing the balance work is ***20% up to a maximum of 10% of the Contract Price.***
7	63. Increase or decrease of costs	The prices shall remain firm during the performance of the Contract.
8	68. Arbitration	Except where a decision has become final and conclusive, all disputes arising in connection with this Contract shall be referred to arbitration at the Bhutan Alternative Dispute Resolution Centre (BADRC), Thimphu. The parties shall follow the procedure as contained in the Alternatives Resolution Act of Bhutan 2013 and its Rules & Regulations 2019.



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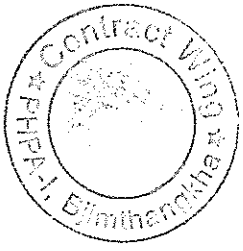
SECTION VII

GENERAL TECHNICAL SPECIFICATIONS



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GENERAL TECHNICAL SPECIFICATIONS

1. 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 therefore 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 particular 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 bought 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.

The Contractor shall be required to use locally manufactured Bhutan Standard Bureau (BSB) certified Domestic construction materials especially Concrete Blocks/Bricks, Interlocking cement earth blocks, HDPE pipes, Reinforcement & Steel section, etc. in the Buildings and Road construction works. The material shall conform to latest BSB standards or in the absence of these standards, to the equivalent IS Codes. These materials must be cost effective as compared to the imported materials of certified quality standards.

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 2025, Royal Govt. of Bhutan /I.S. Code or as directed by the Engineer-in-Charge. The Contractor shall endeavor to provide all such necessary efforts in order to comply with the intent of these specifications to the satisfaction of the Engineer-in-Charge.

2. SCOPE OF WORK

The broad scope of works in general, shall be ***"Balance finishing and architectural works of Powerhouse Utilities and Pothead Yard buildings"***. For detailed scope refer Section II – Instruction to Bidders and Section III - BDS

The work needs to be completed to meet functional requirements as per the approved design drawings, RGoB's Specifications for Building & Road Works 2025 under Steel, Tiling, Plumbing, Plastering and Painting (enclosed), Bill of Quantities and/or as directed by the Engineer-in-Charge.

5.12 Chapter 12: STEEL & OTHER METAL WORK

5.12.1 Single Section

- *Steel work in single section including cutting, hoisting, fixing and applying priming coat of red lead paint*

SW0001 *In R.S. joists*

SW0002 *In Flats*

SW0003 *In Tees, angles and channels*

Fabrication: The steel sections shall be straightened and cut square or otherwise as required to correct lengths, measurement being done 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.

Holing: The locations of the holes shall be carefully marked by measuring with steel tape and holes drilled. Finished holes shall be not more than 1.5 mm (in case of rivets/bolts passing through them being dia. 25 mm or less) or 2.0 mm (in case of rivet/bolts dia. being more than 25 mm). Holes may be punched if permitted by the Engineer. Gas cutting shall not be used to form the holes unless otherwise specified as gas cutting diminish the strength of the metal.

Painting: All surfaces, which are to be painted, oiled or otherwise treated shall be dry and thoroughly cleaned to remove all loose scale and rust. Surface not in contact but inaccessible after shop assembly, shall receive the full-specified protective treatment before assembly. This does not apply to the interior of sealed hollow sections. Parts to be encased in concrete shall not be painted or oiled.

Erection: Steelwork shall be hoisted and placed in position carefully without any damage to itself and other building work and injury to workmen. Where necessary mechanical appliance such as lifting tackles, winch etc. shall be used. The suitability and capacity of all plant and equipment used for erection shall be to the satisfaction of Engineer.

Measurement: The work as fixed in place shall be measured in running metres correct to a millimetre and their weights calculated on the basis of standard tables.

Rate: The rate includes the cost of labour and materials required for all the operations described above.

5.12.2 Built-up Section

- *Steel work riveted or bolted, in built up sections, trusses, frame-works, including cutting, hoisting, fixing in position and applying priming coat of red lead paint*

SW0010 *In R.S. joists*

SW0011 *In Tees, angles, flats and channels*

Laying Out: Steel structure shall be laid out on a level platform to full scale. This may be done to full size or in parts, as shown on drawings or as directed by the Engineer. A steel tape shall be used for measurements.

Fabrication: Fabrication shall generally be done as specified below or as specified by the Engineer in special cases having complicated structures.

Straightening, Shaping to Form and Cutting: The steel sections as specified or required, shall be straightened and cut, square or otherwise as required and to correct lengths, and measurement being done 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. In major work or where so specified, shop drawings giving complete information for the 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 the actual fabrication and approved by the Engineer. The drawings shall indicate the shop and field rivets bolts and welds. The steel members shall be distinctly marked or stencilled with paint with the identification marks as given in the shop drawings.

Great accuracy shall be observed in the 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. The base of steel columns and the position of anchor bolts shall be carefully set out. All stiffeners shall be formed by pressure, and where practicable the metal shall not be cut and welded in making these.

Making Holes: Holes through more than one thickness of material for members, such as compound stanchion and girder flanges shall, where possible, be drilled after the members are assembled and tightly clamped or bolted together. Punching may be permitted before assembly, provided the holes are punched 3 mm less in diameter than the required size and reamed after assembly to the full diameter. The thickness of material punched shall be not greater than 16 mm.

Rivet holes: The diameter for rivets and black bolts holes shall be taken as the nominal diameter of a rivet plus 1.5 mm for rivets of nominal diameter less than or equal to 25 mm, and 2.0 mm for rivets of nominal diameter exceeding 25 mm, unless specified otherwise. Holes for turned and fitted bolts shall be drilled or reamed large by 0.2 to 8 mm depending upon the dia. of bolts.

Holes shall have their axis perpendicular to the surface bored through. The drilling or reaming shall be free from burrs, and the holes shall be clean and accurate. Holes for rivets and bolts shall not be formed by gas cutting process. Holes for counter-sunk bolts shall be made in such a manner that their heads sit flush with the surface after fixing.

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 spliced, shall have clearance of not more than 5 mm. The

erection clearance for cleated ends of members connecting steel to steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm at each end but where for practical reasons, greater clearance is necessary suitably designed seating shall be provided.

Column splices and butt joints of struts and compression members depending on contact for stress transmission shall be accurately machined and close-butted over the whole section. In column caps and bases, the ends of shafts together with the attached gussets, angles, channels, etc. after riveting together shall be accurately machined so that the parts connected, butt against each other over the entire surfaces of contact. 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 bearings stiffeners shall be machined or ground to fit tightly both at top and bottom.

Preliminaries before riveting: Riveted members shall have all parts firmly drawn and held together before and during riveting, and special care shall be taken in this respect for all single-riveted connections. For multiple riveted connections, a service bolt or drift shall be provided in every third or fourth hole.

Process of riveting: The riveting shall be carried out by using steady pressure type machines. However, Engineer may permit hand riveting where such facilities are not available. The rivets shall be heated red-hot, care being taken to control the temperature of heating so as not to burn the steel. Rivets of diameter less than 10 mm may be driven cold. Rivets shall be finished neat, with heads full and of equal size. The heads shall be central on shanks and shall grip the assembled members firmly. All loose, burnt, or badly formed rivets with eccentric or deficient heads shall be out and replaced. In cutting out rivets, care shall be taken so as not to injure the assembled members. Caulking and re-cupping shall not be permitted.

For testing rivets, a hammer weighing approximately 0.25 kg shall be used. Both heads of the rivet (specially the machine head) shall be tapped. When so tested the rivets shall not give a hollow sound and/or a jar. Where so specified, further test shall be carried out to ensure the soundness of rivets. All rivet heads shall be painted with approved steel primer paint within a week of their fixing.

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 bolt 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 bolts heads and nuts shall be hexagonal unless specified otherwise. The screwed 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 ends of bolts properly.

Where necessary, washers shall be tapered or otherwise suitably shaped to give the heads and nuts of bolt a satisfactory bearing. The threaded portion of each bolt shall project through the nut at least one thread. In all cases where the 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.

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. 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. 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 steelwork 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 nodes. The trusses above 10 m in span shall not be slinged at the apex, as it will develop compression stresses in the bottom tie member. They shall be lifted by slinging 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. In case of trusses of spans up to 10 m the free end of the truss shall be laid on lead sheet or steel plate as per design, and the holes for holding down bolts shall be made in the form of oblong slots, so as to permit the free movement of the truss end. For larger spans, the truss shall be provided with bearing as per design.

Columns and stanchions shall be erected truly vertical with the necessary cross bracing etc. as per drawing and the base shall be properly fixed with the foundation concrete by means of anchor bolts etc. as per design. Anchor bolts shall be placed in the concrete foundation. These should be held in position with a wooden template. The anchor bolts shall be provided with suitable timber mould or pipe sheeve to allow for adjustment. The timber mould or pipe shall be removed after initial set of concrete. The spaces left around anchor bolts shall have a sloping channel leading to the side of the pedestal and on the underside of the base plate to allow the spaces being grouted up after the base plate is fixed in the position along with the column footing. Grouting shall be of cement mortar 1:3 (1 cement: 3 coarse sand) or as specified.

Bedding of Column, Stanchions etc.: Bedding shall not be carried out until the steelwork has been finally levelled, plumbed and connected together. The stanchion shall be supported on steel wedges and adjusted to make the column plumb. For multi-storeyed buildings, the bedding shall not be done until sufficient numbers of bottom lengths of stanchions have been properly lined levelled and plumbed and sufficient floor beams are fixed in position. The base plates shall be wedged clear of the bases by MS wedges and adjusted where necessary to plumb the columns. The gaps under the base plates up to 25 mm shall then be pressure grouted with cement grout. With small columns, if permitted by the Engineer, the column base shall be floated on a thick cement grout on the concrete pedestal. The anchor-bolt holes in the base plate may be made about 10 to 15 mm larger than the bolts. In such cases suitable washers shall be provided.

Painting: Before the members of the steel structure are placed in position or taken out of the workshop, these shall be painted as specified.

Measurement: The work as fixed in place shall be measured in running metres correct to a millimetre and their weights calculated on the basis of standard tables in kilogram correct to two places of decimal.

Unless otherwise specified, weight of cleats, brackets, packing pieces, bolts, nuts, washers, distance pieces, separators, diaphragms, gussets taking overall square dimensions fish plates, etc. shall be added to the weight of respective items. No deductions shall be made for skew cuts. In riveted work, allowance is to be made for weight of rivet heads. Unless otherwise specified an addition of 2.5% of the weight of structure shall be made for shop and site rivet heads in riveted steel structures. No deduction shall be made for rivet or bolt holes (excluding holes for anchor or holding down bolts). Deduction in case of bolt hole shall, however, be made if its area exceeds 0.02 sqm.

The weight of steel sheet, plate and strip shall be taken from relevant standards. For rolled section, steel rods and steel strips, weight given in relevant Standards shall be used.

Rate: The rate shall include the cost of all materials and labour involved in all the operations described above with the exception noted in the relevant paragraphs.

- *Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and applying priming coat of red lead paint*

SW0020 *In R.S. joists*

SW0021 *In Tees, angles, flats and channels*

Laying out: It shall be as specified in riveted and bolted built-up section above.

Fabrications: Straightening, shaping to form, cutting and assembling shall be as for riveted and bolted as far as applicable, except that the words "riveted or bolted" shall be read as "welded" and holes shall only be made for the bolts used for temporary fastening as shown in drawings.

Welding: Welding shall generally be done by electric process. The electric arc method is usually adopted and is economical. Where public electricity is not available, generators shall be arranged. Gas welding shall be resorted to using oxyacetylene flame with specific prior approval of the Engineer. Gas welding shall not be permitted for structural steel work. Gas welding requires heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses. The work 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 maximum dia. of electrodes for welding any work shall be as under unless otherwise specified.

Table 5.12.1 MAXIMUM DIAMETER OF ELECTRODES FOR WEILDING

Average thickness of plate or section	Maximum diameter of electrodes to be used
Less than 5 mm	3.2 mm
5mm to 7 mm	4 mm
8mm to 9 mm	5 mm
10mm to 15 mm	6 mm
16mm to 24 mm	9 mm
25mm and over	9 mm

Surfaces, which are to be welded together, shall be free from loose mill scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil may be permitted.

Precautions: All operations connected with welding and cutting equipment shall conform to the safety requirements given in IS:818 for Safety requirements and Health Provision in Electric and gas welding and cutting operations.

Assembly: Before welding is commenced the plate shall first be brought together and firmly clamped or spot-welded at specified distance. This temporary connection has to be strong enough to hold the parts accurately in place without any disturbance.

Erection: The specifications shall be as described above in riveted and bolted section except that while erecting a welded structure adequate means shall be employed for temporary fastening the members together and bracing the framework until the joints are welded. Such means shall consist of erection bolts, tack welding or other positive devices imparting sufficient strength and stiffness to resist all temporary loads and lateral forces including wind. Owing to the small number of bolts ordinarily employed for joints which are to be welded, the temporary support of heavy girders carrying columns shall be specially examined and provisions made to cater for such forces. Different members those are to be fillet welded shall be brought into as close contact as possible. The gap due to faulty workmanship or incorrect fit if any shall not exceed 1.5 mm. If gap exceeding 1.5 mm or more occurs locally, the size of fillet weld shall be increased at each position by an amount equal to the width of the gap.

Measurements: The method of measurement shall be as described above in riveted and bolted section except that the weight of welding material shall not be added to the weight of members for payment. Nothing extra shall be paid for making and filling holes for temporary fastening of members during erection before welding.

Rate: The rate shall include the cost of all labour and materials involved in all the operations described above.

- *Steel work welded, in built up sections, trusses, frame-works including cutting, hoisting, fixing and applying priming coat of red lead paint*

SW0022 In Tubular sections

Fabrication: The component parts of the structure shall be assembled in such a manner that they are neither twisted nor otherwise damaged and is so prepared that the specified cambers, if any, are maintained.

Straightening: All material before being assembled shall be straightened, if necessary, unless required to be of a curvilinear form and shall be free from twist.

Bolting: Washers shall be specially shaped where necessary, or other means used, to give the nuts and the heads of bolts a satisfactory bearing. In all cases where the full bearing area of the bolt is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts bolted together, and washers of appropriate thickness shall be provided to allow the nut to be completely tightened.

Welding: Where welding is adopted, it shall be done as per the relevant Indian standard.

Caps and Bases for Columns: The ends of all the tubes for columns, transmitting loads through the ends, should be true and square to the axis of the tube and should be provided with a cap or base accurately fitted to the end of the tube and screwed, welded or shrunk on. The cap or base plate should be true and square to the axis of the column.

Sealing of tubes: When the end of a tube is not automatically sealed by virtue of its connection by welding to another member, the end shall be properly and completely sealed. Before sealing, the inside of the tube should be dry and free from loose scale.

Flattened Ends: In tubular construction the ends of tubes may be flattened or otherwise formed to provided that the methods adopted for such flattening do not injure the material. The change of sections shall be gradual.

Hoisting and Erection: Tubular trusses shall be hoisted and erected in position carefully, without damage to themselves, other structure, equipment and injury to workmen. The method of hoisting and erection proposed to be adopted shall be got approved from the Engineer. The contractor shall however 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.

Measurement: The work as fixed in place shall be measured in running metres correct to 10 mm and their weights calculated on the basis of standard tables in kilogram correct to two places of decimal, unless otherwise specified. Weight of cleats, brackets, packing pieces, bolts, nuts, washers, distance pieces, separators diaphragm gussets (taking overall square dimensions) fish plates, etc. shall be added to the weight of respective item unless otherwise specified. No deductions shall be made for skew cuts.

Rate: The rate shall include the cost of labour and materials involved in all the operations described above including one coat of approved steel primer.

5.12.3 Collapsible/ rolling Shutters

SW0030 Providing & fixing in position collapsible steel shutters with vertical channels 20x10x2mm and braced with flat iron, diagonals 20x5mm with top and bottom rails of T-iron 40x40x6mm with 38mm dia. steel pulleys complete with bolts, nuts, locking arrangement, stoppers handles including applying a priming coat of red lead paint

These shall be of approved manufacture and shall be fabricated from the mild steel sections. The gates shall consist of double or single collapsible gates depending on the size of the

opening. These shall consist of vertical double channels each 20 x 10 x 2mm at 10 cm centres braced with flat iron diagonals 20 x 5mm and top and bottom rails of T-iron 40 x 40 x 6mm @ 3.5 kg/m with 40 mm dia ball bearings in every fourth double channel, unless otherwise specified. Wherever collapsible gate is not provided within the opening and is fixed along the outer surface T-iron at the top may be replaced by flat iron 40 x 10mm.

The collapsible gate shall be provided with necessary bolts and nuts, locking arrangement, stoppers, handles. Any special fittings like spring, catches and locks, shall be so specified in the description of item where so required. The gate shall open smoothly and easily.

Fixing: T-iron rails shall be fixed to the floor and to the lintel at top by means of anchor bolts embedded in cement concrete of floor and lintel.

The anchor bolts shall be placed approximately at 45cm centres alternatively in the two flanges of the T-iron. The bottom runner (T-iron) shall be embedded in the floor and proper groove shall be formed along and under the runner for the purpose. The collapsible shutter shall be fixed at sides by fixing the end double channels with T-iron rails and also by hold-fasts bolted to the end double channel and fixed in the masonry of the sidewalls on the other side.

In case the collapsible shutter is not required to reach the lintel, beam or slab level, a Tee-section suitably designed may be fixed at the top, embedded in masonry and provided with necessary clamps and roller arrangement at the top. All the adjoining work damaged in fixing of gate shall be made good to match the existing work, without any extra cost.

Painting: All the members of the collapsible gate including T-iron shall be thoroughly cleaned of rust, scales, dust etc. and given a priming coat of approved steel primer, before fixing them in position.

Measurements: The height and breadth shall be measured correct to 10 mm. The height of the gate shall be measured as the length of the double channels and breadth from outside to outside of the end fixed double channels in open position, of the gate. The area shall be calculated in square metres correct to two places of decimal.

Rate: The rate shall include the cost of materials and labour involved in all the operations described above.

SW0035 Providing & fixing in position Aluminium Rolling shutters of 0.57mm thickness, including all accessories complete

Aluminium Rolling Shutters shall be supplied with necessary locking arrangements, handles, guide channels, brackets, top cover, and all fixing accessories. They shall be suitable for installation inside or outside the opening, either on or below the lintel or between jambs, as specified. Shutters up to 10 sqm in area shall generally be manually operated (push and pull type), while those above 10 sqm shall be provided with mechanical gear or motorized operation, as required. If motorized, the motor and electrical components shall be paid for separately.

The shutter curtain shall be made of cold-rolled aluminium laths, extruded from high-strength aluminium alloy. Laths shall be at least 0.57 mm thick and around 80 mm wide, interlocked throughout their length, and fitted with end locks to prevent lateral movement. The surface shall be anodized or powder-coated for corrosion resistance. Each lath shall be a single, continuous piece. The bottom rail shall be reinforced with an aluminium section and provided with locking arrangement. Weather seals may also be included.

Guide channels shall be of extruded aluminium with a minimum thickness of 2 mm and a depth of 60 mm for shutters up to 3.5 m wide and 75 mm for wider openings. These shall be fixed securely to the wall at intervals not exceeding 0.75 m using anchor bolts. Soft inserts like PVC strips or brushes may be used to reduce noise and ensure smooth operation.

The shutter shall be mounted on a shaft of aluminium or steel, which may house coiled spring mechanisms to balance the shutter. The shaft and spring shall be supported on strong brackets fixed with anchor fasteners. A protective top cover box made of aluminium shall enclose the roller assembly.

Brackets and guide channels shall be fixed accurately to ensure smooth and rattle-free operation. All visible fasteners shall be neatly concealed, and fixing shall be done in a workmanlike manner.

Measurement: Clear width and clear height of the opening for rolling shutter shall be measured correct to 10 mm. The clear distance between the two jambs of the opening shall be the clear width and the clear distance between the sill and the soffit (bottom of lintel) of the opening shall be the clear height. The area shall be calculated in square metres correct to two places of decimal.

Rate: The rate shall include the cost of materials and labour involved in all the operations described above including spring and ball bearing except top cover and mechanical device of chain and crank operation, which shall be paid for separately.

5.12.4 Doors/Windows (Aluminium)

- *Providing & fixing Aluminium section for doors, windows, ventilators, partitions and false ceiling of specified sections including all accessories such as U-rubber gasket for glass panes, weather strip fibre glass or weather seals, roller, etc complete (excluding cost of providing & fixing glass panes, ceiling boards)*

SW0045 *Sliding, openable, fixed and pivoted windows*

SW0046 *Sliding, openable doors*

SW0047 *Partition framing*

SW0048 *False ceiling framing*

- *Extra for providing and fixing plain glass panes on aluminium sections complete (excluding the cost of aluminium frame & accessories)*

SW0055 *4mm thick plain glass*

SW0056 *5mm thick plain glass*

SW0057 *5mm thick frosted glass*

All Aluminium sections for doors, windows, ventilators, partitions and false ceiling shall be of specified sections and anodised to international standards.

Windows and ventilators shall be fully weather sealed using high quality weather seals/strips to reduce ingress of air and water as well as the escape of interior atmosphere.

All glass panes shall be 4 mm thick clear transparent sheet glass. All such glazing shall be firmly secured with matching aluminium glazing beads and gaskets of PVC (ethylene-propylene).

Tolerances: The sizes of doors, windows or ventilator frames shall not vary by more than ± 1.5 mm.

Designation: Doors, windows and ventilators shall be designated by standard symbols denoting width, type and height in succession. For details refer aluminium section under "*Material Specification*" or refer IS:1948 for further details and illustrations.

Fixing of frame: Outer frames will be provided with fixing holes centrally in the web. The frame shall be fixed to the wall or other base by using the screws and lugs. Any steel lug coming in contact with aluminium shall be either galvanised or given one coat of bituminous paint.

Table 5.12.3 FIXING SCREWS AND LUGS

Place of fixing	Size of screw or lug
i. To wooden frames rebated on the outside	30mm x No. 10 galvanised wood-screws
ii. To plugs in concrete, stone or brick work rebated on the outside	30mm x No. 10 galvanised wood-screws
iii. To plugs in concrete, stone or brick work not rebated on the outside	45mm x No. 10 galvanised wood-screws
iv. Direct to brick work or masonry (that is plain or square jambs)	
v. To steel work	Slotted steel adjustable lugs not less than 100x16x3mm countersunk galvanised machine screws and nuts 19x6.3mm Standard clips and 8mm galvanised bolts with hexagonal nuts

Measurement: The work as fixed in place shall be measured in running metres correct to 10 mm and their weights calculated on the basis of standard tables/weights in kilogram correct to two places of decimal, unless otherwise specified. Weight of cleats, brackets, bolts, nuts, fish plates, etc. shall be added to the weight of respective item unless otherwise specified.

Rate: The rate shall include the cost of labour and materials involved in all the operations described above excluding the cost of glass and ceiling boards.

5.12.5 Steel Fasteners

SW0080 Providing & fixing MS round hold-down bolts with nuts and washer plates

The holding down bolts shall be placed in the concrete foundation. These should be held in position with a wooden template. The bolts shall be provided with a suitable timber mould or pipe sheeve to allow for adjustment. The timber mould or pipe shall be removed after the initial set of concrete. The spaces left around holding down bolts shall have sloping channel leading to the side of the pedestal and on the underside of the base plate to allow the spaces

being grouted up after the base plate is fixed in the position along with the column. Grouting shall be of cement mortar 1:3 (1 cement: 3 coarse sand) or as specified.

Measurement: The holding down bolts shall be measured in kg.

Rate: The rate shall include the cost of materials and labour involved in all the operations.

SW0081 Providing & fixing bolts of various sizes including nuts & washers.

Bolts, nuts and washers shall be thoroughly cleaned and dipped in double boiled linseed oil, before use. All bolts heads and nuts shall be hexagonal unless specified otherwise. The screwed 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 ends of bolts properly.

Measurement: The bolts, nuts and washers shall be measured in kg as per actual weight.

Rate: The rate shall include cost of material and labour involved in the work.

SW0082 Providing & fixing MS rivets of various sizes

All loose, burnt, or badly formed rivets with eccentric or deficient heads shall be out and replaced. In cutting out rivets, care shall be taken so as not to injure the assembled members. Caulking and re-cupping shall not be permitted.

Measurement: The rivets shall be measured in kg as per actual weight.

Rate: The rate shall include all materials and labour involved in the work.

SW0090 Providing, making and fixing MS straps, flats, sole plates etc.

The MS straps, flats & sole plates shall be from flats and MS sheets. Steel shall be free from excessive rust, scaling and pitting and shall be well protected.

Fabrication: The steel sections as specified of required, shall be straightened and cut, square and to correct lengths and 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 metal. The holes of required diameter shall be done with drilling machine.

Painting: All surfaces, which are to be painted, oiled or otherwise treated shall be dry and thoroughly cleaned to remove all loose scale and loose rust. Surfaces to be encased in concrete shall not be painted or oiled.

Erection: Steelwork shall be hoisted and placed in position carefully without any damage to itself and other building work and injury to workmen.

Measurements: The work as fixed in place shall be measured in running metres correct to a millimetre and their weights calculated on the basis of standard tables.

Rate: The rate includes the cost of labour and materials required for all the operation described above.

5.12.6 Fan Clamps

SW0095 Providing & fixing MS fan clamps of 16 mm dia. in R.C. slabs, including painting with red lead paint

The fan clamp shall be of the following types.

(a) Fan clamp to be fixed during the laying of R.C.C. slab, shall be of type I. This shall be made of 16 mm dia. MS bar bent to shape with its ends hooked. The overall height of the clamps shall be made to suit the depth of the slab.

(b) Fan clamp for beams shall be of type II. It shall be similar to fan clamp type I, except that its height shall be greater depending on the depth of the beam rib.

Fixing: Holes for inserting the fan clamps in the positions shown in the drawing or as instructed by the Engineer shall be made in the shuttering after the latter has been fixed in position. After steel reinforcement is tied, fan clamps shall be fixed with their loops truly vertical and at the correct depth from the underside of the slab or beam. The hooked arms and the loop shall be tied to the reinforcement, either directly or through cut pieces of MS bars with annealed steel wire 1.6 mm or 1.00 mm thick. The clamp shall neither be disturbed out of position during concreting nor shall they be bent out of shape when shuttering of slabs or beams is removed. The exposed portion of loops of the clamp shall be given two or more coats of paint, including priming coat, of shade as ordered by the Engineer.

Measurements: Clamps shall be counted in numbers.

Rate: The rate per fan clamp shall include the cost of labour and materials involved in all the operations described above.

SW0110 Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc...including welding, grinding, buffing, polishing and making curvature New items for BSR 2017 (wherever required) and fittings the same with necessary stainless steel nuts and bolts complete, i/e fixing railing with necessary accessories and stainless steel dash fasteners, stainless steel bolts etc, of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of engineers in charge

Fabrication: Fabrication of all stainless steels should be done only with tools dedicated to stainless steel materials. Tooling and work surfaces must be thoroughly cleaned before use. These precautions are necessary to avoid cross contamination of stainless steel by easily corroded metals that may discolour the surface of the fabricated product.

Welding: Fusion welding performance for type 304 stainless steel is excellent both with and without fillers. Recommended filler rods and electrodes for stainless steel 304 is grade 308 stainless steel. For 304L the recommended filler is 308L. Heavy welded sections may require post-weld annealing. This step is not required for 304L. Grade 321 may be used if post-weld heat treatment is not possible. Welding shall be executed from the non-exposed side, as far as possible and in each case the welds shall be ground smooth and finished with a texture matching the parent metal. All welds shall be finished smooth and square.

Measurement: The stainless steel shall be measured in kg. F*or payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc*

Rate: The rate shall include the cost of all materials and labour involved in all the operations.

5.14 Chapter 14: TILING - WALL & FLOOR

5.14.1 Tiles

GL0001 Providing and fixing vitrified tiles in skirting, step risers, dado and wall in different sizes (Sizes and thickness to be specified by the engineer / as per design) in all colours and shade, on 12mm thick cement mortar 1:3 (1 cement: 3 sand) finished with flush-pointing in white cement

Preparation of surfaces: The joints shall be raked out to a depth of at least 15 mm in masonry walls, while the masonry is being laid. In case of concrete walls, the surface shall be hacked and roughened with wire brushes. The surface shall be cleaned, thoroughly washed with water and kept wet before skirting is commenced.

Laying: 12 mm thick plaster of cement mortar 1:3 (1 cement: 3 coarse sand) shall be applied and allowed to harden. The plaster shall be roughened with wire brushes or by scratching diagonally at close intervals. The tiles should be soaked in water, washed clean, and a coat of cement slurry applied liberally at the back of tiles and set in the bedding mortar. The tiles shall be tamped and correct to proper plane and lines. The tiles shall be set in the required pattern and butt jointed. The joints shall be as fine as possible. Top of skirting or dado shall be truly horizontal and joints truly vertical except where otherwise indicated. Skirting and dado shall rest on the top of the flooring. Where full size tiles cannot be fixed these shall be cut (sawn) to the required size and their edges rubbed smooth.

Curing and Finishing: The joints shall be cleaned off the grey cement grout with wire brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement with pigments added if required to match the colour of tiles. The floor shall then be kept wet for 7 days. After curing, the surface shall be washed and finished clean. The finished work shall not sound hollow when tapped with a wooden mallet.

Measurement: Length shall be measured correct to 10 mm. Height shall be measured correct to 10 mm in the case of dado and 5 mm in the case of riser and skirting. The area shall be calculated in square metre, correct to two places of decimal. Length and height shall be measured along the finished face of the skirting or dado including curves where specials such as coves, internal and external angles and beads are used. Where cornices are used the area of dado shall be measured excluding the cornices.

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above. The specials such as coves, internal and external angles and boards shall be measured and paid for separately in running metres. The rate shall not include cost of cornices which shall be measured and paid for separately. Raking of joints in masonry and hacking of RCC are not included in the rate.

GL0002 Providing and laying vitrified tiles in flooring, treads of steps and landings in different sizes (Sizes and thickness to be specified by the engineer / as per design) in all colours and shade, on 20mm thick cement mortar 1:4 (1 cement: 4 sand) finished with flush-pointing in white cement

GL0005 Providing and laying tactile floor tiles in different sizes (Sizes and thickness to be specified by the engineer/as per design) in all colours and shade, laid

on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) finished with tiles grout flush pointing.

Preparation of surface and laying: Sub-grade concrete or the R.C.C. slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tile shall be with cement mortar 1:4 (1 cement: 4 coarse sand). The average thickness of bedding shall be 20mm under any portion of the tiles.

Mortar shall be spread, tamped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set and to enable the mason to place wooden plank across and squat on it. Over this mortar bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 3.3 kg of cement per square metre. Tiles shall be soaked in water, washed clean and shall be fixed in this grout one after another, each tile gently being tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern.

The surface of the flooring during laying shall be frequently checked with a straight edge about 2 m long, so as to obtain a true surface with the required slope. Where full size tiles cannot be fixed these shall be cut (sawn) to the required size, and their edge rubbed smooth to ensure straight and true joints. Tiles, which are fixed in the floor adjoining the wall, shall enter not less than 10 mm under the plaster, skirting or dado. After tiles have been laid surplus cement grout shall be cleaned off.

Pointing and finishing: The joints shall be cleaned off the grey cement grout with wire brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement with pigment added if required to match the colour of tiles. The floor shall then be kept wet for 7 days. After curing, the surface shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden mallet.

Measurement: Length and breadth shall be measured correct to 10 mm between the exposed surfaces of skirting or dado, where the junction of floor with skirting or dado is square and its area as laid shall be calculated in square metre, correct to two places of decimal. Where coves are used at the junctions, the length and breadth shall be measured between the lower edges of the coves.

Rate: The rate for flooring shall include the cost of the materials and labour involved in all the operations described above. No extra shall be paid for the use of cut (sawn) tiles in the work. No deduction shall be made or extra paid for any opening in the floor of area up to 0.1 square metres. Nothing extra shall be paid for laying the floor at different levels in the same room.

GL0003 Extra, for laying tiles in treads of steps, width <300mm, skirting and risers of steps, height <300mm

Measurement: The area shall be calculated in square metre, correct to two places of decimal.

Rate: The rate shall include the cost of additional labour required in the work.

5.17 Chapter 17: PLUMBING - OUTDOOR WORK

5.17.1 Water Supply

- *Providing and laying G.I. pipes including G.I. fittings (excluding trenching, refilling and thrust block)*

PO0001 *15mm*

PO0002 *20mm*

PO0003 *25mm*

PO0004 *32mm*

PO0005 *40mm*

PO0006 *50mm*

PO0007 *65mm*

PO0008 *80mm*

PO0009 *100mm*

PO0010 *150mm*

- *Providing and laying H.D.P.E pipes, PN 2.5/4/6/10/12.5, including H.D.P.E fittings (excluding trenching, refilling and thrust block)*

20mm

25mm

32mm

40mm

PO0015 *50mm*

63mm

To *75mm*

90mm

PO0689 *110mm*

140mm

160mm

180mm

200mm

225mm

250mm

280mm

315mm

355mm

400mm

- *Providing and fixing 3-layer PP-R (Polypropylene Random Copolymer) PN 16 pipes, SDR 7.4 UV Stabilized and anti microbial fusion welded, having thermal stability for hot and cold water supply including all PP-R plain and brass Threaded Polypropylene random fittings excluding trenching, refilling but including testing of joints complete as per direction of Engineer-in- Charge.*

PO0700 16mm

PO0701 20mm

PO0702 25mm

PO0703 32mm

PO0704 40mm

PO0705 50mm

PO0706 63mm

PO0707 75mm

PO0708 90mm

- *Providing and fixing 3-layer PP-R (Polypropylene Random Copolymer) PN 10 pipes, SDR 7.4 UV Stabilized and anti - microbial fusion welded, having thermal stability for hot and cold water supply including all PP-R plain and brass Threaded Polypropylene random fittings excluding trenching, refilling but including testing of joints complete as per direction of Engineer-in- Charge.*

PO0709 110mm

PO0710 160mm

The specified pipes and fittings shall be laid in trenches. The width and depths of the trenches of different diameters of the pipes shall be as shown in the table below.

Table 5.17.1 WIDTH AND DEPTHS OF THE TRENCHES OF DIFFERENT DIAMETERS OF THE PIPES

Diameter of pipe	Width of trench (cm)	Depth of trench (cm)
15 mm to 50 mm	30	60
65 mm and above	45	75

Note: Refer 5.3.7 for specification on excavation for pipes/cables etc.

At joints, trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line and gradient in accordance with general specifications for earthwork in trenches. In case of GI pipes, the pipes shall be painted with two coats of anticorrosive bitumastic paint of approved quality. The pipes shall be laid in a layer of 7.5 cm sand and filled upto 20 cm above the pipes. The remaining portion of the trench shall then be filled with excavated earth. The surplus earth shall be disposed off as directed by the Engineer.

When excavation is done in rock, the bottom shall be cut deep enough to permit the pipes to be laid on a cushion of sand of minimum 7.5 cm. In case of bigger diameter pipes where the pressure is very high thrust blocks of cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate of 20 mm nominal size) shall be constructed on all bends to transmit the hydraulic thrust without impairing the ground and spreading it over a sufficient area.

Testing the joints: After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6kg/cm^2 (60 metres). The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw off takes and the stop-cocks shall then be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped the test pressure should be maintained without loss for at least half an hour. The pipes and fittings shall be tested in sections as the work of laying proceeds, keeping the joints exposed for inspection during the testing.

Measurements: The lengths shall be measured in running meter correct to 10 mm for the finished work, which shall include pipe and fittings such as bends, tees, elbows, reducers, crosses, plugs, sockets, nipples, flanges, nuts, etc. but exclude brass or gun metal taps (cocks), valves, lead connection pipe and shower rose. The length shall be taken along the central line of the pipe and fittings. All pipes and fittings shall be classified according to their diameters, method of jointing and fixing substance, quality and finish. The diameter shall be the nominal diameter of the internal bore. The pipe shall be described as including all cuttings and waste. In case of fittings of equal bore, the largest bore shall be measured. Digging and refilling of trenches shall be measured separately.

Rate: The rate shall include the cost of labour and material involved in all operations described above (excluding the cost for excavation in trenches, refilling of trenches, thrust block, painting of pipes and sand filling all round the pipes).

5.17.2 Ductile Iron Pipes for Water Supply

- *Providing and Laying Ductile Iron K-9 pipes with push-on joints, including fittings (excluding trenching, refilling and thrust block)*

PO0065	*80 mm*
PO0066	*100 mm*
PO0067	*150 mm*
PO0068	*200 mm*
PO0069	*250 mm*
PO0070	*300 mm*

PO0071 350 mm

PO0072 400 mm

PO0073 450 mm

PO0074 500 mm

PO0075 600 mm

- *Providing and Laying Ductile Iron K-7 pipes with push-on joints including fittings (excluding trenching, refilling and thrust block)*

PO0078 100 mm

PO0079 150 mm

PO0080 200 mm

PO0081 250 mm

PO0082 300 mm

PO0083 350 mm

PO0084 400 mm

PO0085 450 mm

PO0086 500 mm

PO0087 600 mm

- *Providing and Laying Double Flanged (Screwed or Welded) Centrifugally Spun ductile iron K-9 Pipes including fittings (excluding trenching, refilling and thrust block)*

PO0090 100 mm

PO0091 150 mm

PO0092 200 mm

PO0093 250 mm

PO0094 300 mm

PO0095 350 mm

PO0096 400 mm

PO0097 450 mm

PO0098 500 mm

PO0099 600 mm

- *Providing and Laying Ductile Iron K - 9 Restrained Joint Pipe including fittings with Locking Bar/Plate Device along with fixing of EPDM Rubber Gasket, excluding trenching, refilling & thrust block*

PO0750 80 mm

PO0751 100 mm

PO0752 150 mm

PO0753	*200 mm*
PO0754	*250 mm*
PO0755	*300 mm*
PO0756	*350 mm*
PO0757	*400 mm*
PO0758	*450 mm*
PO0759	*500 mm*
PO0760	*600 mm*

Use and laying of DI pipes shall conform to IS 12288:1987.

Transportation, handling and inspection: Pipes should be transported in such a way that damage to the protective coating and brushing or damage of jointing surfaces although they are less susceptible to cracking and breaking on impact. Pipes should be offloaded with cranes. The pipes should be arranged in stacks before usage and the stacking should either be one of the following:

(a) Square Stacking
(b) Parallel stacking with timbers
(c) Nested Stacking (pyramid stacking)
(d) Stringing

Bitumen sheathed pipes should be laid in single layer supported on timbers placed under the uncoated portions of the spigots and sockets. Sheathed pipes should be lifted by means of properly designed hooks.

Excavation and Trenching: The width of trench at the bottom between faces of sheeting shall be such as to provide not less than 200mm clearance on either side of the pipe except where rock excavation is involved. In agricultural land, the depth must not be less than 900mm, while it may be necessary to increase the depth of pipeline in the vicinity of land drains, roads, railways and other crossings.

When pipes are directly bedded on the bottom of the trench, it should be trimmed and leveled, and where excavation is through rocks or boulders, the pipeline should be bedded on concrete bedding or on at least 150mm or fine grained soil or other means to protect the pipe and the coating.

Laying of pipes: Pipes should be lowered into the trench with tackle suitable for the weight of pipes. For pipes up to 250mm nominal bore, the pipe may be lowered by the use of ropes but for heavier pipes either a well designed set of shear legs or mobile cranes should be used.

All construction debris should be cleared from the inside of the pipe either before or just after a joint is made. When the laying is not in progress, a temporary end closure should be securely fitted to the open end of the pipeline. All persons should vacate any section of the trench where the pipe is being lowered. Partial backfilling may be done in order to secure the pipe in place.

When the pipe is laid over ground, the ground should be dressed to match the curvature of the pipe shell for an arch length subtending an angle of 120º at the centre of the pipes. Pipes may be allowed to rest on ground if the soil is non- aggressive. Pipes with spigot and socket,

should be supported at the rate of one support per pipe and they should be tied to the supports by mild steel straps so that axial movement due to expansion and contraction resulting from temperature change is adjusted in the individual joints.

The maximum unsupported length for flanged pipes is 8 m, and the supports should be stable and unyielding due to movements in the pipeline. Straps should fix the pipes to the supports and should prevent lateral or lifting movements while allowing expansions and contractions.

The pipes should be cut using suitable equipments in a neat and workmanlike manner without any damage to the pipe of lining so as to leave a smooth end at right angles to the axis of the pipe.

All pipelines having unanchored flexible joints require anchorage at changes in direction and at dead ends to resist static thrusts developed by internal pressure. Anchorages should be designed taking into account maximum pressure the main is to carry in service and in test, and the safe bearing capacity of the surrounding soil. Concrete hollow blocks of suitable shape should be used.

Joints and the jointing procedure shall conform to IS 12288:1987.

Hydraulic Testing: After a new pipeline is laid and jointed, testing shall be done for

(a) Mechanical soundness and leak tightness of pipes and fittings
(b) Leak tightness of joints
(c) Soundness of any construction works particularly the anchorages.

The hydraulic testing may be done in either one length of in sections. Length of test sections may vary but after gaining experience the test section may be as long as 1.5 Kms. The test section should be properly sealed off. The section under test should be filled with water taking that all air bubbles are displaced. After filling, the pipeline is pressurized to the specified operating pressure and left for a period of time to achieve stable conditions. The duration depends on many factors. Then the pipeline is pressurized to the full test pressure and the section under test completely closed off. The test should be maintained over 10 minutes to reveal any defeat in the pipes, joints and the anchorages. Test pressure should be measured at the lowest section or alternatively an allowance should be made to the static head between the lowest point and the point of measurement to ensure that the required test pressure is not exceeded at the lowest point.

If the test is not satisfactory, the fault should be found and rectified. Where there is difficulty in finding the fault, the sections may be further sub-divided and test conducted again. After all the sections have been tested, test on the complete pipeline should be carried out.

Before commissioning of the pipeline, it should be disinfected.

Measurement: The net length of the pipes as laid or fixed, shall be measured in the running metres correct to a cm.

Rate: The rate shall include the cost of materials and labour involve in all the operations described above (excluding the cost for excavation in trenches, refilling of trenches, thrust block, and sand filling all round the pipes)

5.17.3 Brass Fittings

- *Providing and fixing brass stopcock*

PO0100 15mm

PO0101 20mm

PO0102 25mm

- *Providing and fixing brass full way valve with wheel*

PO0105 32mm

PO0106 40mm

PO0107 50mm

PO0108 65mm

PO0109 80mm

- *Providing and fixing non-return valve*

PO0110 50mm

PO0111 65mm

PO0112 80mm

- *Providing and fixing brass bibcock*

PO0114 15mm, brass

5.17.4 H.D.P.E Fittings

- *Providing and fixing, Equal Tee butt-welded-type fittings*

PO0115 20mm

PO0116 25mm

PO0117 32mm

PO0118 50mm

PO0119 63mm

PO0120 90mm

PO0121 110mm

PO0122 160mm

- *Providing and fixing Elbow*

PO0125 32mm

PO0126 50mm

PO0127 63mm

PO0128 90mm

PO0129 110mm

- *Providing and fixing Reducer*

PO0130 90 x 50mm

PO0131 90 x 63mm

PO0132 110 x 63mm

PO0133 110 x 90mm

- *Providing and fixing Blank End (Cap)*

PO0140 50mm

PO0141 63mm

PO0142 90mm

PO0143 110mm

PO0144 160mm

The fittings of the type specified in the items shall be fully examined and cleared of all foreign matters before being fixed. The fitting shall be fitted in the pipeline in a workman-like manner. The joints between fittings and pipes shall be leak proof when pressure tested to the extent specified by the Engineer. The defective fittings and joints shall be replaced or redone.

Measurement: The item shall be measured in numbers.

Rate: The rate shall include the cost of labour and material involved in all operations described above.

5.17.5 Push on Jointing for DI pipes

- *Providing and fixing push - on joints to Centrifugally Spun D.I pipes including the cost of rubber Gaskets.*

PO0150 80 mm

PO0151 100 mm

PO0152 150 mm

PO0153 200 mm

PO0154 250 mm

PO0155 300 mm

PO0156 350 mm

PO0157 400 mm

PO0158 450 mm

PO0159 500 mm

PO0160 600 mm

At joints, trench width shall be widened where necessary. The joints should satisfy the following basic requirements:

(a) Cleanliness of all parts
(b) Correct location of components
(c) Centralization of spigot with socket, and
(d) Strict compliance with the manufacturer's jointing instructions

The inside of sockets and the outside of spigots should be cleaned and wire brushed for a distance of 150 to 225 mm. Glands and Gaskets should be wiped clean and inspected for damage. When lifting gear is used to place the pipe in the trench, it should also be used to assist in centralizing the spigot in the socket.

Where the pipeline is likely to be subjected to movement due to subsidence or temperature variations, the use of flexible joints is recommended. A gap should be left between the end of the spigot and the back of the socket to accommodate such movement.

Flexible Joint: The spigot and socket flexible joint should be designed to permit angular deflection in direction and axial movement to compensate for ground movement and thermal expansion and contraction. They incorporate gasket of elasotomeric materials and the joints may be of the simple push-on-type or the type where the seal is effected by the compression of a rubber gasket between a seating on the inside of the socket and the external surface of the spigot. Joints of the latter type are referred to as mechanical joints. Both push in and mechanical joints are flexible joints. Flexible joints required to be externally anchored at all changes in direction such as at bends, etc. and at blank end to resist the thrust created by internal pressure and to prevent the withdrawal of spigots.

Flanged Joints: Flanged joints are made on pipes having a machined flange at each end of the pipe. The seal is usually affected by means of a flat rubber gasket compressed between two flanges by means of bolts which also serve to connect the pipe rigidly. Gaskets of other materials, both metallic and non-metallic are used for special applications

Measurement: The items shall be measured in numbers.

Rate: The rate shall include the cost of labour and material involved in all the operations described above.

5.17.6 PVC Soil Waste Pipes & Fittings

- *Providing and fixing PVC soil waste and vent pipes, single or double socketed including clips complete but excluding PVC fittings.*

PO0370 *75 mm dia.*

PO0371 *50 mm dia.*

PO0372 *110 mm dia.*

- *Providing & fixing PVC Pipe connector*

PO0380 *110mm dia*

- *Providing & fixing PVC Coupler*

PO0385 *75mm dia*

PO0386 *50mm dia*

PO0387 *110mm dia*

- *Providing & fixing PVC Reducer*

PO0395 *90x75mm*

PO0396 *110x75mm*

PO0397 *110x90mm*

- *Providing & fixing PVC plain bend*

PO0405 *75mm dia*

PO0406 *50mm dia*

PO0407 110mm dia

- *Providing & fixing PVC door bend*

PO0415 75mm dia

PO0416 50mm dia

PO0417 110mm dia

- *Providing & fixing PVC Long arm bend with door*

PO0425 75mm dia

PO0426 50mm dia

PO0427 110mm dia

- *Providing & fixing PVC Single Tee plain*

PO0435 75mm dia

PO0436 50mm dia

PO0437 110mm dia

- *Providing & fixing PVC Single Tee with door*

PO0445 75mm dia

PO0446 50mm dia

PO0447 110mm dia

- *Providing & fixing PVC Double Tee plain*

PO0455 75mm dia

PO0456 50mm dia

PO0457 110mm dia

- *Providing & fixing PVC Double Tee with door*

PO0465 75mm dia

PO0466 50mm dia

PO0467 110mm dia

- *Providing & fixing PVC Single Y, plain*

PO0475 75mm dia

PO0476 50mm dia

PO0477 110mm dia

- *Providing & fixing PVC Single Y, with door*

PO0485 75mm dia

PO0486 50mm dia

PO0487 110mm dia

- *Providing & fixing PVC Double Y, plain*

PO0495 *75mm dia*

PO0496 *50mm dia*

PO0497 *110mm dia*

- *Providing & fixing PVC Double Y, with door*

PO0505 *75mm dia*

PO0506 *50mm dia*

PO0507 *110mm dia*

- *Providing & fixing PVC Offset, 75mm dia*

PO0515 *With 75mm projection*

PO0516 *With 150mm projection*

- *Providing & fixing PVC Offset, 90mm dia*

PO0525 *With 75mm projection*

PO0526 *With 150mm projection*

- *Providing & fixing PVC Offset, 110mm dia*

PO0535 *With 75mm projection*

PO0536 *With 150mm projection*

- *Providing & fixing PVC Floor Trap*

PO0545 *75mm dia*

PO0546 *50mm dia*

PO0547 *110mm dia*

- *Providing & fixing PVC P-Trap, without air vent*

PO0555 *Big*

PO0556 *Small*

- *Providing & fixing PVC Nahani Trap*

PO0565 *110mm inlet & 75mm outlet*

5.17.7 uPVC Soil Waste Pipes

- *Providing & laying uPVC Pipes including fittings pressure class 4 kg/sq.cm (excluding trenching, refilling & thrust block)*

PO720 *110 mm*

PO721 *160 mm*

PO722 *180 mm*

PO723 *200 mm*

PO724 *225 mm*

PO725	*250 mm*
PO726	*280 mm*
PO727	*315 mm*
PO728	*400 mm*
PO729	*450 mm*
PO730	*560 mm*

Underground installation: For laying PVC and uPVC pipes in trenches, trench width shall not be less than pipe diameter plus 125mm in each side.

Concealed installation: For concealing the drain lines, slots shall be made in the wall or concrete. The slot size shall be such that the system remains stress free at the time of installation. Sharp edges should be avoided. All PVC pipes and fittings shall be cleaned and a light coat of solvent cement applied externally before they are inserted in the slots. Leakage test shall be carried out before concealing the system.

Storage: To avoid damages to the pipes and fittings following precautions shall be taken when intended for storage of PVC pipes:

i. Pipes shall be stacked on an even surface, the staking height not exceeding 1.5m
ii. Pipes and fittings shall not be kept on sharp objects
iii. All fittings shall be stored in cartons or bags
iv. Pipes and fittings shall not be dragged
v. Rubber rings shall be kept tension free
vi. Lubricants and solvent cement shall be stored in a cool place, away from direct sunlight.

Jointing: The commonly used joints are as follows:

a) Solvent welded joints,
b) Flanged joints
c) Screwed or treaded joints, and
d) Rubber ring joints.

a) **Solvent welded joints:** The solvent welded joint may be achieved either by heat application method or non-heat application method.

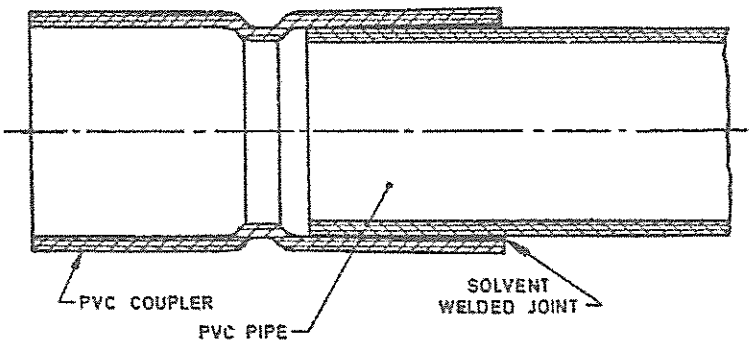


Figure 5.17.1 PVC solvent welded joint

Non-heat application method: In this method, the pipe shall be cut perpendicular to the axis of the pipe length with a saw. The pipe ends have to be bevelled slightly with bevelling tool at an angle of about 30-degree. The total length of insertion of socket shall be marked on pipe and checked how far the pipe end should go into the fitting socket up to 1/3 to 2/3 of the socket length. After cleaning, the coating of solvent cement shall be applied evenly on the inside of the fitting for full length of insertion and then on the outside of the pipe end up to the marked line. For hot and dry climate thicker coatings shall be applied. The pipe shall be pushed in to the fitting socket and held for 1 to 2 minutes as otherwise the pipe may come out of the fitting due to the slippery quality of cement and the tapering inside bore of the fitting. The surplus cement on the surface shall be wiped out. In hot climates it is recommended to join the pipe early in the morning or in the evening when it is cooler. After making the joints, the trench shall be covered immediately.

Heat application method: This method of jointing makes use of spigot and socket shapes of pipes. The female end is bevelled on the bore. The other pipe end to be inserted is bevelled at an angle of 20 to 30 degrees on the outer periphery. The female end of the pipe is expanded by heating a length of 1.5 times the pipe diameter to a temperature of about 130-degree C by blowtorch or any other suitable medium. The male end is inserted inside the softened female end. A plug gauge may be used to prevent distortion. A little before heating is complete, a thin coat of slow drying solvent cement is applied evenly on the inside surface of the female end of pipe, and outside surface of the male end of pipe. After the insertion is complete, the joint is cooled with water or a wet cloth.

b) **Flanged joints:** Flanged joint is preferred for larger diameter pipes. The joint shall be made by the compression of a gasket or a ring seal set in the face of the flange.

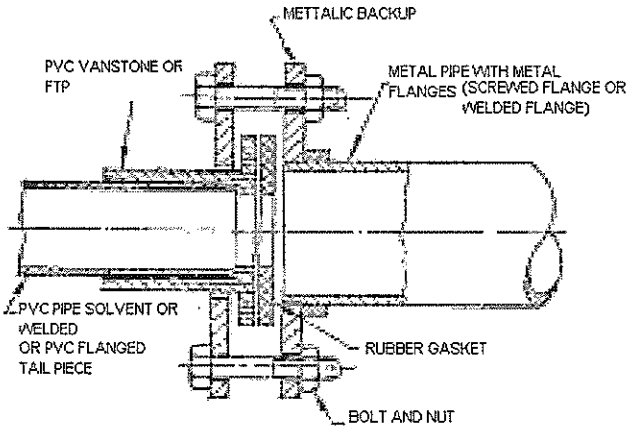


Figure 5.17.2 PVC solvent welded Joint

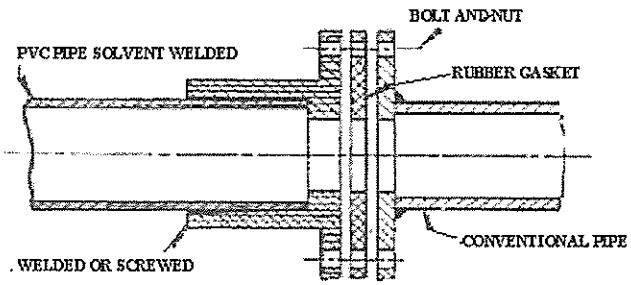


Figure 5.17.3 Flange joints (jointing PVC pipes and other)

c) **Screwed or treaded joints:** These are similar to the joints used with GI pipes. Screwed or treaded joints shall not be used unless otherwise the situation demands.

d) **Rubber ring joints:** Rubber ring joints are not recommended for pipes in tension. The following steps may be followed if such joints are provided:

Cut the PVC pipe to the required length. Chamfer the edge of the pipe to be inserted at an angle of about 15-degree to 1/3rd the wall thickness using a coarse file. After cleaning the pipe ends to be connected, insert the pipe into the socket without the seal ring and mark along the pipe when it is fully inserted. Fix the rubber ring into the groove without twisting it. Apply manufacturer's recommended lubricant to the chamfered end of pipe up to the marked made on the spigot or socket end. Push the pipe firmly into the socket.

Support Spacing: The minimum support spacings for PVC pipes shall be as given below:

Table 5.17.3 MINIMUM SUPPORT SPACINGS FOR PVC PIPES

Outside diameter (mm)	Horizontal spacing (mm)
50 mm	1200
90 mm	1200
110 mm	1500

For vertical runs support spacing may be increased by 50%.

Measurement: The pipes shall be measured in running meters and the fittings shall be measured in numbers

Rate: The rate shall include the cost of labour and materials involved in all the operations described above.

5.17.8 Painting of Pipes

- *Painting GI pipes and fittings including primer & white coat, for new work*

PO0570 *15mm dia pipe*

PO0571 *20mm dia pipe*

PO0572 *25mm dia pipe*

PO0573 *32mm dia pipe*

The primer shall be of approved brand and manufacture and the final paint anticorrosive bitumastic, aluminium or other type of paint as specified.

Preparation of Surface: All rust and scales shall be removed by scraping or brushing with steel wire brushes. All dust and dirt shall be thoroughly wiped away from the surface. If old surface is to be painted, it shall be rubbed with wire brushes and any loosened paint taken off. All dust shall be thoroughly wiped away. The surface shall then be wiped finally with mineral turpentine to remove grease etc and then allowed to dry.

Application: The number of coats of painting over the priming coat shall be as stipulated in the description of the item. The paint shall be laid on evenly and smoothly. The painted surface shall present a uniform appearance and glossy finish free from streaks, blisters etc.

Measurement: For pipes, measurement will be taken over the finished line of pipe including specials etc in running metres correct to 10 mm including fittings.

Rate: The rate shall include cost of the materials and labour involved in all the operations described above.

5.17.9 Soak Pits

- *Constructing Soak Pit*

PO0600 Size 1200x1200x1200mm, filled with brick bats including 110 dia H.D.P.E (PN 4) drain pipe x1200mm long

PO0601 Size 2500 dia. x 3000mm depth including 450x450mm dry brick honeycomb shaft and 110 dia H.D.P.E (PN 4) drain pipe x 1800mm long

The earthwork excavation shall be as per general specifications given under "Earthwork". After the excavation is complete, the soak pit shall be filled with brickbats. The brickbats shall be from properly burnt bricks.

Circular soak pit:

The earthwork excavation shall be carried out to the exact dimensions as given in the description of the item. In this pit, a honeycomb dry brick shaft 45x 45 cm and 292.5 cm high shall be constructed centrally. Round this shaft and within a radius of 60 cm shall be placed well-burnt brickbats. Around the brickbats upto a radius of 90 cms brick ballast of size from 50 to 80 mm nominal size shall be packed. The remaining portion shall be filled with brick ballast of 40 mm nominal size. The construction of the shaft filling of the bats and ballast shall progress simultaneously.

Over the filling shall be placed single matting, which shall be covered with minimum layer of 7.5 cm earth. The shaft shall be covered with 7.5 cm thick stone or R.C.C slab.

Brick edging 10 cm wide 10 cm deep shall be provided round the pit. The connection of the open surface drain to the soak pit shall be made by means of a 100 mm dia. S.W. pipe with open joints.

Measurements: The soak pits shall be measured in numbers.

Rate: The rate shall include the cost of labour and material involved in all the operations described above.

SOAK PIT

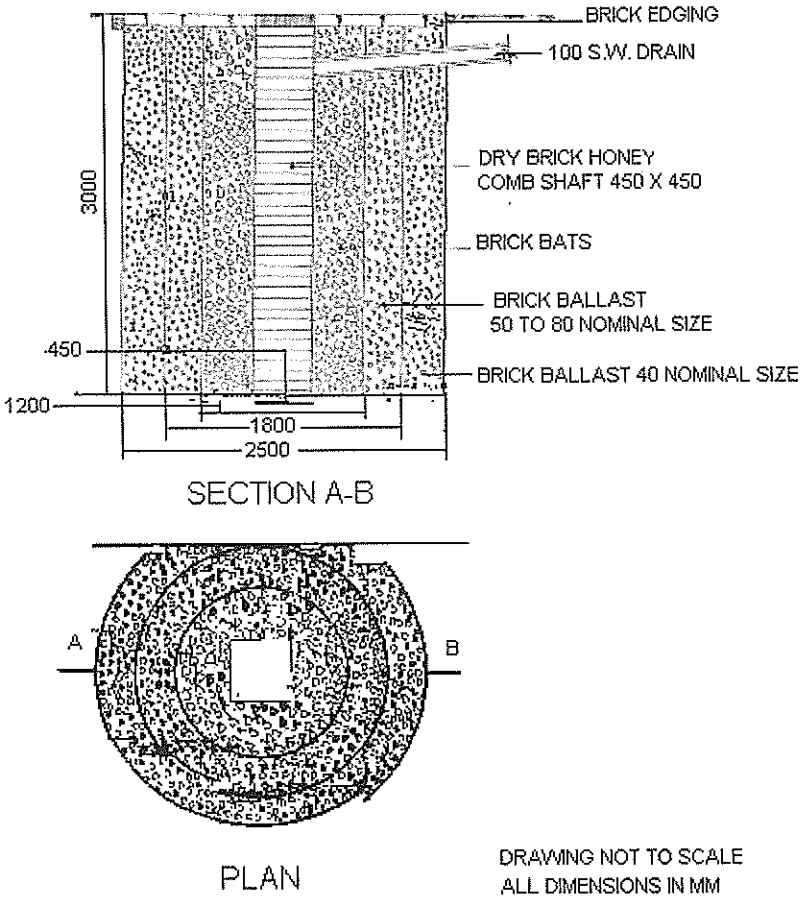


Figure 5.17.4 Soak pit

5.17.10 Septic Tanks

- *Constructing Septic Tanks, in R.R. Masonry in cement mortar 1:6, including fittings, CI cover with frame, 40mm thick concrete flooring (1:4:8, 40mm aggregate) with 12 mm thick cement plaster in C. M 1:4 etc. complete as per standard design*

PO0610 15 users

PO0611 25 users

PO0612 50 users

PO0623 75 users

PO0614 100 users

- *Constructing Septic Tanks, in 2nd class brick masonry in cement mortar 1:4, including fittings, CI cover with frame, 40mm thick concrete flooring (1:4:8 40 mm aggregate) cement plaster concrete base in C.C etc. complete as per standard design*

PO0620 15 users

PO0621 25 users

PO0622 50 users

PO0623 75 users

PO0624 100 users

- *Constructing Septic Tanks, in reinforced concrete 1:2:4 (20mm aggregate) including fittings, CI cover with frame, 40mm thick concrete flooring (40mm aggregate) cement plaster concrete base in C.C 1:4:8 etc. complete as per standard design*

PO0630 15 users

PO0631 25 users

PO0632 50 users

PO0633 75 users

PO0634 100 users

Every septic tank shall be provided with PVC ventilating pipe of at least 50 mm dia. and extended to a height of 2m. The top of the pipe shall be provided with a suitable cage of mosquito proof wire mesh. Septic tank shall be located away from the nearest building as per the regulations of the local implementing authority.

Septic tank shall have minimum width of 750mm, and minimum liquid capacity of one cm^3. Length of the tank shall be 2 to 4m. However, the actual sizes of the tank shall be as per the standard size based on the number of users.

The minimum size for different number of users for cleaning interval of 2 years is as shown below:

Table 5.17.4 SIZES OF SEPTIC TANK FOR VARIOUS NUMBER OF USERS

No. of users	Length (m)	Width (m)	Height (m)
15	2.00	0.90	2.00
25	2.60	1.30	1.80
50	4.00	1.40	2.00
75	5.00	1.50	2.00
100	5.70	2.10	1.70

Before the tank is commissioned for use, it shall be tested for water-tightness by filling it with water and allowing it to stand for 24 hours. It shall then be topped up, if necessary, and allow to stand for a further period of 24 hours, during which time the fall in the level of water shall not be more than 15mm.

Measurement: The measurement shall be made in numbers.

Rate: The rate shall include all operation as described above for construction of septic tank including necessary pipe fitting in position.

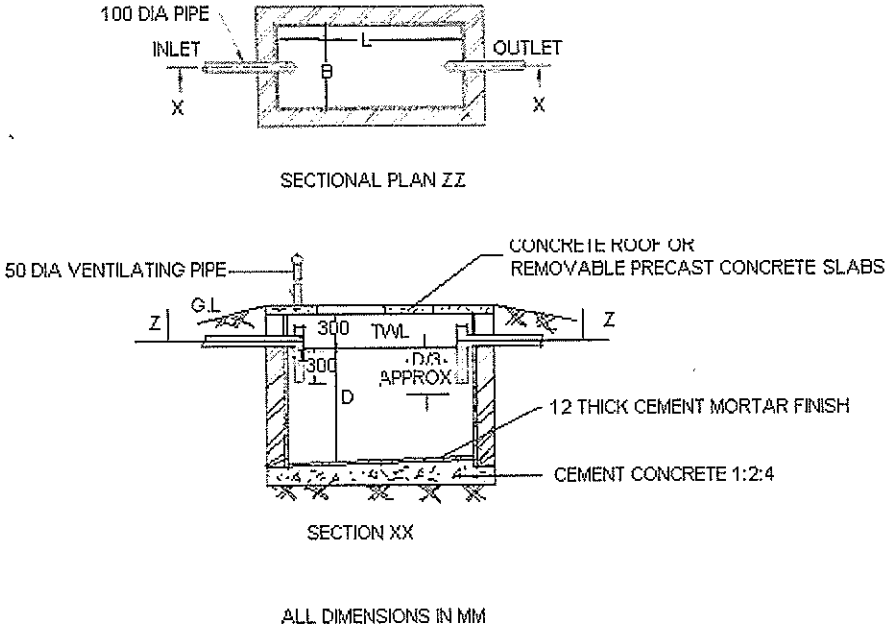
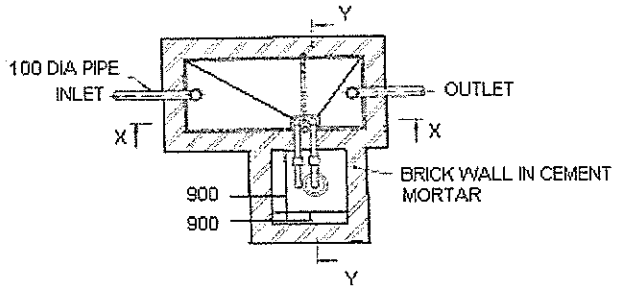


Figure 5.17.5 Typical sketch of single compartment septic tank up to 20 users



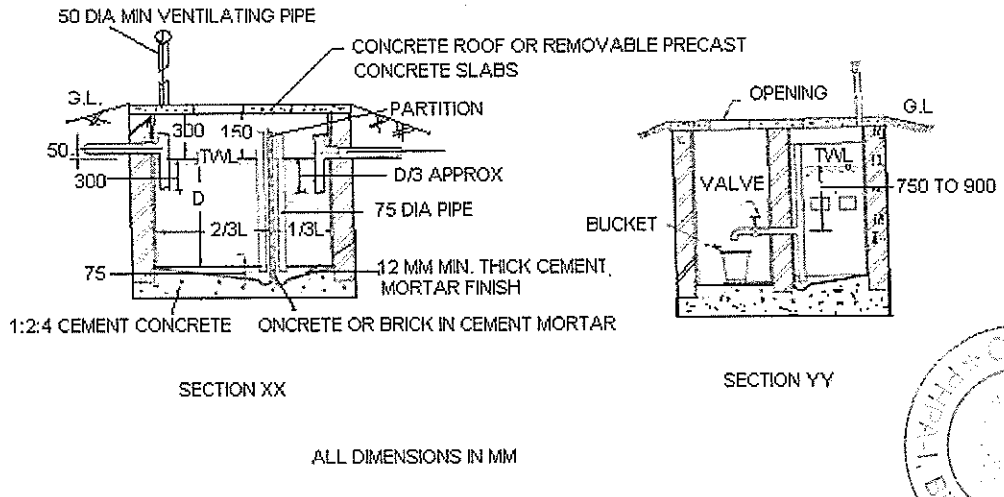


Figure 5.17.6 Typical sketch of two compartment septic tank for population up to 50

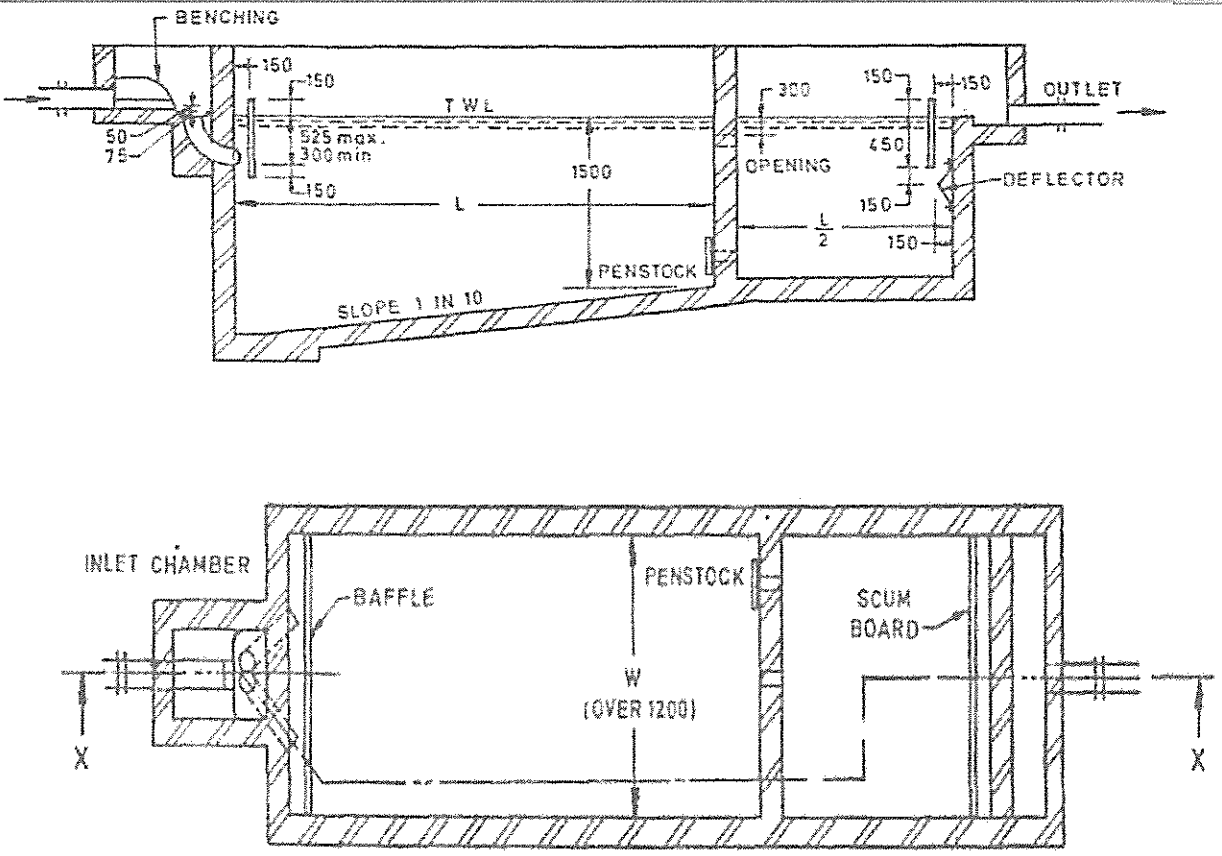


Figure 5.17.7 Typical sketch of two compartment septic tank for population over

BLANK

5.18 Chapter 18: PLASTERING

5.18.1 Mud Plaster

- *Providing and laying mud plaster incl. neat finish*

PL0001 *15mm*

PL0002 *20mm*

5.18.2 Cement Plaster

- *Providing and laying 6mm cement plaster (in ceilings)*

PL0010 *CM 1:3*

PL0011 *CM 1:4*

PL0012 *Extra, for plaster to ceiling height > 5m ...per additional meter height*

- *Providing and laying 12mm cement plaster*

PL0020 *CM 1:3*

PL0021 *CM 1:4*

PL0022 *CM 1:5*

PL0023 *CM 1:6*

- *Providing and laying 15mm cement plaster on rough side of single or half-brick wall*

PL0030 *CM 1:3*

PL0031 *CM 1:4*

PL0032 *CM 1:5*

PL0033 *CM 1:6*

- *Providing and laying 20mm cement plaster*

PL0040 *CM 1:3*

PL0041 *CM 1:4*

PL0042 *CM 1:5*

PL0043 *CM 1:6*

Preparation of surface: The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scraping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced. In case of concrete surface, if a chemical retarder has been applied to the formwork, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarder is left on the surface. The joints of masonry shall be raked out properly so that the plaster is well keyed with the masonry.

Mortar: The mortar of the specified mix described in the item shall be used.

Scaffolding: For all exposed brickwork or tile work, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with

horizontal pieces over which scaffolding planks shall be fixed. For all other masonry in buildings, single scaffolding shall be permitted. In such cases, the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one metre in width, or immediately near the skewbacks of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering.

Note: In case of special type of brickwork, scaffolding shall be got approved from Engineer.

Application of Plaster: Ceiling plaster shall be completed before commencement of wall plaster. Plastering shall be started from the top and worked down towards the floor. All putlog holes shall be properly filled in advance of the plastering as the scaffolding is taken down. To ensure even thickness and true surface, plaster about 15 x 15 cm, shall be first applied, horizontally and vertically, at not more than 2 metres intervals over the entire surface to serve as gauges. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall, between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness. The surface shall be brought to a true surface, by working a wooden straight edge reaching across the gauges, with small upward and side ways movements at a time. Finally the surface shall be finished off true with trowel or wooden float accordingly as a smooth or a sandy granular texture is required. Excessive trowelling or over working the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, junctions etc. where required shall be done without any extra payment. Such rounding or chamfering shall be carried out with proper templates to the sizes required. In suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically, when recommencing the plastering, the edge of the old work shall be scraped cleaned and wetted with lime putty or cement grout before plaster is applied to the adjacent areas, to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and not nearer than 15 cm to any corners or arises. It shall not be closed on the body of the features such as plasters, bands and copings, as these invariable lead to leakages. No portion of the surface shall be left out initially to be patched up later on. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar.

Finish: The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

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

Thickness: The thickness of the plaster specified shall be measured exclusive of the thickness of key. The average thickness of the plaster shall not be less than the specified thickness and the minimum thickness over any portion of the surface shall not be less than specified thickness by more than 3 mm. Where the thickness required as per description of the item is 20 mm the average thickness of the plaster shall not be less than 20 mm whether the wall treated is of brick or stone. In the case of brickwork, the minimum thickness over any portion

of the surface shall not be less than 15 mm while in the case of stonework the minimum thickness over the bushings shall be not less than 12 mm.

Curing: Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered. The plaster shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages at the contractor's expense by such means as the Engineer may approve. The dates on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched.

Measurement: Length and breadth shall be measured correct to 10 mm and its area shall be calculated in square metres correct to two places of decimal. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves, or open joints in brick works. The measurements of wall plaster shall be taken between the walls or partitions (the dimensions before plastering shall be taken) for the length, and from the top of the floor or skirting to the ceiling for the height. Depth of coves or cornices if any shall be deducted.

The following shall be measured separately from wall plaster:

(a) Plaster bands 30 cm wide and under.

(b) Cornices, beadings and architraves or architraves moulded wholly in plaster.

(c) Circular work not exceeding 6 m in radius.

Plaster over masonry pilasters will be measured and paid for as plaster only. A coefficient of 1.63 shall be adopted for the measurement of one side plastering on honeycomb work.

(a) Moulded cornices and coves:

(b) Length shall be measured at the centre of the girth.

(c) Moulded cornices and coves shall be given in square metres the area being arrived at by multiplying length by the girth.

(d) Flat or weather-top cornices when exceeding 15 cm in width shall not be included in the girth but measured with the General Plaster work.

(e) Cornices, which are curved in their length, shall be measured separately.

Exterior plastering at a height greater than 10m from average ground level shall be measured separately in each storey height. Patch plastering (in repairs) shall be measured as plastering new work, where the patch exceeds 2.5 sq.m, extra payment being made for preparing old wall, such as dismantling old plaster, raking out the joints and cleaning the surface. Where the patch does not exceed 2.5 sq.m in area, it shall be measured under the appropriate item under sub-head "Repairs to Buildings".

Deductions in measurements for openings etc. will be regulated as follows:

(a) No deduction will be made for openings or ends of joists, beams, posts, girders, steps etc. upto 0.5 sq.m in area; no additions shall be made either, for jambs, soffits and sills of such openings. The above procedure will apply to both faces of wall.

(b) Deduction for openings exceeding 0.5 sq.m but not exceeding 3 sq.m each shall be made for reveals, jambs, soffits, sills etc. of these openings.

(i) When both faces of walls are plastered with same plaster, deductions shall be made for one face only.

(ii) When two faces of walls are plastered with different types of plaster or if one face is plastered and other is pointed, or one face is plastered and other is un-plastered, deduction shall be made from the plaster or pointing on the side of the frame for the doors, windows etc. on which width of reveal is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

(iii) For opening having door frame equal to or projecting beyond thickness of wall, full deduction for opening shall be made from each plastered face of wall.

(iv) For opening exceeding 3 sq.m in area, deduction will be made in the measurements for the full opening of the wall treatment on both faces, while at the same time, jambs, sills and soffits will be measured for payment. In measuring jambs, sills and soffits, deduction shall not be made for the area in contact with the frame of doors, windows etc.

Rate: The rate shall include the cost of the labour and materials involved in all the operations described above.

5.18.3 Plaster Band

- *Providing and laying 12mm plain cement mortar band in CM 1:4*

PL0050 *Flush band*

PL0051 *Sunk band*

PL0052 *Raised band*

- *Providing and laying 20mm plain cement mortar band in CM 1:4*

PL0060 *Flush band*

PL0061 *Sunk band*

PL0062 *Raised band*

Plain band is a plaster strip of uniform width not exceeding 30 cm and of uniform thickness, provided for decorative or other purposes flush with, sunk below or projecting beyond, the wall plaster. A flush band is one where due to the difference in mix or shade of the mortar, the band is executed as a separate and distinct operation from the wall plaster.

Thickness: The thickness of a raised band is the thickness of the projection beyond the plane of the wall plaster. In the case of a flush or a sunk band, the thickness will be the thickness of the wall plaster measured from the untreated wall-surface.

Preparation of Surfaces and Application: In the case of flush or sunk bands the joints shall be raked out properly. Dust and loose mortar shall be brushed out.

Efflorescence if any shall be removed by brushing and scraping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced. In case of concrete surface if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned of and care shall be taken that none of the retarders is left on the surface. In case of raised band the surface shall be prepared as specified for plastering works. The surface of the wall plaster behind the band shall be left rough and furrowed 2 mm deep with a scratching tool, diagonally

both ways to form key for the band. No reduction in the rate for the above backing wall plaster shall, however, be made for not finishing the same smooth.

Mortar: Mortar of the mix and type of sand specified in the description of the item shall be used.

Finish: The bands shall be finished exactly to the size as shown in the drawings. The horizontal or vertical lines of bands shall be truly parallel and straight and the surfaces shall be finished truly plane and smooth. The lines and surfaces shall be checked with fine threads for straightness and accuracy.

Scaffolding, Curing and Precaution shall be as described in plastering items.

Measurements: Length will be measured in running metres correct to 10 mm. The length shall be taken along the finished face. The width shall not be measured by girthing. For width of band 30 cm or below, the width shall be measured in cm correct to 25 mm. The quantity shall be calculated in metre in 2.5 cm units.

Rate: The rate shall include the cost of the labour and materials involved in all the operations described above. Nothing extra shall be paid for mitres, stops or for bands on curved surfaces of whatever radius, they maybe. The rate is also inclusive of all rounding or chamfering at corners, arises etc.

5.18.4 Cement Plaster with Floating Coat

- *Providing and laying cement plaster, finished with floating coat of neat cement*

PL0070 *12 mm plaster in CM 1:3*

PL0071 *15 mm plaster in CM 1:3*

PL0072 *20 mm plaster in CM 1:3*

PL0073 *12 mm plaster in CM 1:4*

PL0074 *15 mm plaster in CM 1:4*

PL0075 *20mm plaster in CM 1:4*

The cement plaster shall be 12, 15 or 20 mm thick, finished with a floating coat of neat cement, as described in the item.

Specifications for this item of work shall be same as described in plastering items above except for the additional floating coat, which shall be carried out as below.

When the plaster has been brought to a true surface with the wooden straight edge, it shall be uniformly treated over its entire area with a paste of neat cement and rubbed smooth, so that the whole surface is covered with neat cement coating. The quantity of cement applied for floating coat shall be 1 kg per sq.m. Smooth finishing shall be completed with trowel immediately and in no case later than half an hour of adding water to the plaster mix.

Thickness, curing, measurements **and** rate **shall be as specified above in the plastering items.**

PL00766mm cement plaster in CM 1:3 finished with a floating coat of neat cement, including lime wash on top of wall when dry for bearing of R.C slabs and beams

Cement plaster shall be 6 mm thick finished with a floating coat of neat cement and thick coat of lime wash on top of walls for bearing of slabs.

Application: The plaster shall be applied over the cleaned and wetted surface of the wall. When the plaster has been brought to a true surface with the wooden straight edge, it shall be uniformly treated over its entire area with a paste of neat cement and rubbed smooth, so that the whole surface is covered with neat cement coating. The quantity of cement applied for floating coat shall be 1 kg per sq.m. Smooth finishing shall be completed with trowel immediately and in no case later than half an hour of adding water to the plaster mix. The rest of the specifications described in "plastering works with floating coat of neat cement" shall apply.

Lime Wash: This shall be applied in a thick coat after curing the plaster for three days.

Measurement: Length and breadth shall be measured correct to 10 mm and area worked out in sq.m correct to two places of decimal.

Rate: The rate shall include the cost of the labour and materials involved in all the operations described above.

5.18.5 Decorative Plaster

- *Roughcast plaster with a mixture of sand and gravel or crushed stone 2-12mm including plaster in two layers with under layer 12mm in CM 1:4, & top layer 10mm in CM 1:3 hydrated lime cement*

PL0080 *Grey cement*

PL0081 *White cement*

Roughcast finish comprises of a mixture of sand and crushed stone (or gravel) in specified proportions dashed over a freshly plastered surface. Scaffolding shall be done as specified above in ordinary plastering works.

Preparation of surface: The joints shall be raked out; dust and loose mortar shall be brushed out. The surface shall be thoroughly washed with water, cleaned and kept wet before plastering is commenced.

Mortar: Mortar of specified mix using the type of sand described in the item shall be used.

The plaster base over which rough cast finish is to be applied shall consist of two coats, under layer 12 mm thick and top layer 10 mm. The under layer shall be applied in the same manner as specified above in ordinary plastering works. The top layer shall be applied a day or two after the under layer has taken initial set. The latter shall not be allowed to dry out before the top layer is laid on. The mortar used for applying top layer shall be sufficiently plastic and of mix 1:3 (1 cement: 3 fine sand) so that the mix of sand crushed stone (or gravel) gets well pitched with the plaster surface. In order to make the base plastic about 10% of finely ground lime by volume of cement shall be added.

Finish: It shall be ensured that the base surface, which is to receive roughcast mixture, is in plastic state. The roughcast mixture shall consist of sand and crushed stone (or gravel) of uniform colour from 2mm to 12 mm as specified to get the effect required. The mixture shall be wetted and shall be dashed on the plaster base in plastic state by hand scoop so that the mix gets well pitched with the plaster base. The mix shall again be dashed over the vacant spaces, if any, so that the surface represents a homogeneous surface of sand/stone (or gravel). A sample of the plaster shall be got approved by the Engineer.

Measurement and rate shall be same as for general plastering.

PL0090 Pebble dash plaster with a mixture of washed pebble or crushed stone 6-12mm including plaster in 2 layers

Pebble dash plaster with a mixture of washed pebble or crushed stone 6 mm to 12 mm nominal size dashed over and including fresh plaster in the layers, the under layer 12 mm cement plaster 1:4 (1 cement: 4 sand) and top layer 10 mm cement plaster 1:3 (1 cement: 3 sand) mixed with finely ground hydrated lime by volume of cement.

The specifications shall be the same as under "Rough cast plaster" except that the washed pebble or crushed stone graded from 6 mm to 12.5 mm shall be dashed over the plastic base and the vacant spaces if any shall be filled in by pressing pebbles or crushed stone as specified, by hand so that the finished surface is homogeneous.

Specifications, Measurements, rate shall be the same as given under item "Rough cast plaster".

5.18.6 Cement Plaster in Two coats

PL009118 mm cement plaster in two coats; under layer 12 mm C.P 1:5 (1 cement : 5 sand) and top layer 6 mm thick C.P 1:4 (1 cement : 6 sand) finished even and smooth and curing etc. complete

PL009218 mm cement plaster in two coats; under layer 12 mm C.P 1:5 (1 cement : 5 sand) and top layer 6 mm thick C.P 1:3 (1 cement : 6 sand) finished even and smooth and curing etc. complete

The Specification for scaffolding and preparation of surface shall be as described in 19.2.

Mortar - The mix and type of the fine aggregate specified in the description of the item shall be used for the respective coats. Generally the mix of the finishing coat shall not be richer than the under coat unless otherwise described in item. Generally coarse sand shall be used for the under coat and fine sand for the finishing coat, unless otherwise specified for external work and under coat work, the fine aggregate shall conform to grading zone IV. For finishing coat work the fine aggregate conforming to grading zone V shall be used.

Application - The plaster shall be applied in two coats i.e. 12 mm under coat and then 6 mm finishing coat and shall have an average total thickness of not less than 18 mm.

12 mm *Under Coat:* This shall be applied as specified in19.2 except that when the plaster has been brought to a true surface a wooden straight edge and the surface shall be left rough and furrowed 2 mm deep with a scratching tool diagonally both ways, to form key for the finishing coat. The surface shall be kept wet till the finishing coat is applied.

6 mm *Finishing Coat:* The finishing coat shall be applied after the under coat has sufficiently set but not dried and in any case within 48 hours and finished in the manner specified in 19.2.

Specifications for Curing, Finishing, Precautions, Measurements and Rate shall be as described under 19.2.

5.18.7 Cement Lime Plaster

PL009512 mm cement lime plaster of mix on fair side of brick work - 1:1:6 (1 cement: 1 lime: 6 sand) finished even and smooth and curing etc., complete

PL009612 mm cement lime plaster of mix on rough side of brick work - 1:1:6 (1 cement: 1 lime: 6 sand) finished even and smooth and curing etc., complete

The cement lime plaster shall be 12 mm or 15 mm as specified in the item.

Mortar - The mortar of the mix and types of sand specified in the description of the item shall be used. The cement lime mortar shall be as specified in specifications for mortars

Application - It shall be as specified under 19.2 except that the plastering and finishing shall be completed within half an hour of adding slurry of lime putty to the dry cement sand mixture or mixing cement to ground lime mortar.

Specifications for scaffolding, Preparation of surface, Finish, Thickness, Curing, Precautions, measurements and Rate shall be as described under 19.2.

5.18.8 Extra for Plaster

- *Extra, for providing and mixing water-proofing materials in proportion recommended by the manufacturers*

PL0100 *12mm plaster in CM 1:3*

PL0101 *12mm plaster in CM 1:4*

PL0102 *15mm plaster in CM 1:3*

PL0103 *15mm plaster in CM 1:4*

PL0104 *20mm plaster in CM 1:3*

PL0105 *20mm plaster in CM 1:4*

The water-proofing compound shall be mixed in the proportion and in the way as recommended by the manufacturers.

Measurement: The measurement shall be in square metres correct to two places of decimal.

Rate: The rate shall include the cost of water proofing compound and labour involved in mixing the compound with cement Mortar.

PL0110 *Extra for neat cement punning*

When the plaster has been brought to a true surface with the wooden straight edge it shall be uniformly treated over its entire area with a paste of neat cement and rubbed smooth, so that the whole surface is covered with neat cement coating. The quantity of cement applied for floating coat shall be 1 kg per sq.m. Smooth finishing shall be completed with trowel immediately and in no case later than half an hour of adding water to the plaster mix.

Curing: Curing shall be started as soon as the plaster has hardened sufficiently as not be damaged when watered. The work shall be kept wet for period of at least 7 days. During this period, it shall be suitably protected from all damages at the contractor's expense by such means as the Engineer may approve. The dates on which the work is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched. Specifications for scaffolding, finish and precautions to be taken for the work shall be as described under ordinary plastering works.

Measurement: The measurements for cement punning shall be taken over the finished work. The length and breadth shall be measured correct to 10 mm. The area shall be calculated in sq.m correct to two places of decimal. Punning over plaster on bands, skirting, coving, cornices, drip courses, stringcourses, etc. shall not be measured separately. In these cases the measurements shall be taken girthed over the above features. Punning over plaster on

circular work also, of any radius shall be measured only as wall surfaces and not separately. Cement punning in patch repairs irrespective of the size of the patch shall be measured as new work, and in this case the rate shall include for cutting the patch to rectangular shape before cement punning. Deductions in measurements for openings shall be regulated generally as described under item for ordinary plastering works.

Rate: The rate shall include the cost of the labour and materials involved in all the operations described above.

5.18.9 Putty finishes

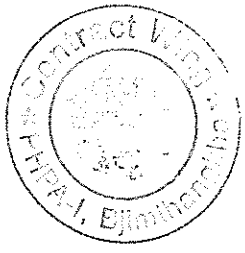
PL0125 Providing & applying putty of 2mm or more thickness over plastered surface to prepare the surface even and smooth complete.

Application of Putty finishes: Apply putty of 2mm thick over finished cement plaster surface.

Finish: The putty shall be finished to a true and plumb surface and to the proper degree of smoothness as required.

Measurement: Length and breadth shall be measured correct to 10 mm and its area shall be calculated in square metres correct to two places of decimal. The measurements of wall putty plaster shall be taken between the walls or partitions (the dimensions before plastering shall be taken) for the length, and from the top of the floor or skirting to the ceiling for the height.

Rate: The rate shall include the cost of the labour and materials involved in all the operations described above.



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5.19 Chapter 19: PAINTING & WALL PAPER

5.19.1 General

Painting shall not be started until the Engineer has inspected the items of work to be painted and satisfied himself about their proper quality and given his approval to commence the painting work. Painting, except the priming coat, shall generally be taken in hand after practically finishing all other builder's work. Painting of external surface should not be done in adverse weather condition like hail or dust storm etc. The rooms should be thoroughly swept out and the entire building cleaned up at least one day in advance of the painting work being started. The contractor shall bring approved paints, oils and varnishes to the site of work, in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The empties shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer.

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 brick work or tile work, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal piece over which scaffolding planks shall be fixed.

In case of special type of brickwork, scaffolding shall be got approved from Engineer 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.

5.19.1.1 Preparation of surface:

Wooden surface: The woodwork to be painted shall be dry and free from moisture. The surface shall be thoroughly cleaned. All unevenness shall be rubbed down smooth with sandpaper and shall be well dusted. Knots, if any shall be covered with preparation of red lead made by grinding red lead in water and mixing with strong glue sized and used hot. Appropriate filler material with same shade, as paint shall be used where specified. The surface treated for knotting shall be dry before painting is applied. After the priming coat is applied, the holes and indentation on the surface shall be stopped with a glazier's putty or wood putty. Stopping shall not be done before the priming coat is applied as the wood will absorb the oil in the stopping and the latter is therefore liable to crack.

Iron & Steel Surface: All rust and scales shall be removed by scraping or by brushing with steel wire brushes. Hard skin of oxide formed on the surface of wrought iron during rolling, which becomes loose by rusting shall be removed. All dust and dirt shall be thoroughly wiped away from the surface. If the surface is wet, it shall be dried before priming coat is undertaken.

Plastered surface: The surface shall ordinarily not be painted until it has dried completely. Trial patches of primer shall be laid at intervals and where drying is satisfactory, painting shall then be taken in hand. Before primer is applied, holes and undulations shall be filled up with plaster of paris and rubbed smooth.

Measurements

The length and breadth shall be measured correct to 10 mm. The area shall be calculated in sq.m correct to two places decimal, 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, compound girders, stanchions, lattices and similar work shall, however be given in sq. metres irrespective of the size or girth of members. In measuring painting, varnishing oiling etc., of joinery, and steel work etc. the coefficients as in tables 5.19.1 shall be used to obtain the area payable.

The following coefficients shall be applied to the areas measured flat and not girth.

EXPLANATORY NOTE FOR THE TABLE

1. Measurements for doors windows etc., shall be taken flat (and not girth) overall including frames, where provided. Where frames are not provided, the shutter measurements shall be taken.
2. Where doors, windows etc., are of composite types other than those included in Table -1 the different portion shall be measured separately with their appropriate coefficients, the centre line of the common rail being taken as the dividing line between the two portions.
3. The coefficients for doors and windows shall apply irrespective of the size of the frames and shutters members.
4. In case steel frames are used the area of doors, windows shutters shall be measured flat excluding frames.
5. When two faces of a door, window etc. are to be treated with different specified finishes, measurable under separate items, the edges of frames and shutters shall be treated with the one or the other type of finish as ordered by the Engineer, and measurement of this will be deemed to be included in the measurement of the face treated with that finish.
6. In the case where shutters are fixed on both faces of the frames, the measurement for the doorframe and shutter on one face shall be taken in the manner already described. While the additional shutter on the other face will be measured for the shutter area only excluding the frame.
7. Where shutters are provided with clearance at top or/ and bottom each exceeding 15 cm height, such openings shall be deducted from the over-all measurements and relevant co- efficient shall be applied to obtain the area payable.
8. Collapsible gates shall be measured for width from outside to outside of gate in its expanded position and for height from bottom to top of channel verticals. No separate measurements shall be taken for the top and bottom guide rails rollers, fittings etc.
9. Co-efficient for sliding doors shall be the same as for normal types of doors in the table. Measurements shall be taken outside to outside of shutters, and no separate measurements shall be taken for painting guides, rollers, fittings etc.
10. Measurements of painting as above shall be deemed to include painting all iron fittings in the same or different shades for which no extra will be paid.

11. The measurements of guard bars expanded metal, hard drawn steel wire fabric of approved quality grill work and gratings, when fixed in frame work, painting of which is once measured elsewhere shall be taken exclusive of the frames. In other cases the measurements shall be taken inclusive of the frames.

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. Painting 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.

Measurements of wall surfaces and wood and other work not referred to already shall be recorded as actual. Flag staffs, steel chimneys, aerial masts, spires and other such objects requiring special scaffolding shall be measured separately.

Precautions: All furniture, fixtures, glazing, floor etc. shall be protected by covering and stairs, smears, splashing, in any shall be removed and any damage done shall be made good by the contractor at his cost.

Table 5.19.1 COEFFICIENTS FOR PAINTING MEASUREMENT

Sl. No	Description of work	How measured	Multiplying coefficients
I.	**Wood work – Doors, windows, etc.**		
1	Panelled or framed and braced doors, windows, etc.	Measured flat (not girthed) including frame	1.3 (for each side)
2	Flush doors etc.	-do-	1.20 (for each side)
3	Part panelled and part glazed or gauzed doors, windows, etc.	-do-	0.8 (for each side)
4	Fully glazed or gauzed doors, windows, etc.	-do-	0.5 (for each side)
5	Fully venetianed or louvered doors, windows, etc.	-do-	1.80 (for each side)
6	Railing (Jadhang Tazi)	Measured flat over all on one side, no deduction shall be made for open spaces, supporting members shall not be measured separately.	2.00 (for painting all over)
7	Traditional Cornices	Measured flat	2.00 (for each side)
8	Wood shingle roofing	Measured flat (not girthed)	1.10 (for each side)
9	Tile and slate battening	Measured flat over all, no deduction shall be made for open spaces	0.80 (for painting all over)
II	**STEEL: WORK-DOORS, WINDOWS, ETC.**		
10	Plain sheeted steel doors or windows	Measured flat (not girthed) including frame edges etc.	1.10 (for painting all over)

11	Fully glazed or gauzed steel doors and windows	-do-	0.50 (for each side)
12	Partly panelled and partly glazed or gauzed doors and windows	-do-	0.80 (for each side)
13	Corrugated sheeted steel doors or windows	-do-	1.25 (for each side)
14	Collapsible gates	Measured flat	1.50 (for each side)
15	Rolling shutters of interlocked laths	Measured flat (size of opening) all over jamb, guides, bottom rails and locking arrangements etc. shall be included in the item (top cover shall be measured separately)	1.10 (For each side)
III	**General**		
16	Expanded metal, hard drawn steel wire fabric of approved quality grill works and gratings in guard bars, balustrades, railings, partitions and m.s bars in window frames	Measured flat over all, no deductions shall be made for open spaces, supporting members shall not be measured separately	1.0 for painting all over
17	Corrugated iron sheeting in roofs, side cladding, etc.	Measured flat (not girthed)	1.14 (for each side)
18	Wire gauze shutters including painting of wire gauze	-do-	1.0 (for each side)

5.19.2 Surface Preparation

- *Surface preparation removing by scraping, sand papering, including scratch repairs*

PT0001 *White colour-wash*

PT0002 *Dry oil bound distemper*

Preparation of Surface: Before new work is white washed, the surface shall be thoroughly brushed free from mortar dropping and foreign-matter. In the case of old work, all loose pieces and scales shall be scraped off and shades in plaster as well as patches of less than 50 sq.cm area shall be filled up with mortar of the same mix. The surface shall then be allowed to dry for at least 48 hours. Where so specifically ordered by the Engineer, the entire surface of old white wash shall be thoroughly removed by scraping. Any unevenness shall be made good by applying putty, made of plaster of paris mixed with water on the entire surface including filling up the undulation and then sand papering the same after it is dry.

Measurement: Length and breadth shall be measured correct to 10 mm and area shall be calculated correct to two places of decimals. Corrugated surface shall be measured flat as fixed and the area so measured shall be increased by 20% to allow for the girth area. Cornices and other such wall or ceiling features shall be measured along the girth and included in the

measurements. The item shall include removing nails, making good holes, cracks, patches etc. not exceeding 0.1 sq.m each with material similar in composition to the surface to be prepared. Work on old treated surfaces shall be measured separately and so described. Measurement for jambs, soffits, sills, etc. shall be same as for plastering works.

Rate: The rate shall include the labour and materials involved in the work.

5.19.3 Primers

- *Providing & applying one coat of primer*

PT0010	*Cement primer*
PT0011	*Metal work - synthetic red oxide primer*
PT0012	*Wood work - pink primer*
PT0013	*Wood work - white primer*
PT0014	*Red lead primer*

Cement primer coat is used as a base coat on wall finish of cement, lime or lime cement plaster or on asbestos cement surfaces before oil emulsion distemper paints are applied on them. The cement primer is composed of a medium and pigment which are resistant to the alkalis present in the cement, lime or lime cement in wall finish and provides a barrier for the protection of subsequent coats of oil emulsion distemper paints. Primer coat shall be preferably applied by brushing and not by spraying. Hurried priming shall be avoided particularly on absorbent surfaces. New plaster patches in old work should also be treated with cement primer before applying oil emulsion paints etc.

Application: The cement primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for atleast 48 hours, before oil emulsion paint is applied. The specifications in respect of scaffolding protective measures, measurements and rate shall be as described above for surface preparation.

The primer for woodwork, ironwork shall be as specified in the description of the item. The primer shall be applied with brushes, worked well into the surface and spread even and smooth. Primers for plaster/wood/iron & steel/aluminium surfaces shall be as specified in the Table below:

Table 5.19.2 PRIMERS FOR PLASTER/WOOD/IRON & STEEL/ALUMINIUM SURFACES

Sl. No	Surfaces	Primer to be used
1	Wood works (hard and soft wood)	Pink confirming to (IS 3536)
2	Resinous wood and ply wood	Aluminium primer
3	Aluminium steel and galvanised steel work	Zinc chromate primer conforming to (IS:104)
4.	Cement, brick work, plaster surface, Asbestos surface for oil bound distemper and paint	Cement primer

The primer shall be ready mixed primer of approved brand and manufacture.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

5.19.4 Wall Washing

- *Providing & applying white or colour washing*

PT0020	*White washing with lime, new work, three coats*
PT0021	*White washing with lime, old work, two coats*
PT0022	*White washing with lime, old work, one coat*
PT0023	*Colour washing new work, two coats, including base coat of white wash with lime*
PT0024	*Colour washing with lime, old work, two coats*
PT0025	*Colour washing with lime, old work, one coat*

Preparation of lime wash: The wash shall be prepared from fresh stone white lime. The lime shall be thoroughly slaked on the spot, mixed and stirred with sufficient water to make a thin cream. This shall be allowed to stand for a period of 24 hours and then shall be screened through a clean coarse cloth. 40 gm of gum dissolved in hot water shall be added to each 0.01 cubic metre of the cream.

The approximate quantity of water to be added in making the cream will be 5 litres of water to 1 kg of lime. Blue up to 3 gm per kg of lime dissolved in water shall be added and wash stirred well. Water then shall be added @ about 5 litres per kg of lime to produce a milky solution.

Application: The specified number of coats of the white wash shall be applied with the brushes. The operation for each stroke shall consist of a stroke of the brush given from the top downwards, another from the bottom upward over the first stroke and similarly one stroke horizontally from the right and another from left before it dries. Each coat shall be allowed to dry before the next one is applied. Further each coat shall be inspected and approved by the Engineer before the subsequent coat is applied. No portion of the surface shall be left out to be patched up later on.

For new work, three or more coats shall be applied till the surface presents a smooth and a uniform finish through which the plaster does not show. The finished dry surface shall not show any signs of cracking and peeling nor shall it come off on the hand when rubbed. For old work, after the surface has been prepared as described above, a coat of white wash shall be applied over the patches and repairs. Then a single coat or two or more coats of white wash as stipulated in the description of the item shall be applied over the entire surface. The white washed surface should present a uniform finish through which the plaster patches do not appear. The washing on ceiling should be done prior to that on walls.

The mineral colours, not affected by lime, shall be added to white wash. Blue (Neel) shall, however, not be added. No colour wash shall be done until a sample of the colour washes of the required tint or shade has been got approved from the Engineer-. The colour shall be of even tint or shade over the whole surface. If it is blotchy or otherwise badly applied, the contractor shall redo it. For new work, the priming coat shall be of white wash with lime or

with whiting as specified in the description of the item. Two or more coats shall then be applied on the entire surface till it represents a smooth and uniform finish. For old work, after the surface has been prepared a coat of colour wash shall be applied over the patches and repairs. Then a single coat, or two or more coats of colour wash, as stipulated in the description of the item shall be applied over the entire surface. The colour washed surface shall present a uniform finish. The finished dry surface shall not be powdery and shall not readily come off on the hand when rubbed.

Note: In case of Hessian ceiling, on no account, lime shall be used as it rots cloth and hessain.

Protective Measures: Doors, windows, floors, articles of furniture etc. and such other parts of the building not to be white washed shall be protected from being splashed upon. Splashing and droppings if any, shall be removed by the contractor at his own cost. Damages if any to furniture or fittings and fixtures shall be recoverable from the contractor.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

5.19.5 Cement Paint

- *Finishing wall with Water-Proof Cement Paint*

PT0030 *New work, three coats*

PT0031 *Old work, one coats*

Material: The cement paint shall be (equivalent to IS 5410) of approved brand and manufacture.

Preparation of Surface: For new work, the surface shall be thoroughly cleaned of all mortar dropping, dirt, dust, algae, grease and other foreign matter by brushing and washing. The surface shall be thoroughly wetted with clean water before the cement paint is applied. In the case of old work, all loose pieces and scales shall be removed and the surface shall be cleaned of all dirt, dust, algae, oil etc. by brushing and washing. Pitting in plaster shall be made good and a coat of water proof cement paint shall be applied over patches after wetting them thoroughly.

Preparation of mix: Cement paint shall be mixed in such quantities as can be used up within an hour of its mixing as otherwise the mixture will set and thicken, affecting flow and finish. Cement paint shall be mixed with water in two stages. The first stage shall comprise of two parts of cement paint and one part of water stirred thoroughly and allowed standing for 5 minutes. Care shall be taken to add the cement paint gradually to the water and not vice versa. The second stage shall comprise of adding further one part of water to the mix and stirring thoroughly to obtain a liquid of workable and uniform consistency. In all cases the manufacturer's instructions shall be followed meticulously. The lids of cement paint drums shall be kept tightly closed when not in use, as by exposure to atmosphere the cement paint rapidly becomes air set due to its hygroscope qualities.

Application: The solution shall be applied on the clean and wetted surface with brushes or spraying machine. The solution shall be kept well stirred during the period of application. It shall be applied on the surface, which is on the shady side of the building so that the direct heat of the sun on the surface is avoided. The method of application of cement paint shall be as per manufacture's specification. The completed surface shall be watered after the day's

work. The second coat shall be applied after the first coat has set for at least 24 hours. Before application of the second or subsequent coats, the surface of the previous coat shall not be wetted. For new work, the surface shall be treated with three or more coats of waterproof cement paint as found necessary to get a uniform shade. For old work, the treatment shall be with one or more coats as found necessary to get a uniform shade.

Precaution: Water cement paint shall not be applied on surfaces already treated with white wash, colour wash, distemper dry or oil bound, varnishes, paints etc. It shall not be applied on gypsum, wood and metal surfaces.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

5.19.6 Distemper

- *Providing and applying finishing coats, with*

PT0040 *Dry distemper, two coats on new work, incl. white priming coat*

PT0041 *Dry distemper, one coat on old work*

Materials: Dry distemper of required colour and (IS:427) of approved brand and manufacture shall be used. The shade shall be got approved from the Engineer before application of the distemper. The dry distemper colour as required shall be stirred slowly in clean water using 0.6 litre of water per kg of distemper or as specified by the makers. Warm water shall preferably used. The mixture shall 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 even consistency. Distemper shall not be mixed in larger quantity than is actually required for one day's work.

Priming coat: A priming coat of whiting shall be applied over the prepared surface in case of new work, if so stipulated in the description of the item. No white washing coat shall be used as a priming coat for distemper. The treated surface shall be allowed to dry before distemper coat is given.

Application: In the case of new work, the treatment shall consist of a priming coat of whiting followed by the application of two or more coats of distemper till the surface shows an even colour. For old work, the surface prepared shall be applied one or more coats of distemper till the surface attain an even colour. The application of each coat shall be as follows:

The entire surface shall be coated with the mixture uniformly, with proper distemper brushes (ordinary white wash brushes shall not be allowed) in horizontal strokes followed immediately by vertical ones, which together shall constitute one coat. The subsequent coats shall be applied only after the previous coat has dried. The finished surface shall be even and uniform and shall show no brush marks. Enough distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room, which cannot be completed the same day. After each day's work, the brushes shall be washed in hot water and hung down to dry. Old brushes, which are dirty or caked with distemper, shall not be used.

Measurement and **rate** shall be same as described under item X above.

- *Providing and applying finishing coats, with*

PT0042 *Acrylic washable distemper, two coats on new work, incl. cement primer coat*

PT0043 *Acrylic washable distemper, one coat on old work*

Materials: Oil emulsions (Oil Bound) distemper (IS-428) of approved brand and manufacture shall be used. The primer where used, as on new work, shall be cement primer or distemper primer as described in the item. These shall be of the same manufacture as distemper. The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacture. Only sufficient quantity of distemper required for day's work shall be prepared. The distemper and primer shall be brought by the contractor in sealed tins in sufficient quantities at a time to suffice for a fortnight's work, and the same shall be kept in the joint custody of the contractor and the Engineer. The empty tins shall not be removed from the site of work, till this item of work has been completed and passed by the Engineer.

Application: Priming coat: The priming coat shall be with distemper primer or cement primer, as required in the description of the item. The application of the distemper primer shall be as described above. Oil bound distemper is not recommended to be applied, within six months of the completion of wall plaster. For old work no primer coat is necessary.

Distemper coat: For new work, after the primer coat has dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. One coat of distemper properly diluted with thinner (water or other liquid as stipulated by the manufacture) shall be applied with brushes in horizontal strokes followed immediately by vertical ones which together constitute one coat. The subsequent coats shall be applied in the same way. Two or more coats of distemper as are found necessary shall be applied over the primer coat to obtain an even shade. A time interval of at least 24 hours shall be allowed between consecutive coats to permit for the proper drying of the preceding coat.

For old work the distemper shall be applied over the prepared surface in the same manner as in new work. One or more coats of distemper as are found necessary shall be applied to obtain an even and uniform shade. 15 cm double bristled distemper brushes shall be used. After each day's work, brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes, which are dirty and caked with distemper, shall not be used on the work.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

5.19.7 Finishing Paints

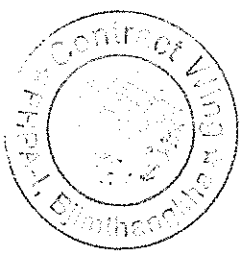
- *Providing and applying finishing coats, with*

PT0044 *Bituminastic enamel, for steel work, two coats on new work*

PT0045 *Bituminastic enamel, for steel work, one coat on old work*

PT0046 *Synthetic enamel, for steel & wood work, one coat on old work*

PT0047 *Synthetic enamel, for steel & wood work, two coats on new work*



Synthetic Enamel paint (conforming to IS:1932) of approved brand and manufacture and of the required colour shall be used for the top coat and an undercoat of shade to match the top and as recommended by the manufacturer shall be used.

Painting on New Surface:

Preparation of Surface for Wood work: The surface shall be cleaned and all unevenness removed. Knots if visible, shall be covered with a preparation of red lead. Hole and indentations on the surface shall be filled in with glazier's putty or wood putty and rubbed smooth before painting is done. The surface should be thoroughly dry before painting.

Preparation of Surface for Iron and steelwork: The priming coat shall have dried up completely before painting is started. Rust and scaling shall be carefully removed by scraping or by brushing with steel wire brushes. All dust and dirt shall be carefully and thoroughly wiped away.

Application: The number of coats including the undercoat shall be as stipulated in the item.

Under Coat: One coat of the specified paint of shade suited to the shade of the topcoat shall, be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.

Topcoat: Topcoats of specified paint of the desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

Other details shall be as specified after item 54 as far as they are applicable.

Painting on old surface:

Preparation of surface: Where the existing paint is firm and sound it shall be cleaned of grease, smoke etc. and rubbed with sand paper to remove all loose paint and loose particles dusted off. All patches and cracks shall then be treated with stopping and filler prepared with the specified paint. The surface shall again be rubbed and made smooth and uniform. If the old paint is blistered and flaked it will be necessary to completely remove the same. Such removal shall be paid for separately and the painting shall be treated as on new surface.

Painting: The number of coats as stipulated in the item shall be applied with the specified paint. Each coat shall be allowed to dry and rubbed down smooth with very fine wet abrasive paper, to get an even glossy surface. If, however, the surface is not satisfactory additional coats as required shall be applied to get correct finish.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

- *Providing and applying finishing coats, with*

PT0048 *High gloss synthetic enamel, for steel & wood work, two coats on new work*

PT0049 *High gloss synthetic enamel, for steel & wood work, one coat on old work*

Ready mixed paints of approved brand and manufacture and of the required shades shall be used. They shall conform in all expects to the relevant IS specifications.

Painting on New Surface: The surface which has not been painted earlier, or the paint has been removed by paint remover, burning, caustic soda etc. shall be considered to be new surface.

Preparation of Surface:

Wood Work: The surface shall be cleaned and all unevenness removed as specified under items 57 to 60. Knots if visible, shall be covered with a preparation of red lead. Holes and indentations on the surface shall be filled in with glazier's putty or wood putty and rubbed smooth before painting is done. The surface should be thoroughly dry before painting.

Iron and Steel work: The priming coat shall have dried up completely before painting is started. Rust and scaling shall be carefully removed by scraping or by brushing with steel wire brushes. All dust and dirt shall be carefully and thoroughly wiped away.

Plastered surface: The priming coat shall have dried up completely before painting is started. All dust or dirt that has settled on the priming coat shall be thoroughly wiped away before painting is started.

Application: The specifications described below shall hold good as far as applicable. The number of coats to be applied will be as stipulated in the item. The painted surface shall present a uniform appearance and glossy finish, free from streaks, blisters etc. The general specifications described after item 54 shall hold good in so far as they are applicable.

Painting an old surface: The surface, which has been painted earlier, shall be considered to be an old surface.

Preparation of Surface:

Wood work: If the old paint is sound and firm and its removal is considered unnecessary, the surface shall be rubbed down with pumice stone after it has been cleared of all smoke and grease by washing with lime and rinsing with water and drying. All dust and loose paint shall be completely removed. The surface shall then be washed with soap and water. If the old painted surface is blistered or flaked badly, old paint shall be completely removed and such removal shall be paid for separately. Holes and cracks if any shall be stopped with glazier's putty or wood putty. Further the painting itself shall be treated as on new surface and paid for, accordingly.

Iron and Steel Work: If the old paint is sound and firm and its removal is considered unnecessary, it shall be rubbed with wire brushes and any loosened paint taken off. All dust shall then be thoroughly wiped away. This surface shall then be wiped finally with mineral turpentine to remove grease and perspiration of hand marks etc. and then allowed drying. If the old painted surface is in bad condition and blistered and flaked, the old paint shall be completely removed and such removal shall be paid for separately. The painting including the priming coat shall be treated as on new work and paid for accordingly.

Plastered surface: If before painting any portion of the wall shows signs of dampness, the causes shall be investigated and the damp surface shall be properly treated. Such treatment shall be paid for separately. A thin coat of white lead if so required shall be applied on the wet or patchy portion of the surface, before painting is undertaken and this shall be paid extra. The number of coats to be given shall be as stipulated in the description of the item.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

- *Providing and applying finishing coats, with*

PT0050 *Red corrugal, ready mixed|on G.I. sheets, two coats on new work*

PT0051 *Red corrugal, ready mixed, on G.I. sheets|one coat on old work*

Ready mixed paint, suitable for painting over GI sheets, of approved brand and manufacture and of the required shade shall be used. New or weathered GI sheets shall be painted with a priming coat of one coat of red oxide zinc chromate paint. Primer shall be applied before fixing sheets in place.

Preparation of Surface:

Painting New Surface: The painting of new GI sheets shall not usually be done till the sheets have weathered for about a year. When new sheets are to be painted before they have weathered they shall be treated with a mordant solution prepared by mixing 38 gm of copper acetate in a litre of soft water or 13 gm hydrochloric acid in a solution of 13 gm each of copper chloride, copper nitrate & ammonium chloride dissolved in a litre of soft water. This quantity of solution sufficient for about 235 sq.m to 280 sq.m of area and is applied for ensuring proper adhesion of paint. The painting with the mordant solution will be paid for separately. Before painting on new or weathered GI sheets, rust patches shall be completely cleaned with coarse emery paper and brush. All grease marks also shall be removed and the surface washed and dried and rusted surface shall be touched with red mixed paint of red lead.

Painting Old Surface: If the old paint is firm and sound, it shall be cleaned of grease, smoke etc. The surface shall then be rubbed down with sandpaper and dusted. Rusty patches shall be cleaned up and touched with red lead. If the old paint is blistered and flaked, it shall be completely removed. Such removal shall be paid for separately and painting shall be treated as on new work.

Application: The number of coats to be applied shall be as in the description of item. In the case of C.G.I. sheets, the crowns of the corrugations shall be painted first and when these get dried the general coat shall be given to ensure uniform finish over the entire surface without the crowns showing signs of thinning. The second or additional coats shall be applied when the previous coat has dried.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

- *Providing and applying finishing coats, with*

PT0052 *Vinyl plastic emulsion paint, for cement, masonry, plaster, two coats on new work*

Plastic emulsion paint is not suitable for application on external wood and iron surface and surfaces, which are liable to heavy condensation, and are to be used on internal surfaces except wood and steel which is liable for condensation. Plastic emulsion paint as per IS 5411 of approved brand and manufacture and of required shade shall be used.

Preparation of surface: The plaster surfaces shall be allowed to dry thoroughly. A thin layer of plaster of Paris shall be used to make the wall surface perfectly plane and wall junction lines perfectly straight and neat. This surface shall be finished smooth. Care must be taken to

keep this layer as thin as possible. This shall be got inspected by the engineer before the application of the plastic emulsion paint.

Application of paint: The paint will be applied in the usual manner with brush or roller. The paint dries by evaporation of the water content and as soon as the water has evaporated the film gets hard and the next coat can be applied. The time of drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces. The thinning of emulsion is to be done as per manufacturer's recommendation. Turpentine should not be used for the purpose. The surface on finishing shall present a flat velvety smooth finish. If necessary more coats will be applied till the surface presents a uniform appearance.

Precautions: Old brushes, if required to be used shall be thoroughly cleaned by washing in warm soap water. Brushes shall be washed immediately after use and kept immersed in water during break periods to prevent paint drying on the brush and hardening. No oil-based putties shall be used in preparation of walls. Splashes of paint shall be cleaned out without delay, as it will be difficult to remove after hardening. Washing of surface treated with plastic emulsion paint shall not be done within 3 to 4 weeks of application.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

- *Providing and applying finishing coats, with*

PT0053 *Acrylic emulsion, one coat*

PT0054 *Aluminium paint, one coat on old work*

PT0055 *Aluminium paint, two coats on new work*

Aluminium paint shall be (conforming to IS: 2339) of approved brand and manufacture. The paint comes in compact dual containers with the paste and the medium separately. The two shall be mixed together to proper consistency before use.

Preparation of Surfaces:

Steel Work (New Surfaces): All rust and scales shall be removed by scraping or brushing with steel wire brushed and then smoothened with sandpaper. The surface shall be thoroughly cleaned of dust.

C.G.I. Sheets (New surface): The painting of new G.I. Sheets shall not usually be done till the sheets have weathered for about a year. When new sheets are to be painted before they have weathered, they shall be treated with a mordant solution prepared by mixing 38 gm of copper acetate in a litre of soft water or 13 gm of hydro chloric acid in a solution of 13 gm each of copper chloride, Copper nitrate and ammonium chloride dissolved in a litre of soft water. This quantity of solution is sufficient for about 235 sq.m of area and is applied for ensuring proper adhesion of paint. The painting with the mordant solution will be paid for separately. Before painting on new or weathered G.I. sheets, rust patches shall be completely cleaned with coarse emery paper and brush. All grease marks also shall be removed and the surface washed and dried and rusted surface shall be touched with ready mixed paint of red lead.

Steel work or CGI sheets (old surface): The specifications shall be as described above.

Application: The number of coats to be applied shall be as given in the item. Each coat shall be allowed to dry for 24 hours and lightly rubbed down with fine grade sandpaper and dusted before the next coat is applied. The finished surface shall present an even and uniform

appearance. As aluminium paste is likely to settle in the container, care shall be taken to frequently stir the paint during use. Also the paint shall be applied and laid off quickly, as surface is otherwise not easily finished.

Measurement and rate shall be same as described under item X above.

5.19.8 Stains, Varnishes & Polishes

- *Providing and applying wood stains, varnishes & polishes*

PT0060 Wood stain (various colours), one coat (Black Japan paint of approved brand shall be used).

PT0061 Synthetic varnish (clear) - one coat, on old work

PT0062 Synthetic varnish (clear) - two coats, incl. coat of wood filler on new work

PT0063 French polish - one coat, on old work

PT0064 French polish - two coats, on new work

Pure shellac 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.

Polishing New Surface:

Preparation of Surface: 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 size laid on while hot. Holes and indentations on the surface shall be stopped with glazier's putty. 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 litre of spirit. The surface shall again be rubbed down perfectly smooth with glass paper and wiped clean.

Application: The number of coats of polish to be applied shall be as described in the item. A pad of woollen 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 over lapping 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 covered with a fresh piece of clean fine cotton cloth slightly damped with methylated spirit and rubbed lightly and quickly with circular motions. The finished surfaces shall have a uniform texture and high gloss.

Polishing Old Surface:

Preparation of surface: If the old polished surface is not much soiled it shall be cleaned of grease and dirt by rubbing with turpentine and then rubbed with fine sandpaper. If the old polished surface is much soiled then it will be necessary to remove the entire polish with patent paint remover or with caustic soda solution, as suitable and such removal shall be paid for separately outside the rate of polishing. Further the polishing itself will have to be done like new work and will be paid for as such.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

5.19.9 Wood Preservatives

- *Providing and applying wood preservatives*

PT0070 *Brown, two coats on new work*

PT0071 *Brown, one coat on old work*

PT0072 *Coal tar, two coats on new work*

PT0073 *Coal tar, one coat on old work*

Oil type wood preservative, of specified quality and approved make conforming to IS-218, shall be used. Generally, it shall be creosote oil type-I or anthracene oil.

Painting on New Surface: Painting shall be done only when the surface is perfectly dry to permit of good absorption. All dirt, dust or other foreign matter shall be removed from the surface to be painted. All roughness shall be sand papered and cleaned.

Application: The preservative shall be applied liberally with a stout brush and not daubed with rags or cotton waste. It shall be applied with a pencil brush at the joints of the woodwork. The first coat shall be allowed at least 24 hours to soak in before the second (the final) coat is applied. The second coat shall be applied in the same manner as the first coat. The excess of preservative which does not soak into the wood shall be wiped off with a clean dry piece of cloth.

Painting on old surface: The work shall be done in the same manner as on new surface except that only one coat shall be done. Such of the specifications given below, in so far as they are applicable shall also hold good.

Materials: Paints, Oils, and Varnishes etc of approved brand and manufacture shall be used. Ready mixed paint as received from the manufacturer shall be used without any admixture. If for any reason, thinning is necessary in case of ready mixed paint, the brand of thinner recommended by the manufacturer or as instructed by the Engineer, shall be used.

Preparation of Surface: The surface shall be thoroughly cleaned and dusted. All rust and dirt scales, smoke and grease etc shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer after inspection, before painting is commenced.

Application: The paint shall be stirred thoroughly in its containers before pouring into containers for use and also while applying so that its consistency is uniform. The paint shall be laid on evenly and smoothly by means of "crossing and laying off" the latter in the direction of the grain of wood. In this process, no brush marks shall be left after the laying off is finished. The full process of "crossing and laying off" will constitute one coat. Where so stipulated painting shall be done by spraying. Spray machines used may be a) high-pressure (small air aperture) type, or b) a low pressure (large air gap) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding suitable thinner. Spraying should only be done when dry condition prevails. Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by thorough ventilation. Each coat except the last coat shall be lightly rubbed with sandpaper or fine pumice stone and cleaned off dust before the next coat is laid. No left over paint shall

be put back into the stock tins. When not in use, the containers shall be kept properly closed. No hair marks from the brush or clogging of paint puddles in the corner of panels, angles of mouldings etc shall be left on the work. In painting doors and windows, the putty round the glass panes must also be painted; but care must be taken to see that no paint stains etc, are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting. In painting steelwork, special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

Brushes and Containers: After work, the brushes/shall be completely cleaned of paint and linseed oil by rinsing with turpentine. A brush in which paint has dried up is ruined and shall on no account be used for painting work. The containers when not in use, shall be kept closed and free from air so that paint does not thicken and also shall be kept safe from dust. When the paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

Coal Tarring: Coal tar of approved manufacture shall be used. The tar, to every litre of which 200 gm of unslaked lime has been added, shall be heated till it begins to boil. It must then be taken off the fire and kerosene oil added to it slowly at the rate of one part of kerosene oil to six or more parts by volume and stirred thoroughly. The addition of lime is for preventing the tar from running.

Coal Tarring New Surface: The work to be painted shall be dry and free from moisture. The surface shall be thoroughly cleaned. Knots, if any shall be covered with preparation of red lead made by grinding red lead in water and mixing with strong glue sized and used hot. Appropriate filler material with same shade, as paint shall be used where specified. The surface treated for knotting shall be dry before painting is applied, the holes and indentation on the surface shall be stopped with glaziers putty or wood putty. Stopping shall not be done before the priming coat is applied, as the wood will absorb the oil in the stopping and the latter therefore liable to crack. Where ironwork is to be painted it shall be free from scales and rust before painting.

Application: The mixture shall be applied as hot as possible with a brush. The second coat shall be applied only after the first coat has thoroughly dried up. Where possible, the article to be tarred shall be dipped in the hot mixture for better results. The quantity of tar to be used for the first or second coat shall be not less than 0.16 and 0.12 litre per sq.m respectively. Thinning with kerosene oil shall be suitably done to ensure this.

Coal Tarring old Surface: The work shall be done in the same manner as specified above except that only one coat using 0.12 litre per sq.m area shall be done.

Measurement: The length and breadth shall be measured correct to 10 mm. The area shall be calculated in sq.m correct to two places of decimal.

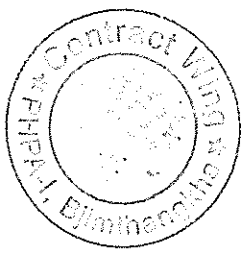
Rate: Rate shall include cost of all labour and materials involved in all the operations described above and in the particular specifications given under the several items.

5.19.10 Wall Paper

- *Providing & fixing wallpaper*

PT0080 *Standard Quality*

PT0081 *High Quality*



Quality of wallpaper shall be as specified.

Measurement: Length and breadth shall be measured correct to 10 mm and area shall be calculated correct to two places of decimal. The item shall include removing nails, making good holes, cracks, patches etc. Work on old treated surfaces shall be measured separately. Measurement for jamps, soffits, sills, etc. shall be same as for plastering works.

Measurement: The measurement shall be taken as described under the section 19.1.2

Rate: The rate shall include the cost of the materials and labour involved in all the operations described above.

5.19.11 Traditional Painting

- *Providing, preparing and applying Sumdang painting*

PT0090 *Rab*
PT0091 *Ding*
PT0092 *Thamar*

- *Providing, preparing and applying Dangtshon painting*

PT0100 *Rab*
PT0101 *Ding*
PT0102 *Thamar*

- *Providing, preparing and applying Sumdang washable painting*

PT0110 *Rab*
PT0111 *Ding*
PT0112 *Thamar*

- *Providing, preparing and applying Dangtshon washable painting*

PT0120 *Rab*
PT0121 *Ding*
PT0122 *Thama*

- *Providing, preparing and applying Yutshon painting (plain)*

PT0130 *Washable*
PT0131 *Not washable*

- *Providing, preparing and applying flower natural painting for wall decoration design such as Tashi-tagey symbols, Tashi-Zeegay, Za-Tshering, etc., etc.*

PT0140 *Dangtshon - Rab*
PT0141 *Sumdang - Rab*

Traditional Painting shall not be started until the Engineer has inspected the items of work to be painted and satisfied himself about their proper quality and given his approval to commence the painting work. Painting, except the priming coat, shall be started after practically finishing all other builder's work. Traditional Painting of external surface should not be done in adverse weather condition like hail or dust storm etc. The rooms should be thoroughly swept out and the entire building cleaned up at least one day in advance of the painting work being started. The contractor shall bring approved painting materials to the site of work, in their original containers in sealed condition. The material shall be brought in

at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The empties shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer.

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 painted. For all exposed brick work or tile work, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal piece over which scaffolding planks shall be fixed. Where ladders are used, pieces of old gunny bags shall be tied on their tops to avoid damages or scratches to walls.

Classification: Traditional Bhutanese paintings are classified into four categories namely *Rab*, *Ding*, *Thamar* and Yu*tshon*. Bill of quantities shall be based on these categories.

Note: The labeling given in the figures in the following pages are not meant to depict/imply the Traditional Bhutanese painting nomenclatures but they are for the structural members only.

SECTION VIII

FORMS

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CONTENT OF FORMS

Form 1: Proforma for Agreement

[Note; This Proforma is included in the Bidding Documents only for the information of Bidders. Only the successful Bidder shall, in due course, be required to fill this Proforma].

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

WHEREAS the PHPA-I is desirous that "_____" (herein after referred to as "the Work") should be executed by the Contractor AND WHEREAS by a Letter of Award No._____dated _____ the PHPA-I 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/bond.

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;
   - 2.1 The Agreement
   - 2.2 The Letter of Award
   - 2.3 Corrigendum/Amendments if any
   - 2.4 Documents furnished by bidder
   - 2.5 General Conditions of the Contract
   - 2.6 General Technical Specifications
   - 2.7 Special Conditions to Contract
   - 2.8 Appendix
   - 2.9 Bill of Quantities
   - 2.10 Drawings
   - 2.11 Any other documents as forming part of the Contract
3. The aforesaid documents shall be taken as complementary and mutually explanatory of one another, but in case of ambiguities or discrepancies, shall take precedence in the order set out under para 2 above.

4. In consideration of the payment to be made by the PHPA-I to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the PHPA-I to execute and complete the Works in conformity, in all respects, with the provisions of the Contract.

5. The PHPA-I 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

_____	_____
NAME _____	NAME _____
on behalf of the Contractor	on behalf of the PHPA-I
in the presence of:	in the presence of;
_____	_____
NAME _____	NAME _____
Address _____	Address _____
_____	_____

Form 2: Proforma for Bank Guarantee for Bid Security

To

The Punatsangchhu-I Hydroelectric Project Authority (PHPA-I)

_____

_____

(Address of PHPA-I)

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

KNOW ALL MEN by these presents that we (Name of Bank) _____ of (Name of Country)_____ having our registered office at _____ (hereinafter called "the Bank") are bound unto the Punatsangchhu-I Hydroelectric Project Authority (PHPA-I) in the sum of _____ for which payment well and truly to be made to the PHPA-I 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;

1. If the Bidder withdraws his Bid during the period of bid validity specified in the Proforma of Bid; or
2. If the Bidder having been notified of the acceptance of his Bid by the PHPA-I during the period of bid validity;
   - 2.1 fails or refuses to execute the Proforma of Agreement in accordance with the Instructions to Bidders, if required; or
   - 2.2 fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders,

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

This Guarantee will remain in force up to and including the date ***150 days*** 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.

DATE ……. .

SIGNATURE OF THE BANK ……..

WITNESS ……..

SEAL ……..

(Signature, Name and Address)

Form 3: Proforma for Bank Guarantee for Performance Security

To

The Punatsangchhu-I Hydroelectric Project Authority,

_____

_____

(Address of PHPA-I)

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").

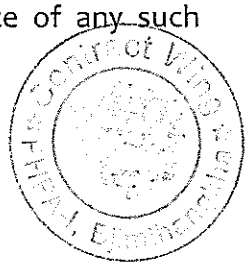
AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

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, up to a total of 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 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 Certificate.

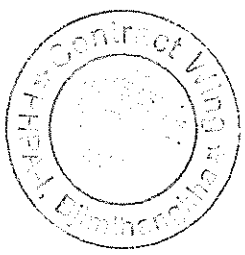
SIGNATURE AND SEAL OF THE GUARANTOR

Name of Bank

Address

Date

Note: The Bidders are not required to fill this Proforma.



Form 4: Proforma for Bank Guarantee for Mobilization Advance

In consideration of the Punatsangchhu-I Hydroelectric Project Authority (PHPA-I) (which expression shall unless repugnant to the subject or context include its administrators, successors and assigns), (hereinafter called the "Principal") 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 Rs.....(Both in figures and words) _____ we, the _____ Bank (any financial institutions in Bhutan) hereinafter referred to as "the Bank") do hereby undertake promise and guarantee payment to the Principal on demand all the amounts advanced by the Principal to the said Contractor.

1. The Bank further agrees that;

   1.1. The Principal 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 Principal and the Bank shall not be released from its liability under these presents by any exercise by the Principal 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 Principal or any indulgence by the Principal 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.

   1.2. These presents shall be governed by and constructed in accordance with Bhutanese laws.

   1.3. The Bank hereby declares that it has the power to issue this Guarantee and the undersigned has full power to do so.

   1.4. It shall not be necessary for the Principal 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 Principal may have obtained or obtain from the Contractor, shall at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealized.

1.5. 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 Principal have been duly paid and its claims satisfied and discharged and till the Principal discharges the Guarantee in writing or until _____ whichever is earlier.

2. The Bank lastly undertakes not to revoke this Guarantee until all the dues of the Principal have been duly paid except with the previous consent of the Principal in writing.

Dated the _____ Day of _____ 2021

Here affix the Common Seal of the

Bank for _____ Bank Ltd.

Note: The Bidders are not required to fill this Proforma.

Form 5: Proforma for Bank Guarantee for Retention Money.

To

The Punatsangchhu-I Hydroelectric Project Authority,

_____

_____

(Address of PHPA-I)

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").

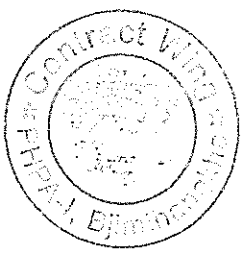
AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

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, up to a total of Nu. _____ (Amount of Guarantee in words to be inserted by the Guarantor), representing the amount of retention money, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of 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 completion of Defects Liability Period.

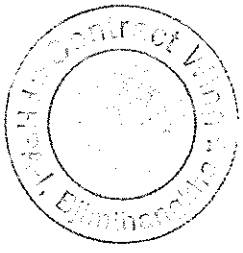
SIGNATURE AND SEAL OF THE GUARANTOR

Name of Bank

Address

Date

Note: The Bidders are not required to fill this Proforma.



Form 6: Pre-Contract Integrity Pact

Note: This Proforma is included in the Bidding Documents for information of Bidders and shall be signed by successful Bidder when the work(s) is awarded. Signing authorities will be the head of the client (agency) or the authorized representative of the bidder.

1. **General:**

   Whereas the Punatsangchhu-I Hydroelectric Project Authority (PHPA-I) 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:

   This agreement shall be a part of the standard bidding document, which shall be signed by both the parties at the time of purchase of bidding documents and submitted along with the tender document. This IP is applicable only to "large" scale works, goods and services, the threshold of which will be announced by the government from time to time. The signing of the IP shall not apply to framework Contracting such as annual office supplies etc.

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 and Contract Administration, 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 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 followings:-

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 De-barment 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) _____

EMPLOYER BIDDER

Witness: Witness:

_____ _____

Form 7: Bidder's Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date: .....[insert date of Bid submission] .....

NIT No.: .....

1.	Bidder's Legal Name:
2.	Bidder's or each member of JV's Country of Registration:
3.	Bidder's Year of Registration:
4.	Bidder's Legal Address in Country of Registration:
5.	Bidder's Local Address in Bhutan (if any):
6.	Bidder's Website Address:
7.	Bidder's Business Activities:
8.	Bidder's Authorized Representative 1. Name: 2. Designation: 3. Address: 4. Telephone/Fax numbers: 5. E-mail Address:
9.	Attached are copies of the following original documents: [check the box(es) of the attached original documents] Tax Clearance Certificate of Bidder named in 1 or 2 above Trade License of Bidder named in 1 or 2 above

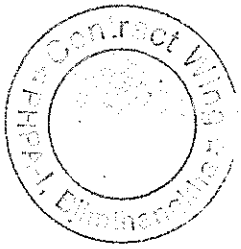
Signature.....

Date :

Place :

Name.....

Designation.....



Form 8: Past Performance Data

Bidder's Name & Address: ..... NIT No: .....

To

[PHPA-I's Name & Address]

Details of similar Works in last five (5) years

Sl. No.	Owner/ Client	Scope of Work	Order Value	Date of Order	Schedule Completion Date	Actual/ Completion Date	Reason for Delay (if any)

Date :

Place :

Signature.....

Name.....

Designation.....

Seal.....

Note:

1. Continuation sheets of like size and format, may be used and annexed to this Form if required.
2. Relevant documents/LOA/Orders to be furnished to justify the data above.

Form 9: Present Order Book Position

Bidder's Name & Address: ..... NIT No: .....

To

[PHPA-I's Name & Address]

List of works under execution and their present status

S. No.	Owner/ Client	Scope of Work	Order Value	Date of Order	Schedule Time of Completion	Value of Outstanding Work	Actual/ Expected Time of Completion	Reason for Delay (if any)

Date :

Place :

Signature.....

Name.....

Designation.....

Seal.....

Note:

1. Continuation sheets of like size and format, may be used and annexed to this Form if required.
2. Relevant documents/LOA/Orders to be furnished to justify the data above.

Form 10: Data regarding Key Construction Personnel

Bidder's Name & Address: …… NIT No: ……

To

[PHPA-I's Name & Address]

The qualification and experience of key construction personnel proposed for administration and execution of the Contract at the Site are as follows:

Position	Quantity	Name	Qualification	Years of experience

Date :

Place :

Signature……

Name……

Designation……

Seal……

Note:

1. Please furnish the complete Site organization chart proposed to be set up for execution of the Contract.
2. Continuation sheets of like size and format, may be used and annexed to this Form if required.

Form 11: Data regarding available Equipment/ Machinery

Bidder's Name & Address: …… NIT No: ……

To

[PHPA-I's Name & Address]

Items of equipment	Quantity	Description, make, Capacity and age (years)	Condition (new, good, poor) and number available	Owned, leased (from whome?), or to be purchased (from Whom?)

Date :

Place :

Signature.....

Name.....

Designation.....

Seal.....

Note: The above list of Equipment & Machineries indicates minimum requirements. However, we shall deploy any additional Equipment and Machineries, which may be required as per the directive of the Engineer-in-Charge to execute the work satisfactorily and as per the time schedule stipulated.

Form 12: Performa for hindrance register

Sl.no	Nature of hindrance	Items of works which could not be executed on account of this hindrance	Date of start of hindrance	Date of removal of hindrance	Overlapping period if any	Net hindrance in days	Weightage of this hindrance	Net effective days of hinderance	Signature of PHPA-I's representatives	Signature of Contractor

SECTION IX

BILL OF QUANTITIES

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BILL OF QUANTITIES (BoQ)						
Name of work : Balance finishing and architectural works of Powerhouse Utilities & Pothead Yard Buildings of PHPA-I						
S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
1	Providing and fixing coloured glazed Vitrified Floor Tiles tiles; size 600mm X 600mm in flooring on mortar bed 20 mm thick cement mortar 1:3; with 3mm gaps (using spacers) grouted in latapoxy SP 100 of matching colour	Sqm	805.44			
2	Providing & fixing Matt stone textured external wall tiles of 600x300mm in wall laid on bed of 12mm thick cement mortar 1:3 finished with flush pointing in white cement	Sqm	247.25			
3	Providing & fixing liftwell tiles of 450mmX300mm in wall laid on bed of 12mm thick cement mortar 1:3 finished with flush pointing in white cement with suitable binding agents	Sqm	388.70			
4	Providing & laying Kota stone flooring over 20mm thick base of cement mortar 1:4, jointed with grey cement slurry mixed with pigment where necessary, rubbing & polishing complete - 20 mm thick	Sqm	430.00			
5	Providing & laying 15 mm cement plaster: In C.M 1:4	Sqm	1621.50			
6	Providing & applying putty of thickness 2mm or more over plastered surface to prepare the surface even and smooth complete	Sqm	1840.00			
7	Providing and applying finishing coats: Acrylic washable distemper, two coats on new work, including cement primer coat	Sqm	2990.00			

Detailed refer ITB Clause 13.2 and GCC Clause 56.4 for Materials Inventory available with PHPA-I

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S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
8	Providing and applying finishing coats - Synthetic enamel, for steel & wood work, two coats on new work	Sqm	1704.50			
9	Providing and laying autoclaved aerated cement blocks masonry (AAC blocks) of 600 X 200 X 250 mm in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete	Cum	29.90			
10	Providing & laying Second-Class -brick Masonry in superstructure in CM 1:4	Nos.	3450.00			
11	Demolishing reinforced concrete, including stacking steel bars and disposal of rubbish	Cum	23.00			
12	Providing, preparing and applying RAB Sumdang washable painting	Sqm	2415.00			
13	Steel Works welded in built up section, trusses, frame works including cutting, hoisting, fixing and appling priming coat of red oxide- in RS Joist	Kg	690.00			

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S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
14	Providing and fixing stainless steel railing (without Balustrade and intermediate horizontal railing) in staircase (Grade 304) made of Hollow tubular/circular section, channels, plates etc... including welding, grinding, buffing, polishing and making curvature (wherever required) and fittings the same with necessary stainless steel nuts and bolts complete, i/e fixing railing with necessary accessories and stainless steel dash fasteners, stainless steel bolts etc, of required size on the top of the floor or the side of waist slab with suitable arrangement as per drawing and approval of engineers in charge. Top rail (horizontal) =2 inch outer dia and its fixed to wall	Rm	50.00			
15	Providing & fixing Aluminium/Rubber/Polymer Strip edging to staircase including rawl plugs and screws/adhesive/fixing arrangement	m	1200.00			
16	Transparent Water proof painting/treatment of the PHY terrace	Sqm	375.00			
17	Miscelleaneous Cleaning works, if required	Sqm	2200.00			
18	**Plumbing & Sanitary items**					
18.1	Providing & fixing stainless steel, 1080 x 520 x 175 mm, single bowl & drainboard kitchen sinks including all connections and fittings	each	2.00			
18.2	Providing & fixing c.p. brass bibcock - 15mm, long nose, c.p. knob for kitchen sink	each	6.00			
18.3	Providing & fixing European-type vitreous china w.c pedestal including seat and lid with c.p brass hinges, 15 lit white vitreous china low level cistern, fittings, brackets, repair walls; white with plastic sheat and lid - complete with necessary fittings and accessories	each	37.00			

S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
18.4	Providing & fixing white vitreous china wash basin, including C.I brackets, 15mm C.P. brass pillar taps, c.p. chain & rubber plug, 32mm pvc waste, 32mm dia. trap & union, repair walls	each	23.00			
18.5	Providing & fixing pedestals for basins, white vitreous china, recessed back for pipes and necessary fittings each	each	7.00			
18.6	Providing & fixing white vitreous china flat back, lipped front urinal basin 430x260x350mm including C.I cistern & fittings, brackets, G.I. flush pipe & spreaders, brass unions, G.I. clamps, painting, repair walls; One bowl-5 litres. C.I. cistern	each	18.00			
18.7	Providing & fixing division plate complete as per drawing and manufacturers' specification	each	15.00			
18.8	Providing & fixing 600x450mm bevelled edge mirror (superior glass) incl.4mm A.C sheet base fixed to wooden cleats	each	27.00			
18.9	Providing & fixing toilet paper holder; CP Brass, including complete necessary screws	each	37.00			
18.10	Providing & fixing Liquid soap container, c.p, including c.p brass lid & brackets, wooden cleats, c.p brass screws	each	24.00			
18.11	Providing & fixing c.p. towel ring	each	25.00			

S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
18.12	Providing and fixing 3-layer PP-R (Polypropylene Random Copolymer) PN-16 pipes, SDR 7.4 UV Stabilized and anti microbial fusion welded, having thermal stability for hot and cold water supply including all PP-R plain and brass Threaded Polypropylene random fittings including fixing pipe with clamps at 1.0m spacing. This includes testing of joints, cutting chases and making good the wall complete as per direction of Engineer-in- Charge					
18.12.1	25mm	m	152.00			
18.12.2	16mm	m	46.00			
18.13	Providing & fixing P.V.C soil waste and vent pipes, single or double socketed, including pipe clip complete (excluding the cost of PVC fittings) : 75 mm dia	m	129.00			
18.14	Providing & fixing P.V.C soil waste and vent pipes, single or double socketed, including pipe clip complete including the cost of PVC fittings: 110 mm dia	m	131.50			
18.15	Providing & fixing P.V.C Nahani Trap: 110mm inlet & 75 mm outlet	each	48.00			
18.16	Providing & fixing P.V.C Single Tee with door - 110 mm dia	each	22.00			
18.17	Providing & fixing P.V.C plain bend - 110mm dia	each	28.00			
18.18	Providing & fixing P.V.C plain bend - 75 mm dia	each	24.00			
18.19	Providing & fixing P.V.C Single Tee with door - 75 mm dia	each	32.00			

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S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
18.20	Providing & fixing P.V.C Coupler - 75 mm dia	each	24.00			
18.21	Providing & fixing P.V.C Coupler - 110 mm dia	each	24.00			
18.22	Providing & fixing P.V.C P-Trap, without air vent. Small	each	24.00			
18.23	Providing & fixing approved brand shower, three in one, with bend flexible tube, and shower & hook, 15mm c.p.	each	2.00			
18.24	Providing & fixing c.p. towel rail 750 x 20mm with c.p brass brackets fixed to wooden cleats	each	4.00			
18.25	Providing & fixing c.p. brass stop cock : 15mm, standard, c.p knob	Each	2.00			
18.26	Providing & fixing 15mm, angle, c.p knob	each	2.00			
18.27	Providing & fixing c.p. brass mixers for basin - 15mm	each	2.00			
18.28	Providing & fixing Electric 15 litres water heater including necessary fittings	each	4.00			
19	Providing & fixing anodised aluminium kicking plate, 4mm thick with necessary aluminium screws etc. complete	sqm	100.00			
20	MYK Laticrete 335 superflex exterior for External wall clad tiles	Bag	40.00			
21	MYK Laticrete 305 Thinset for Lift wall tiles	Bag	65.00			

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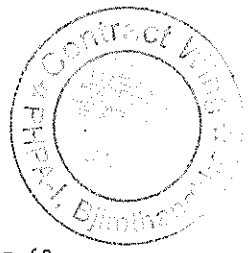
S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
22	Providing & fixing Corrugated Galvanised Iron (CGI) sheeting, including bolts, hooks and nuts 8mm dia. with bitumen and G.I limpet washers filled with white lead for connection, excluding the cost of purlins, rafter and trusses	sqm	100.00			
23	Incorporation of Occupational Health and Safety (OHS) measures at construction sites, including Insurance, Personal Protective Equipment (PPE), First Aid kits, Boundary Fencing, Scaffolding, Safety nets, Traffic management, signage etc as listed in the specifications. The standards and specifications for the Insurance, OHS materials and (or) equipment shall comply with the Labour and Employment Act - 2007, Regulation on Occupational Health, Safety and Welfare - 2012, and other relevant national documents. All OHS items will remain the property of the bidder upon completion of the project.	L/S	1.00			
24	Providing temporary living accommodation (TLA) which includes bed room, kitchen, and toilet cum bathroom including proper water supply and electricity as per the drawing and temporary living accommodation standards. The accommodation facilities must be dismantled and cleaned upon the completion of project. All reusable materials of the accommodation facilities will remain as the property of the bidder upon completion of the project.	L/S	1.00			
	Total Amount					
	Rebate, if any					
	Grand Total Amount					



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S.No.	Description of works	Unit	BoQ	Rate (Nu./Rs.)		Amount
				In Fig.	In Words	
	Grand Total Amount (in words) :					

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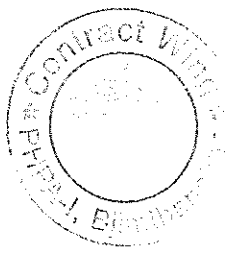
SECTION X

DRAWINGS



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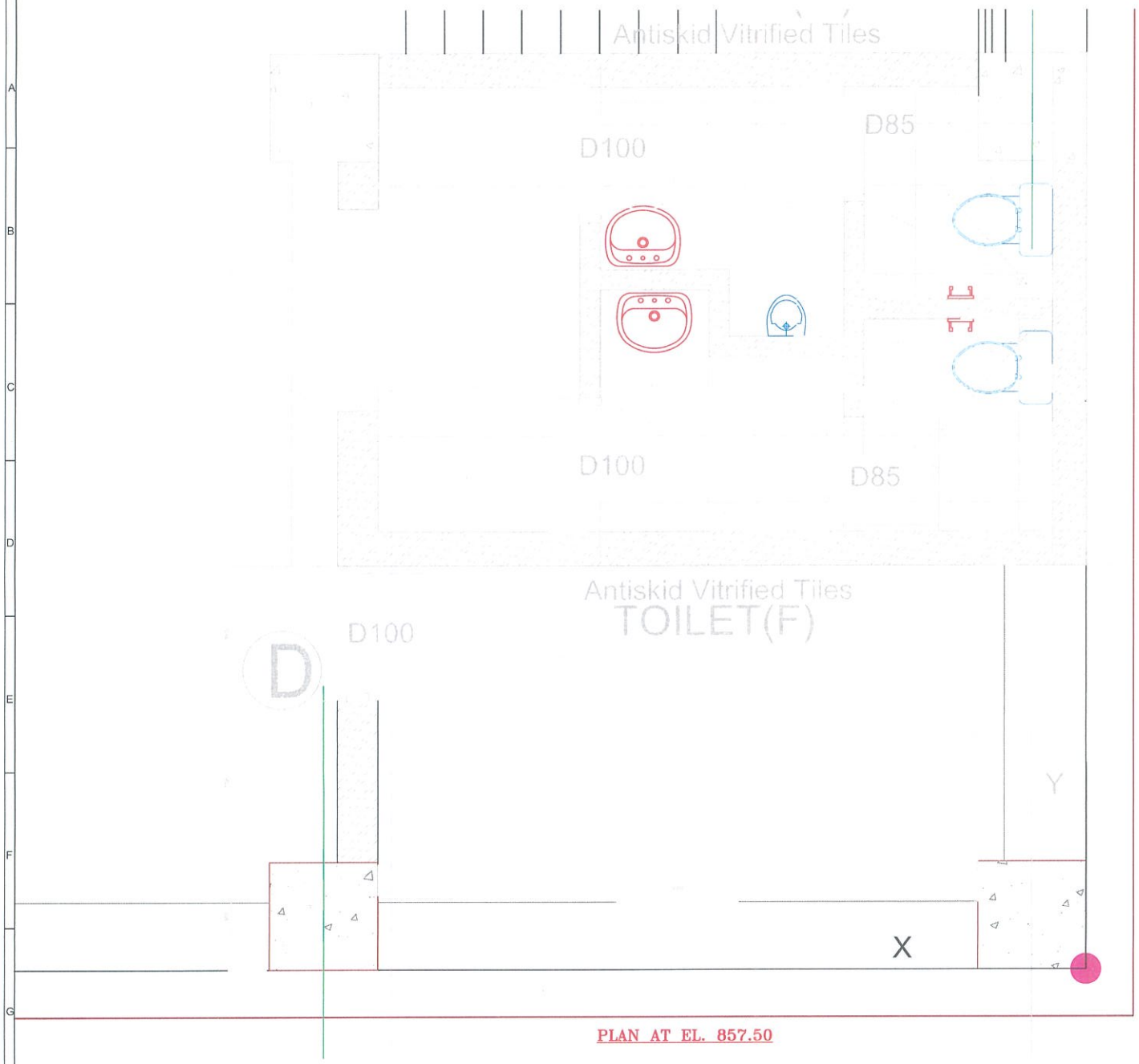


PLAN AT EL. 857.50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

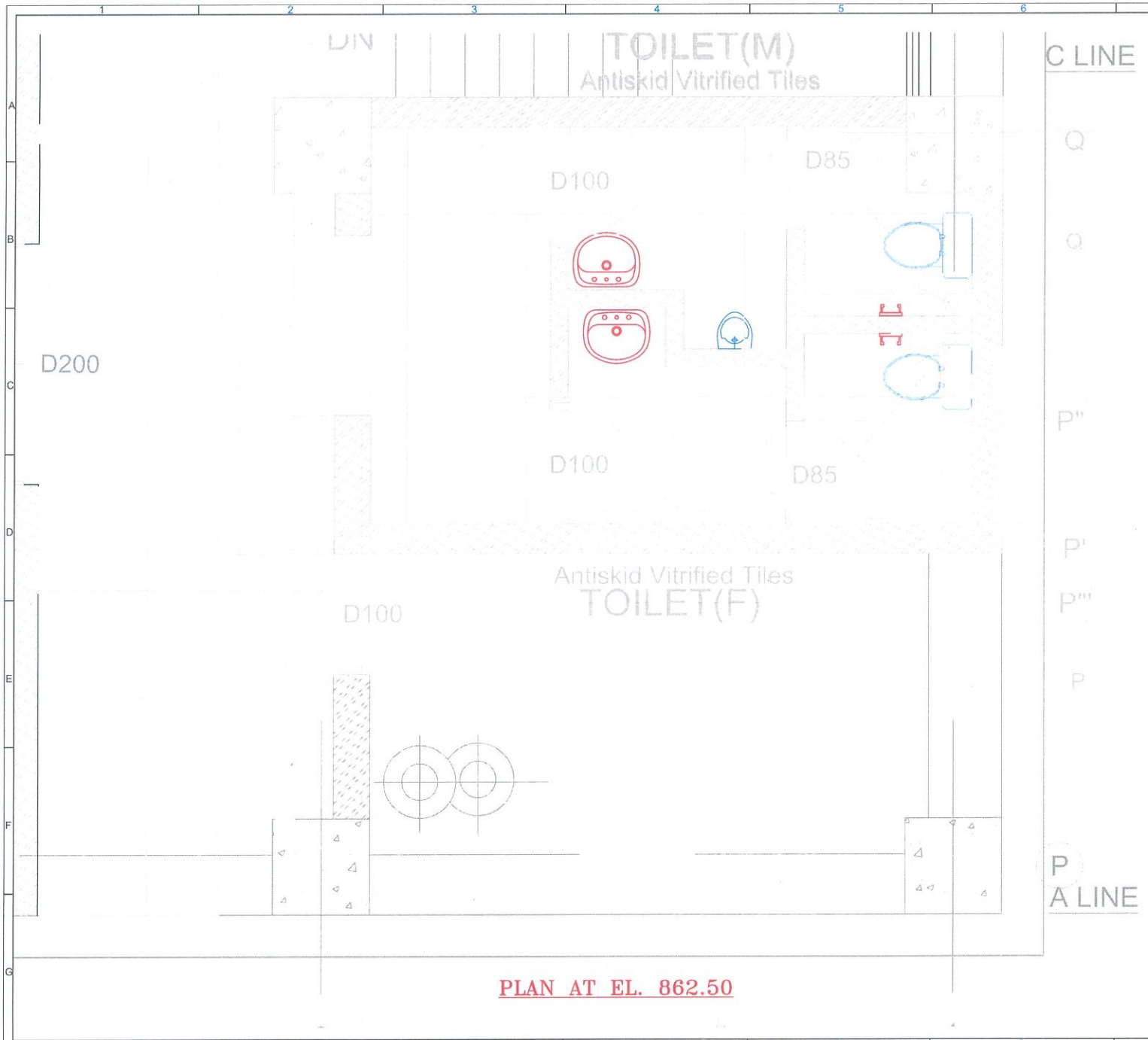
CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

TRANSFORMER HALL ANNEXE BAY
TOILET BLOCK

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2802	REV-0



PLAN AT EL. 862.50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS. ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

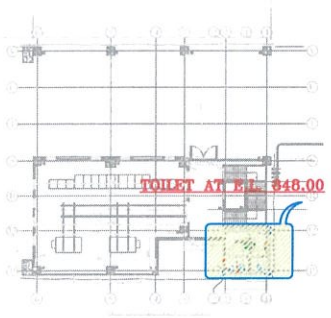
TRANSFORMER HALL ANNEXE BAY
TOILET BLOCK

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN

REV-0

TOILET AT MH-AUX BAY -
FLOOR PLAN AT E.L. 848.00



KEY PLAN
AT EL. 848.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing
PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

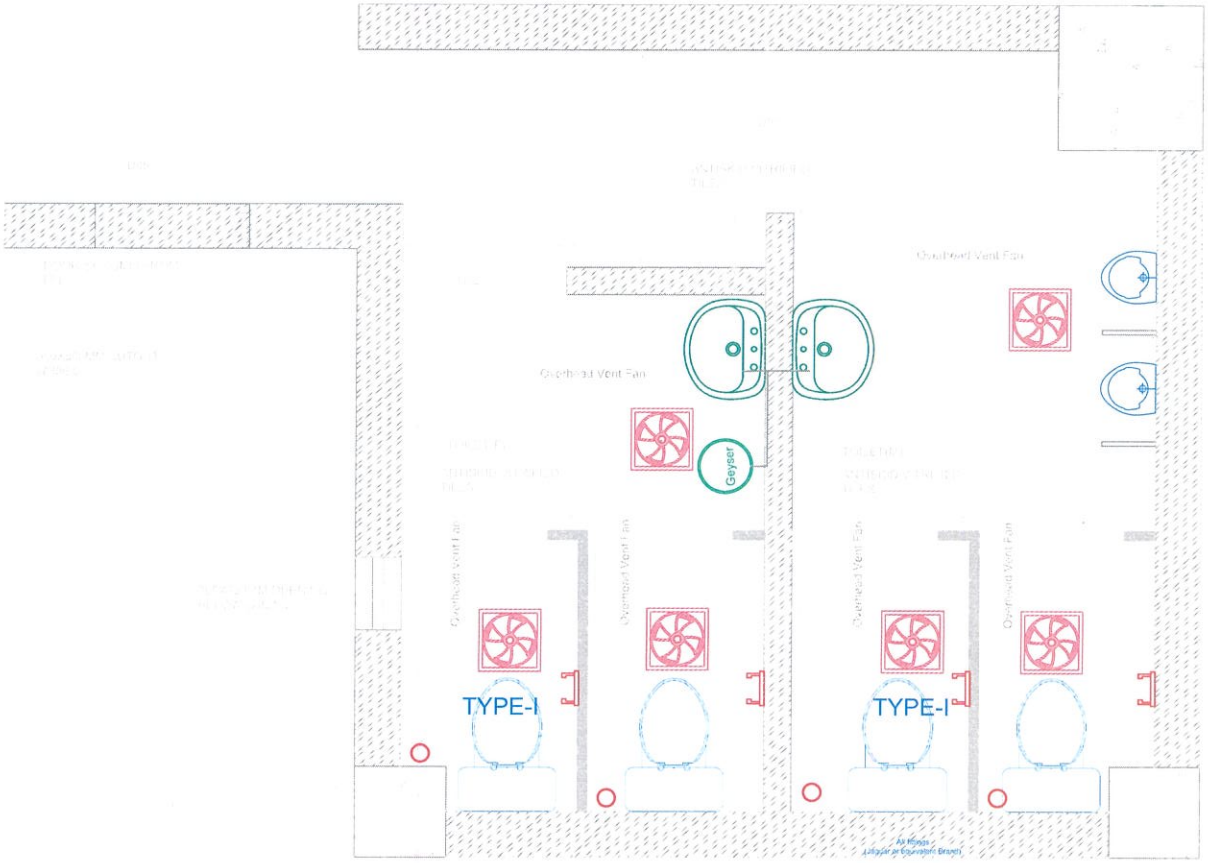
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

MACHINE HALL -AUXILIARY BAY
TOILET BLOCK -LAYOUT PLAN - AT EL: 848.00 m

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2804	REV-0



TOILET AT MH-AUX BAY -
FLOOR PLAN AT E.L. 853.00

KEY PLAN
AT EL. 853.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS. ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

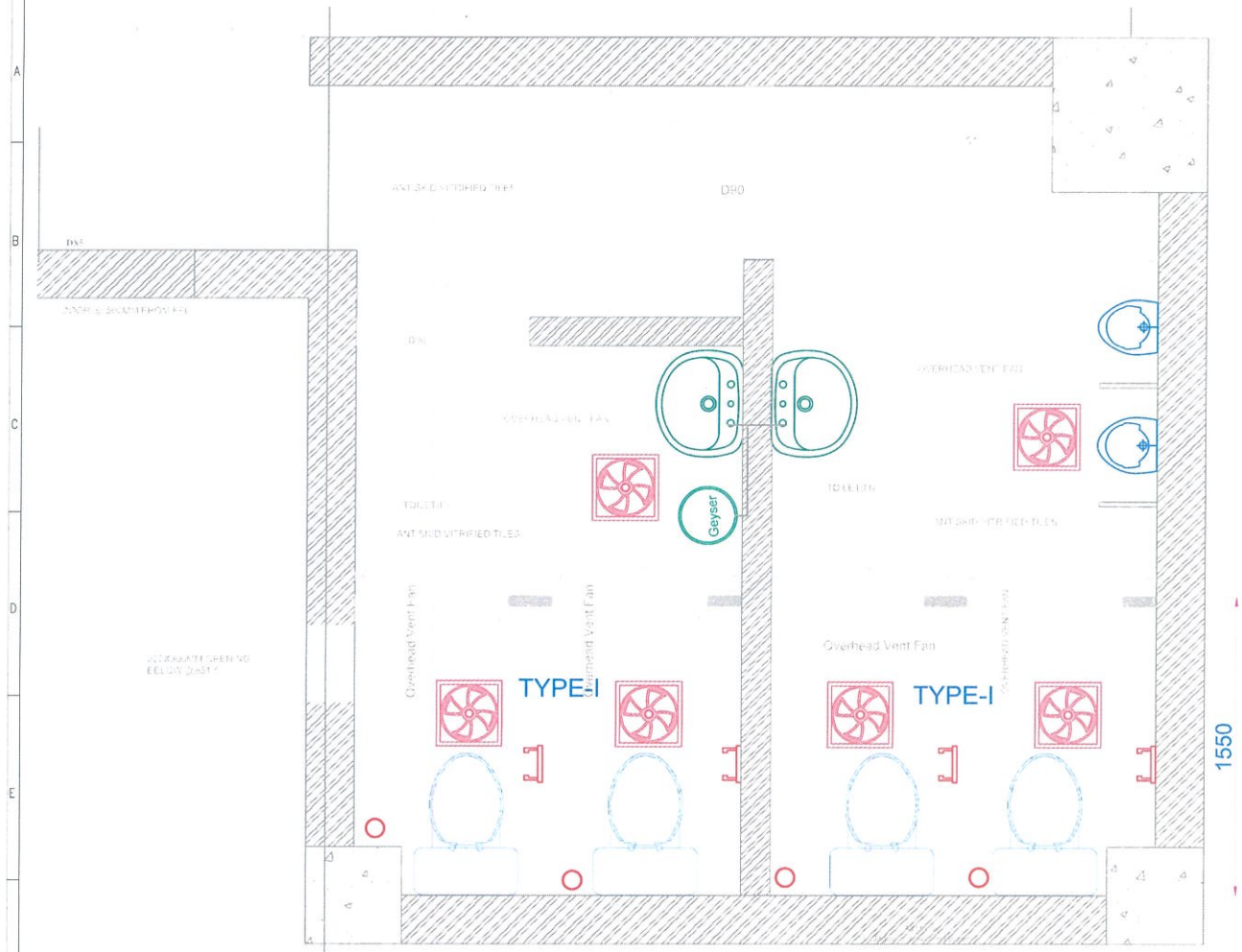
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

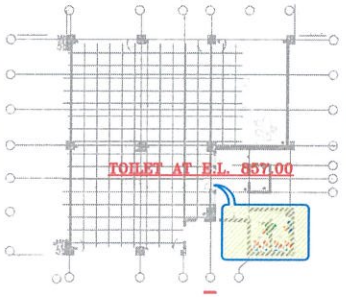
MACHINE HALL -AUXILIARY BAY
TOILET BLOCK -LAYOUT PLAN AT EL: 853.00 m

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2805	REV-0



TOILET AT MH-AUX BAY -
FLOOR PLAN AT E.L. 857.00



KEY PLAN
AT EL. 857.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS. ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing
PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

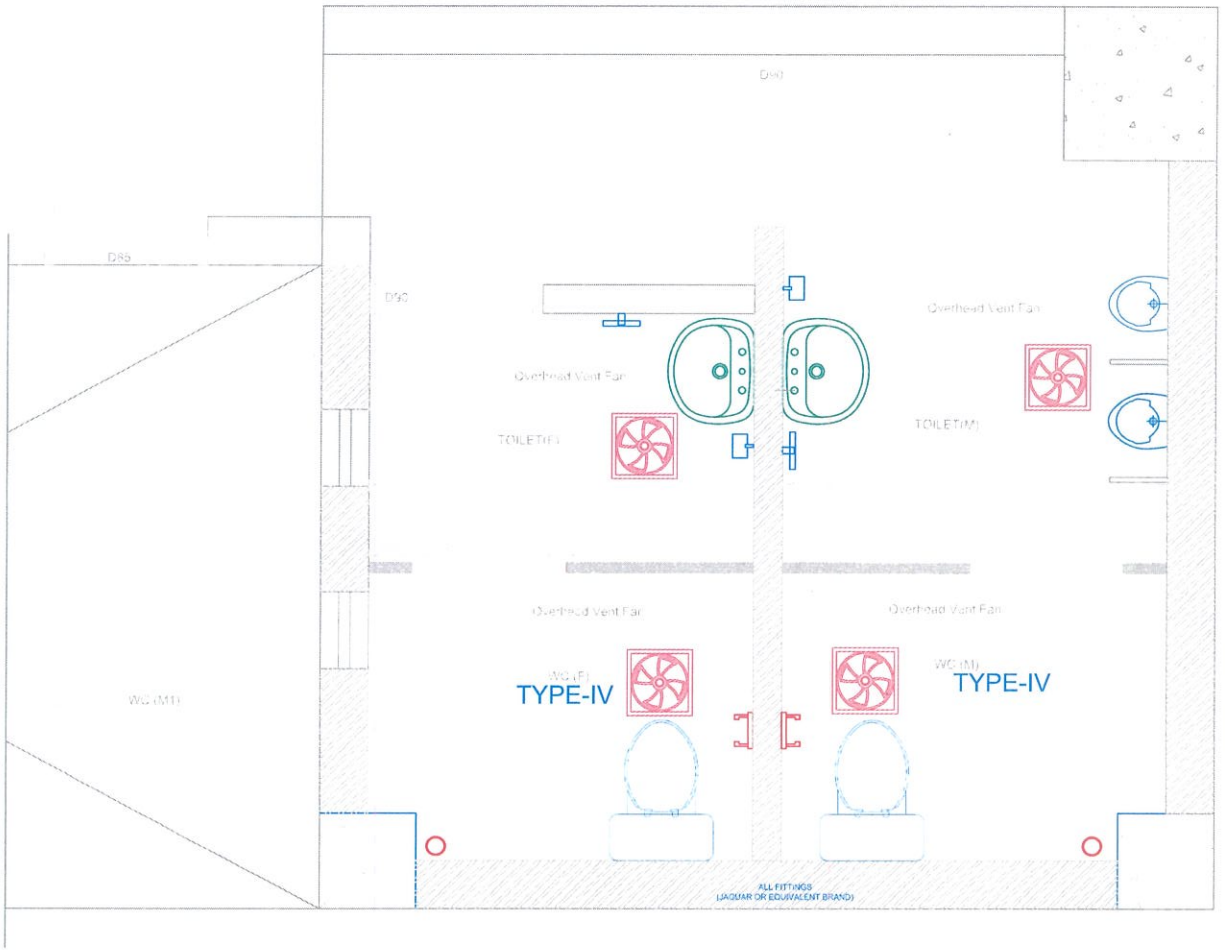
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

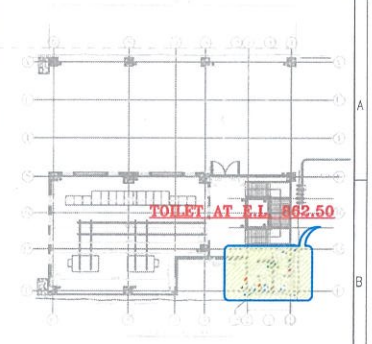
MACHINE HALL -AUXILIARY BAY
TOILET BLOCK -LAYOUT PLAN AT EL: 857.00 m

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2806	REV-0



TOILET AT MH–AUX BAY –
FLOOR PLAN AT E.L. 862.50



KEY PLAN
AT EL. 862.50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

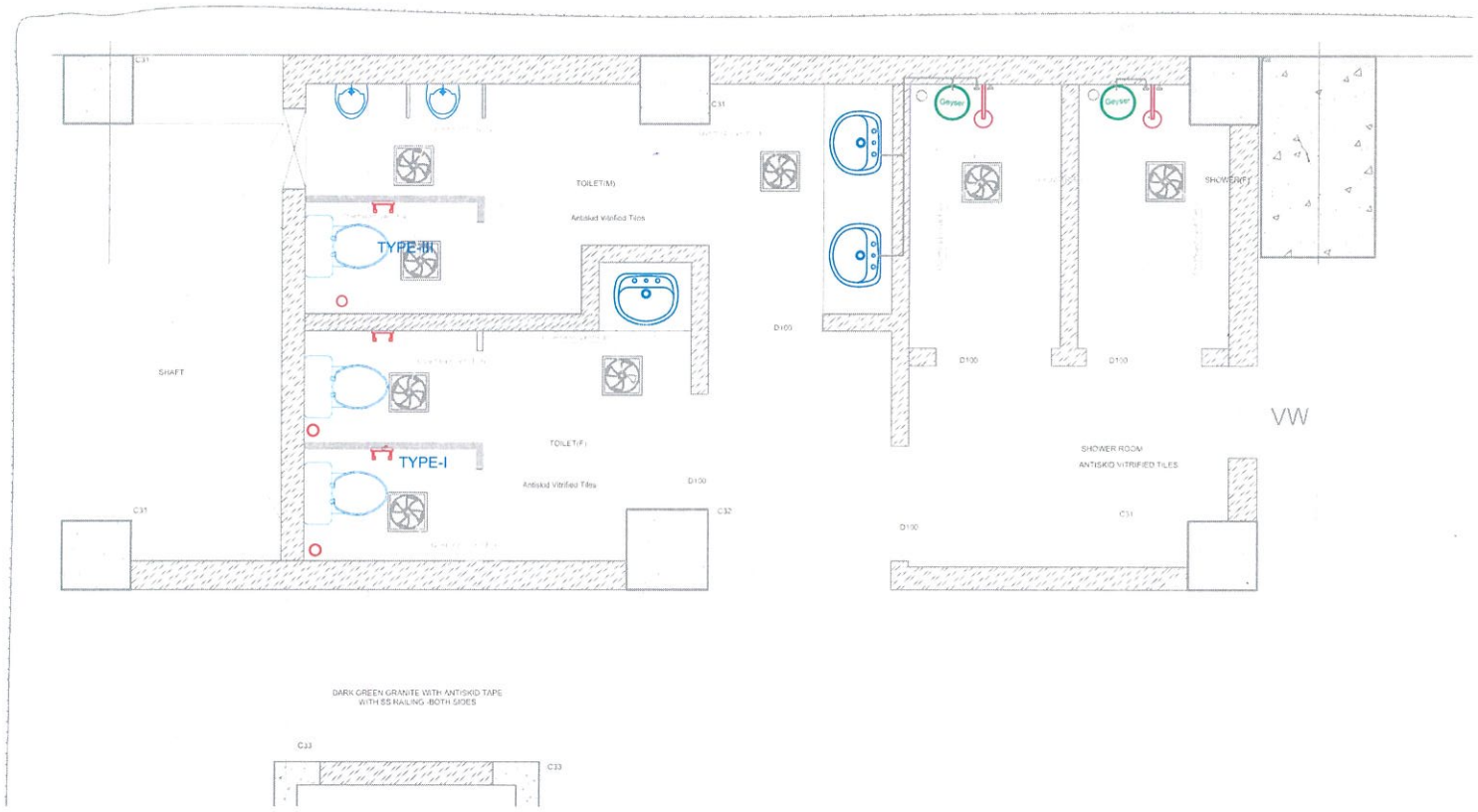
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

MACHINE HALL -AUXILIARY BAY
TOILET BLOCK - LAYOUT PLAN AT EL: 862.50 m

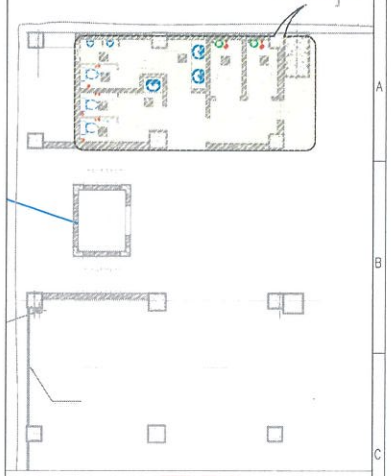
DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2807	REV-0



TOILET AT MH-ANNEXE BAY – PLAN AT EL .838.00

DETAIL-A



KEY PLAN
AT EL. 838.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

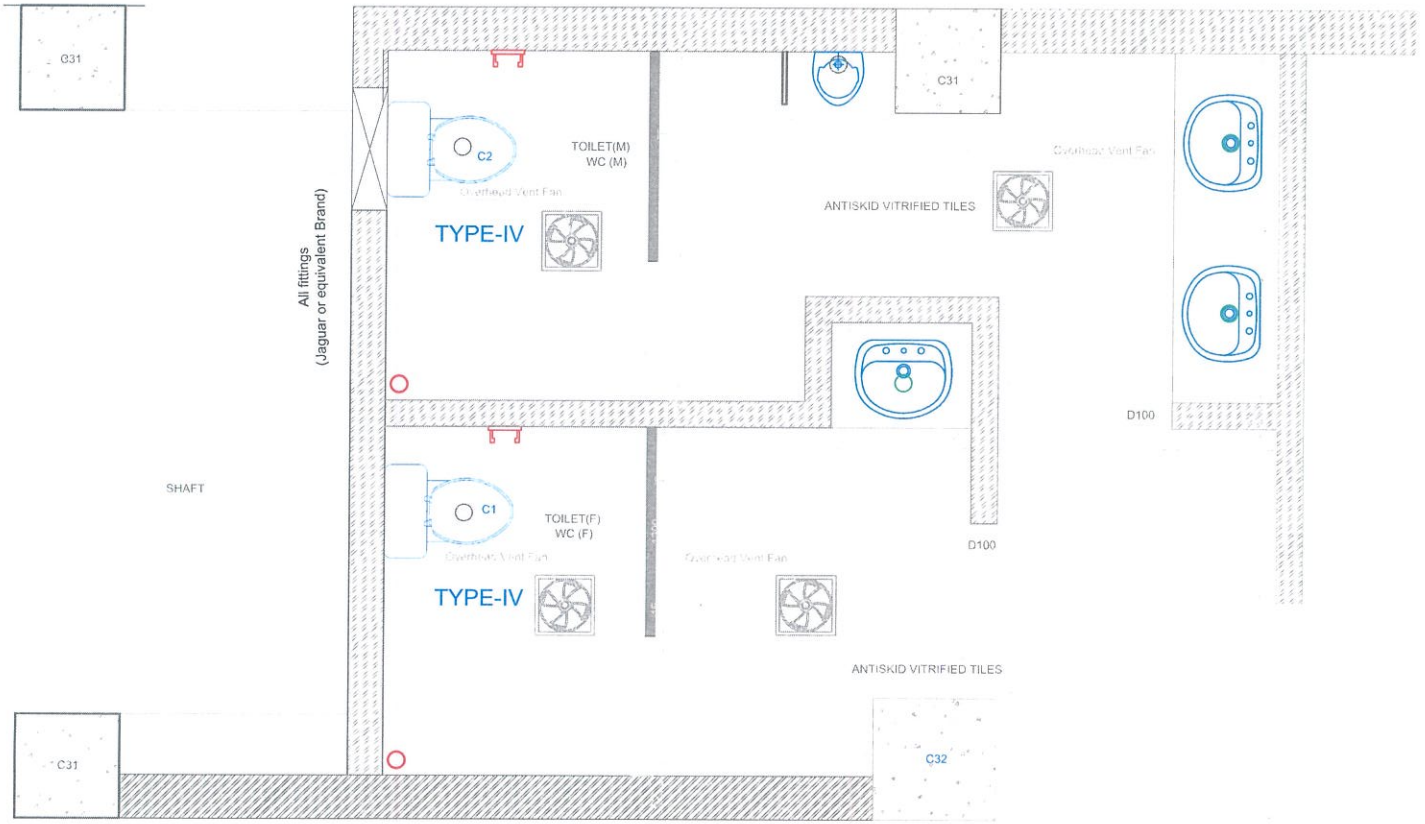
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

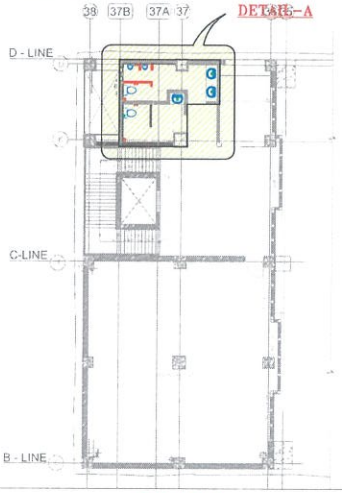
MACHINE HALL -ANNEXE BAY
TOILET BLOCK -LAYOUT PLAN AT EL 838.00 M

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2808	REV-0



DETAIL-A
TOILET AT MH-ANNEXE BAY - PLAN AT EL .843.00M



KEY PLAN
AT EL.843.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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Contract Wing
PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

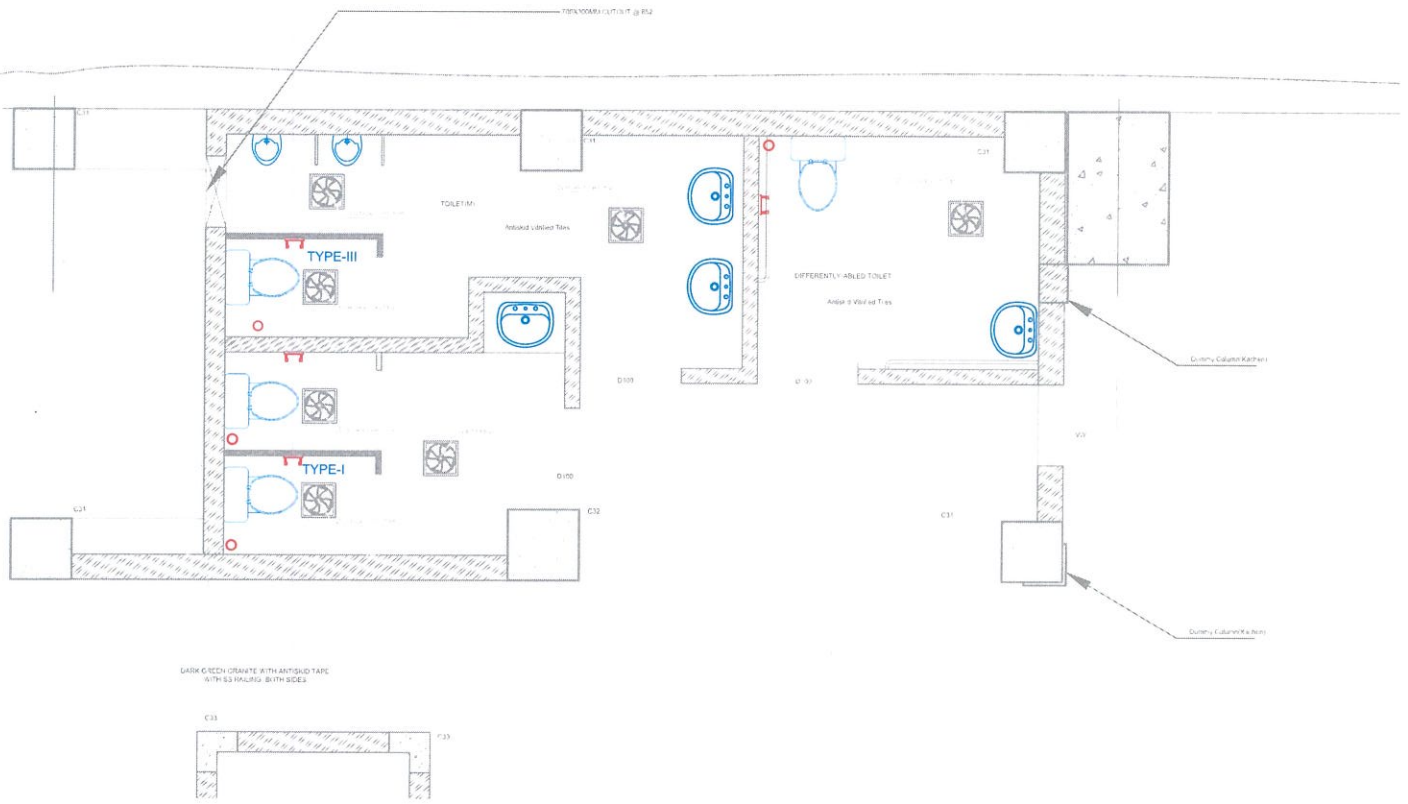
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

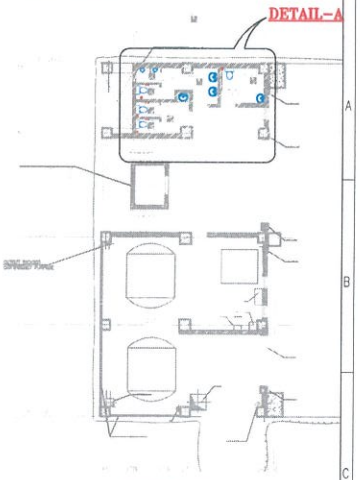
MACHINE HALL -ANNEXE BAY
TOILET BLOCK -LAYOUT PLAN AT EL 843.00 M

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2809	REV-0



TOILET AT MH–ANNEXE BAY – PLAN AT EL .848.00



KEY PLAN
AT EL.848.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

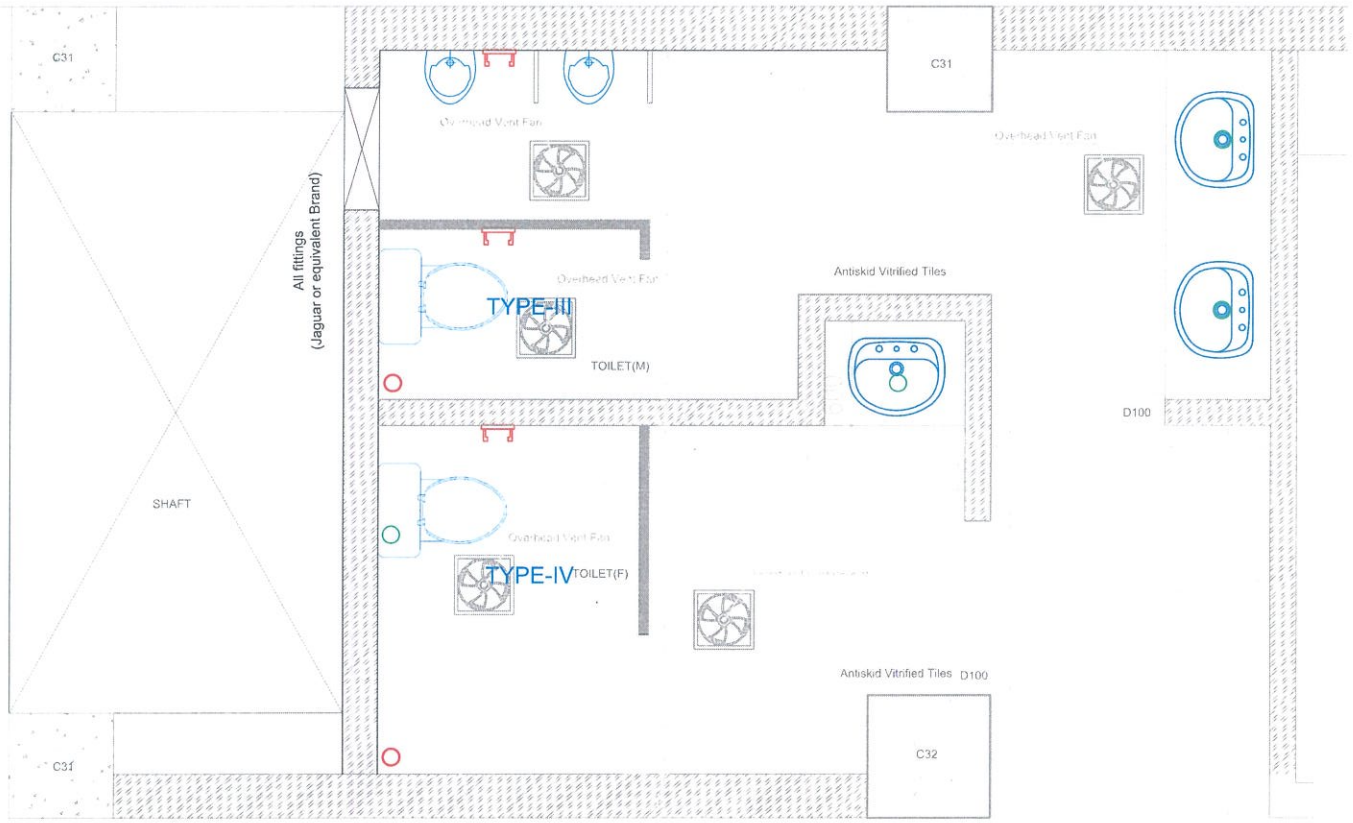
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

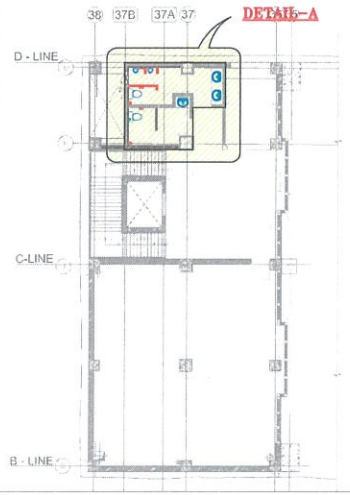
MACHINE HALL -ANNEXE BAY
TOILET BLOCK -LAYOUT PLAN AT EL 848.00 M

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2810	REV-0



DETAIL-A
TOILET AT MH-ANNEXE BAY- PLAN AT EL .857.50M



KEY PLAN
AT EL. 857.50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing
PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

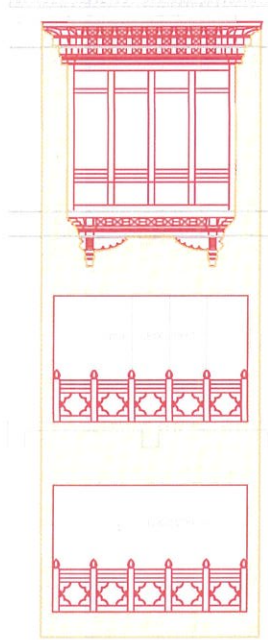
CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU- I H.E. PROJECT (BHUTAN)

MACHINE HALL -ANNEXE BAY
TOILET BLOCK -LAYOUT PLAN AT EL 857.50

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2811	REV-0



TRANSFORMER HALL AUXILIARY BAY FRONT ELEVATION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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LEGEND:

FACADE TILE WORKS

BHUTANESE PAINTING WORKS

Contract Wing ★ PHPA-I, Bjimthangkha ★

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

TRANSFORMER HALL AUXILIARY BAY FRONT ELEVATION

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2801	REV-0

2600 6000 2275 1700 3975 4000 2500

EL.908.50

EL.904.50

EL.901.00

EL.896.50

EL.893.13

EL.889.79

EL.888.75

EL.886.50

EL.885.40

Contract Wing PHPA-I, Bjimthangkha

SIDE ELEVATION -2

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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LEGEND:

BHUTANESE PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

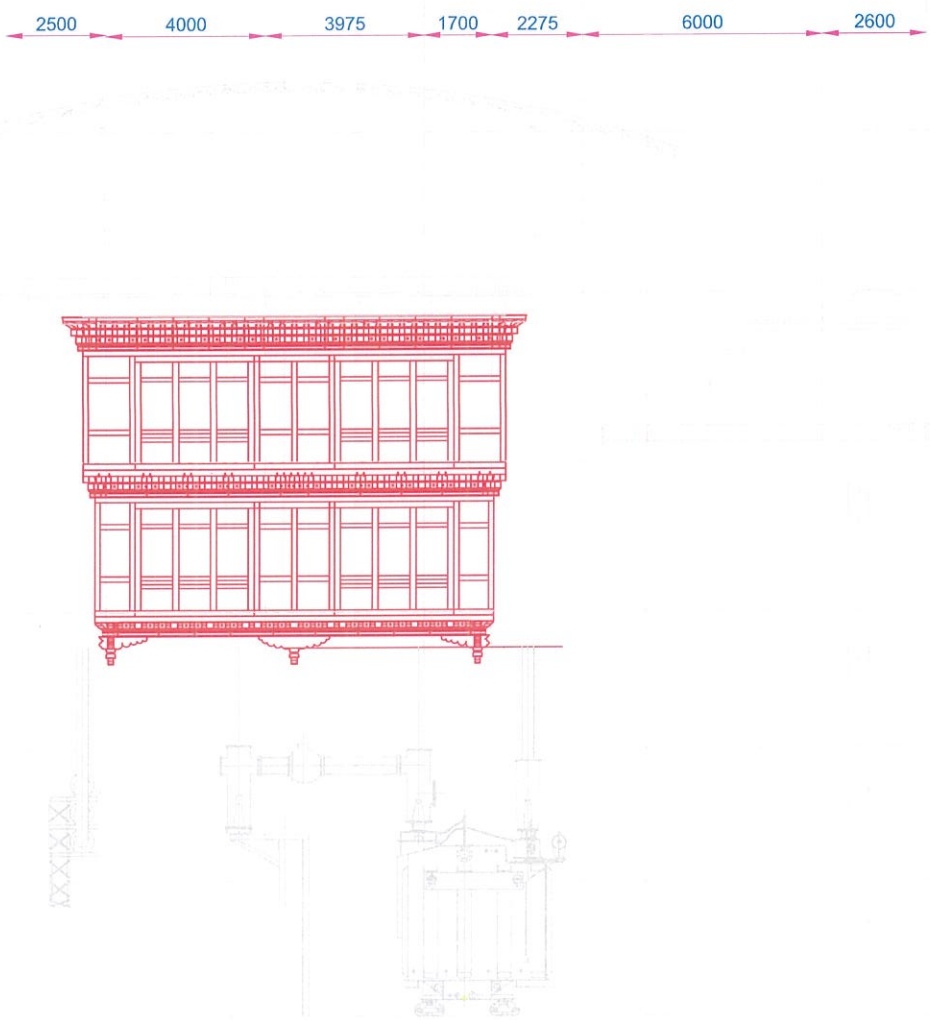
CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

POTHEAD YARD
SIDE ELEVATION -2

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2800	REV-0



SIDE ELEVATION –1

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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Contract Wing
PHPA-I, Bjimthangkha

LEGEND:

BHUTANESE PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

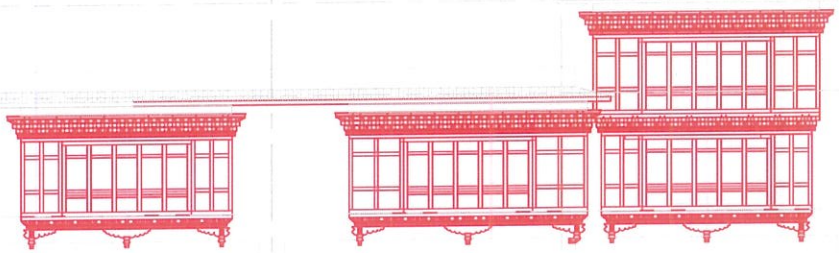
ISO 9001:2015

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

POTHEAD YARD
SIDE ELEVATION - 1

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2799	REV-0



FRONT ELEVATION

Contract Wing PHPA-I, Bjimthangkha

NOTES:

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LEGEND:

BHUTANESE PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

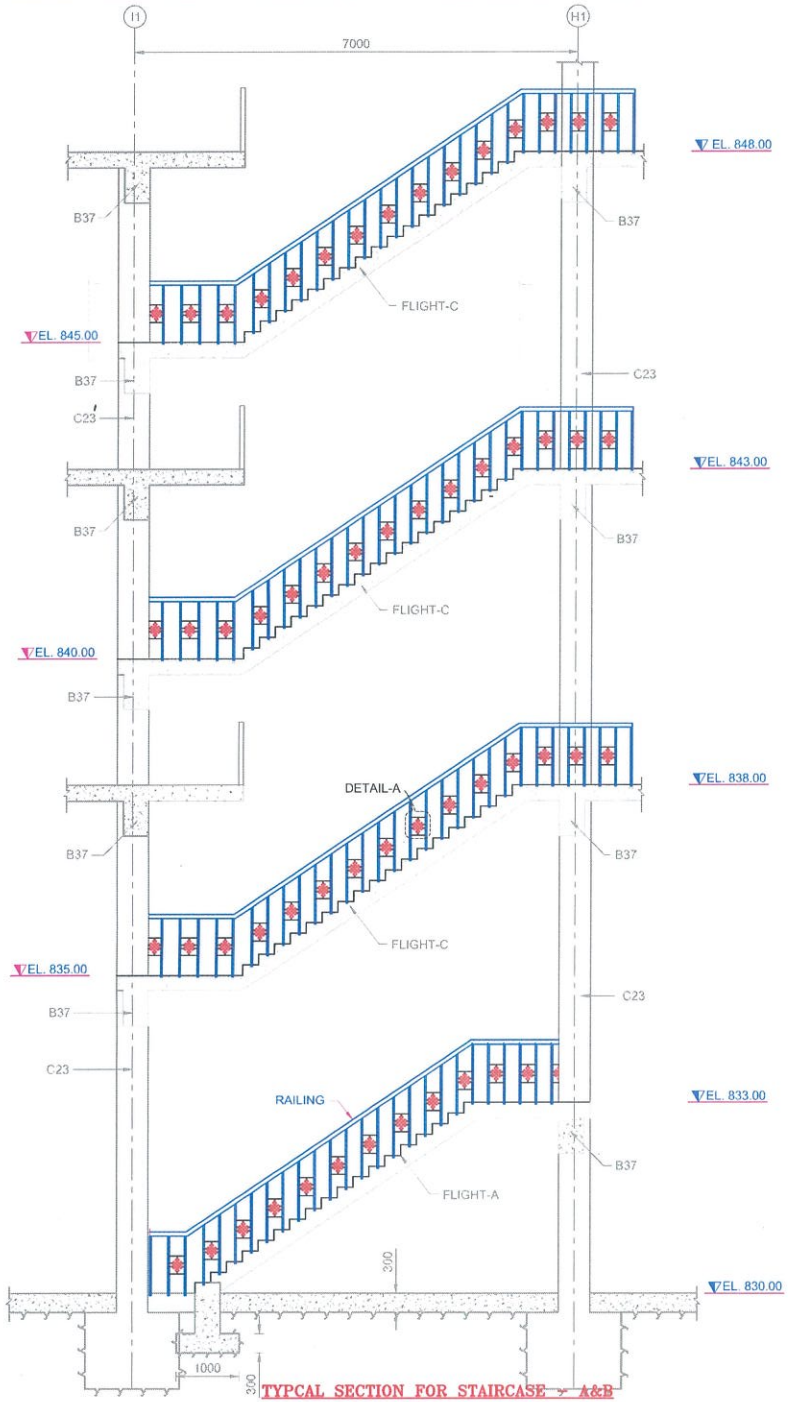
CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

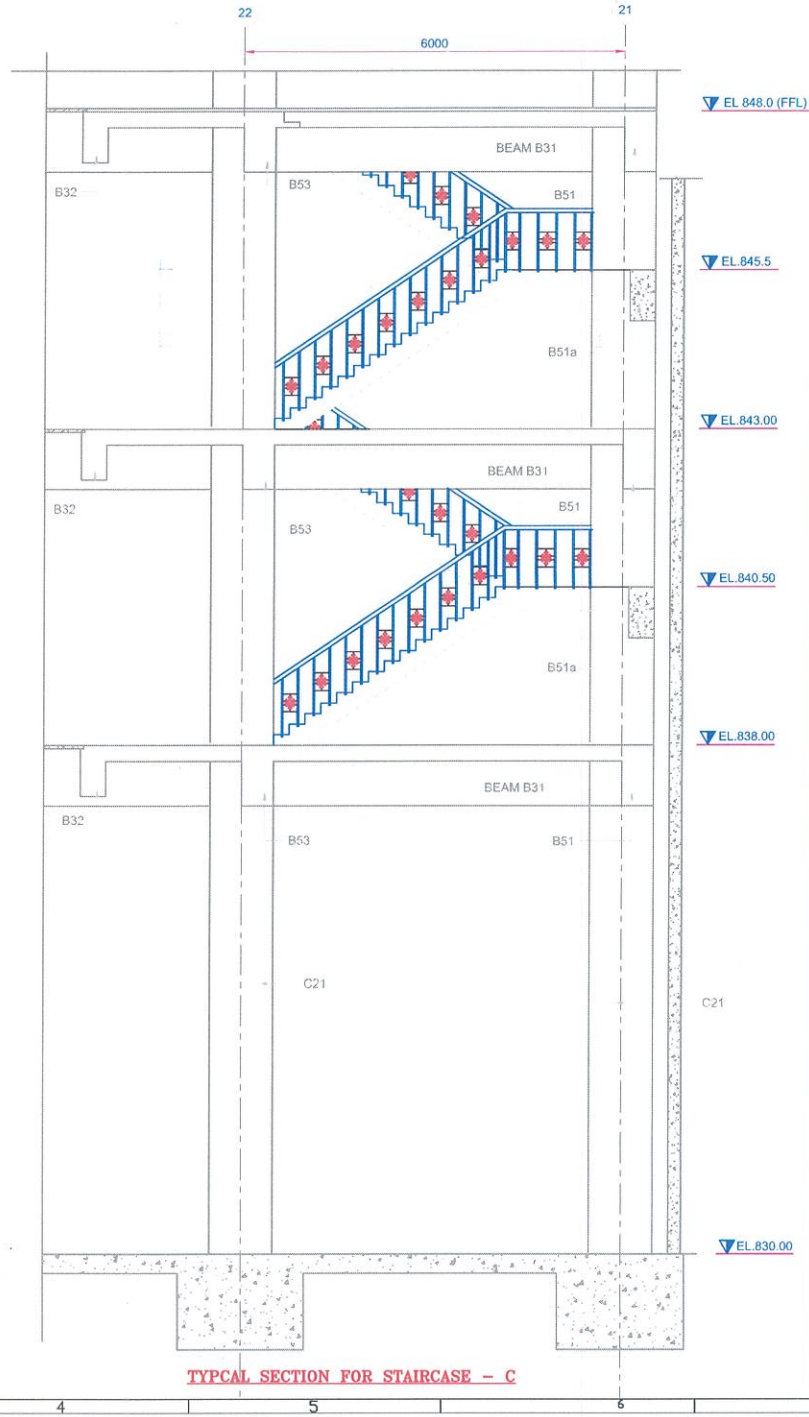
POTHEAD YARD
FRONT ELEVATION

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2798	REV-0



TYPCAL SECTION FOR STAIRCASE – A&B



TYPCAL SECTION FOR STAIRCASE – C

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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Contract Wing PHPA-I Bjimthangkha

LEGEND:

M.S. RAILING PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

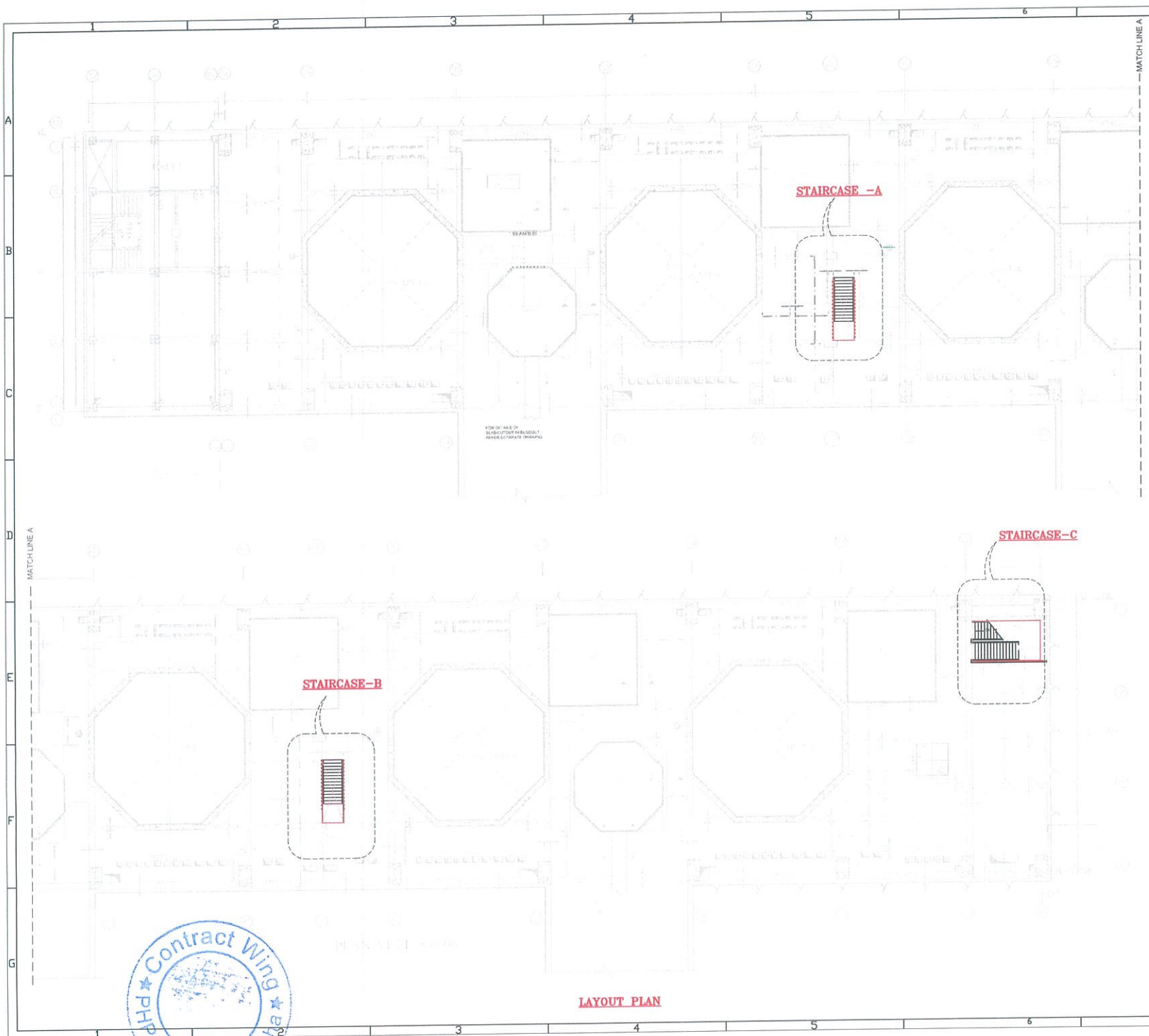
MACHINE HALL STAIRCASE SECTION

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

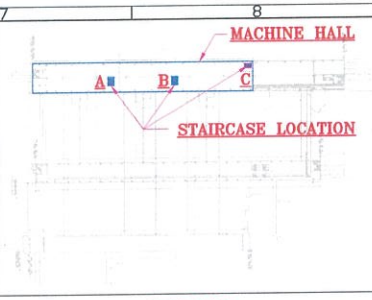
WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN | FEB-2025

DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2797 | REV-0

Uploaded



LAYOUT PLAN



KEYPLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DRAWINGS ARE NOT TO BE SCALED
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

LEGEND:

M.S. RAILING PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

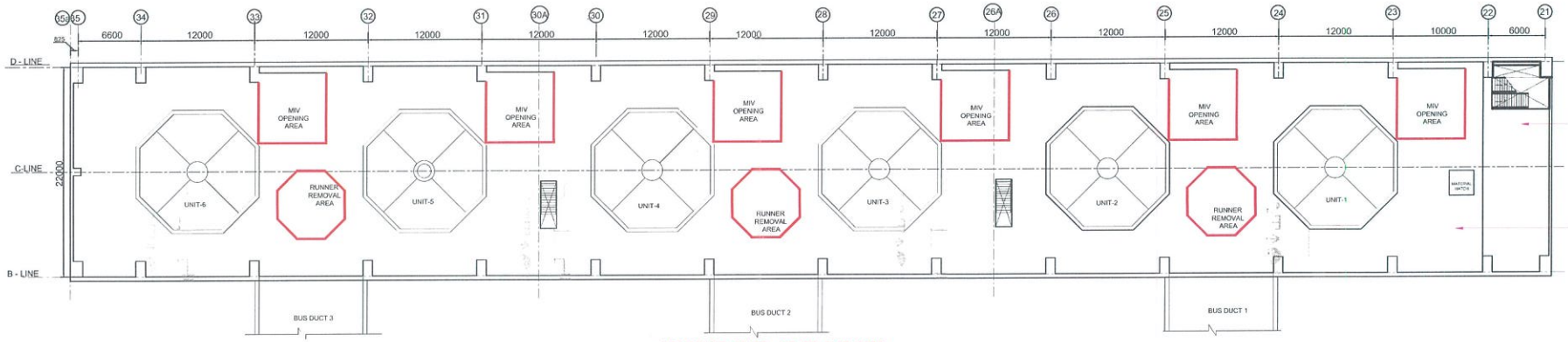
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

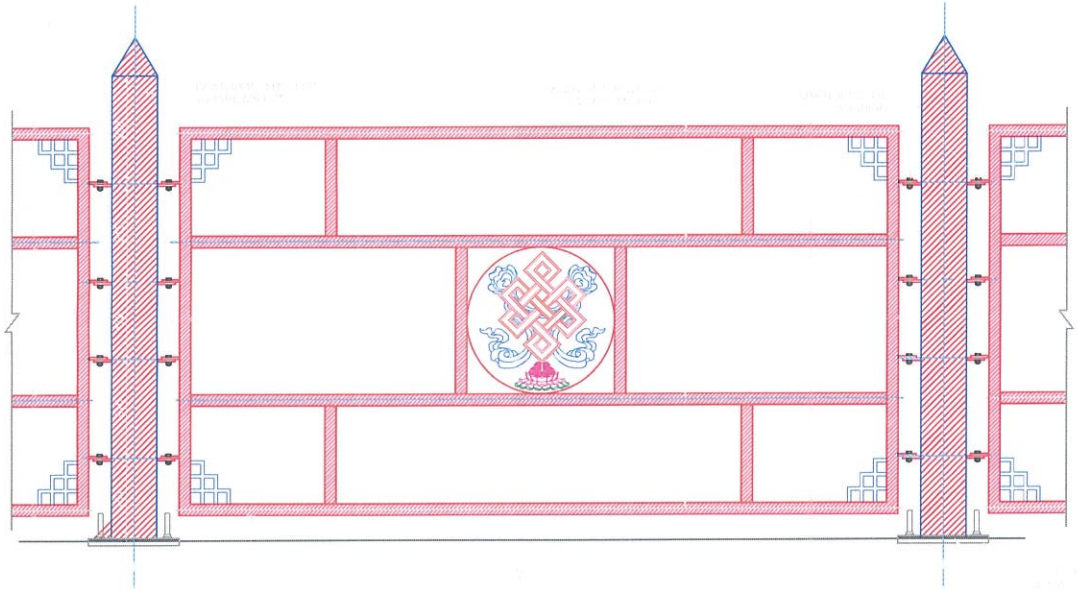
MACHINE HALL STAIRCASE LOCATION PLAN

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2796	REV-0



MACHINE HALL AT EL.848.00M



ELEVATION

LEGEND:

BHUTANESE PAINTING WORK ON M.S. RAILING

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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FOR TENDER PURPOSE

Contract Wing PHPA-I, Bjimthangkha

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

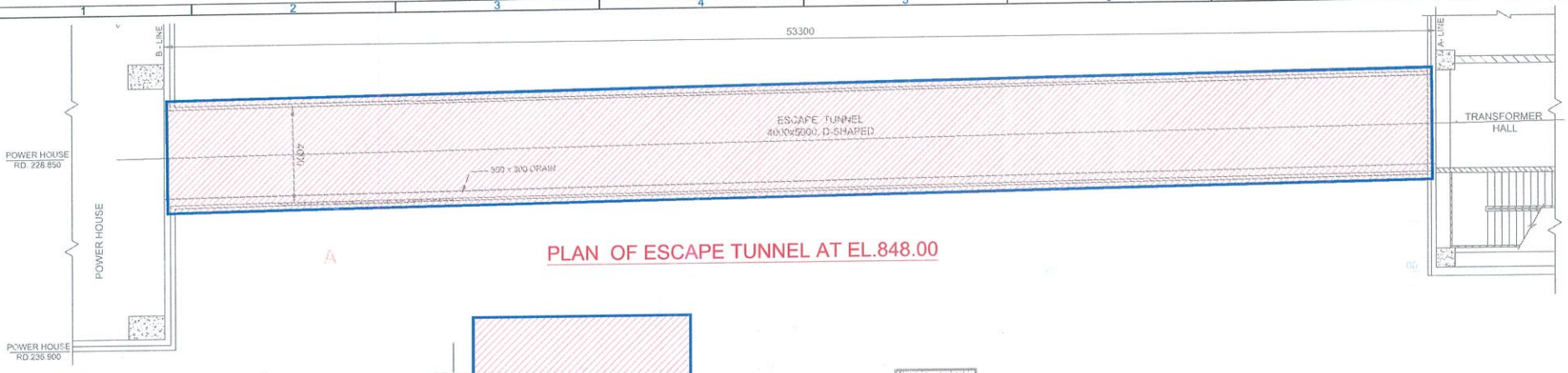
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

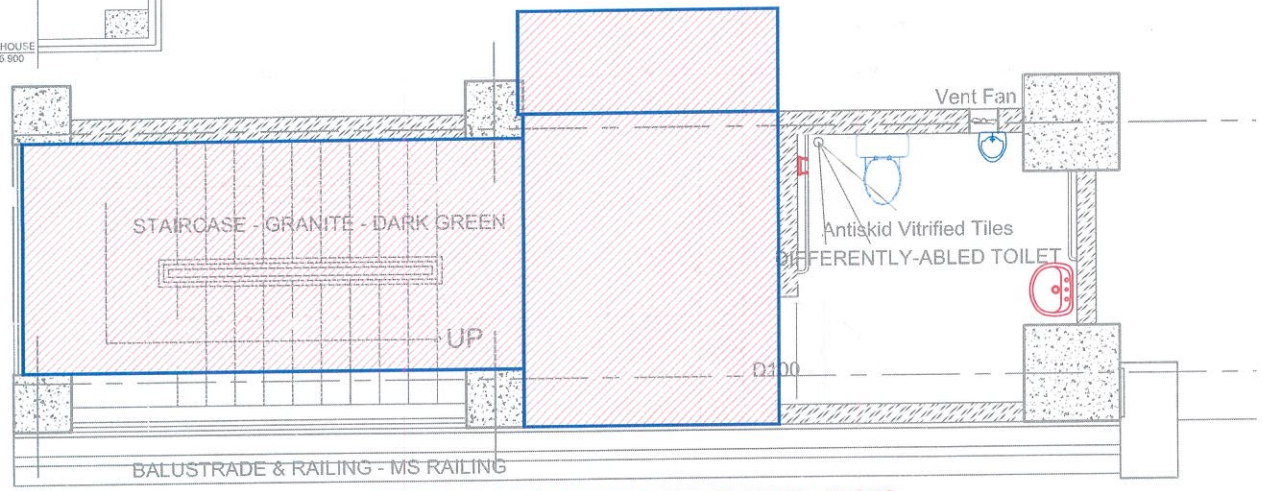
MACHINE HALL PLAN AT EL. 848.00 SHOWING M.S. RAILING

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

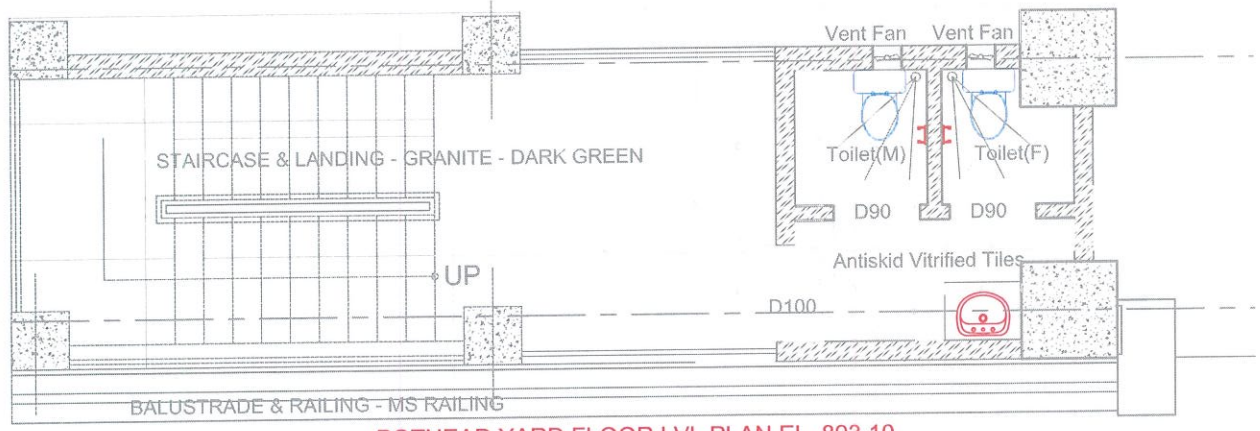
WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2795	REV-0



PLAN OF ESCAPE TUNNEL AT EL.848.00



POTHEAD YARD FLOOR LVL PLAN EL. 885.50



POTHEAD YARD FLOOR LVL PLAN EL. 893.10

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
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LEGEND:

KOTA STONE WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS LIMITED
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

KOTA STONE & PLUMBING WORKS

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN — FEB-2025

DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2794 — REV-0

Contract Wing
PHPA-I, Bjimthangkha

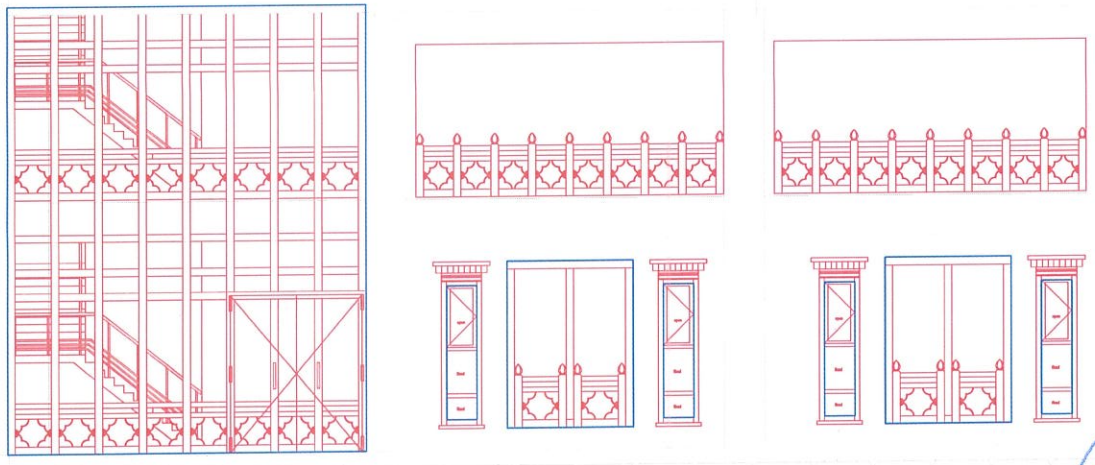
EL. 866.00

EL. 862.00

EL. 857.50

EL. 853.00

EL. 848



AUXILIARY BAY SIDE ELEVATION

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DRAWINGS ARE NOT TO BE SCALED
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. THE DRAWING SHOWS THE SIDE VIEW OF TOUGHENED GLASS OF MACHINE HALL AUXILIARY BAY FLOOR.

LEGEND:

BHUTANESE PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

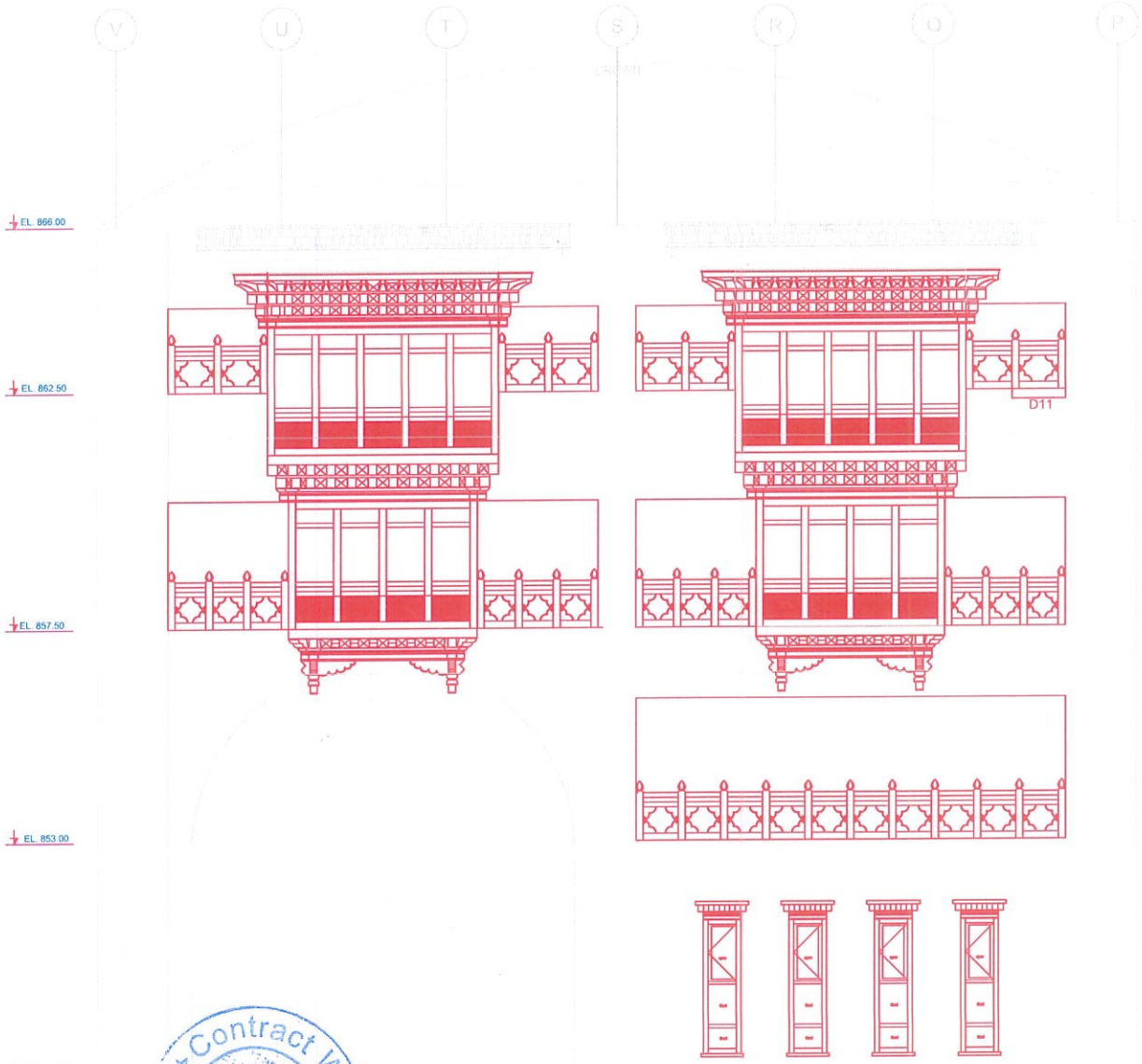
MACHINE HALL AUXILIARY BAY
SIDE ELEVATION

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN | FEB-2025

DRG. NO : WAP/PHEP-I/MC-III/BALANCEWORKS/T/2793 | REV-0

Contract Wing PHPA-I, Bjimthangkha



AUXILIARY BAY FRONT ELEVATION

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DRAWINGS ARE NOT TO BE SCALED
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. THE DRAWING SHOWS THE FRONT VIEW OF TOUGHENED GLASS OF MACHINE HALL AUXILIARY BAY.

LEGEND:

BHUTANESE PAINTING WORKS

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

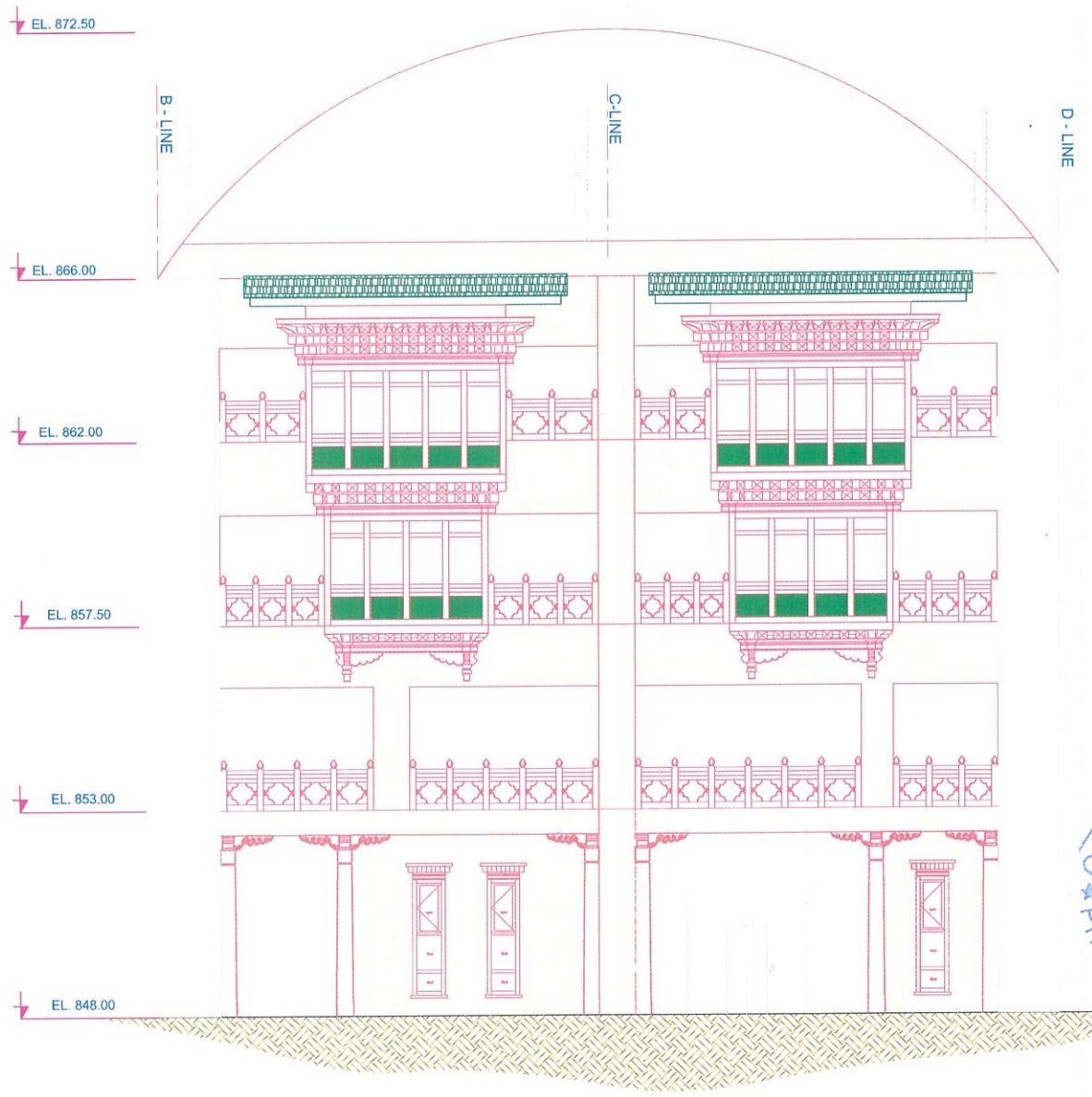
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL AUXILIARY BAY FRONT ELEVATION

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2792	REV-0



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

LEGEND:

FACADE TILE WORKS

BHUTANESE PAINTING WORKS

Contract Wing ★ PHPA-I, Bjimthangkha ★

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

(A GOVT. OF INDIA UNDERTAKING)

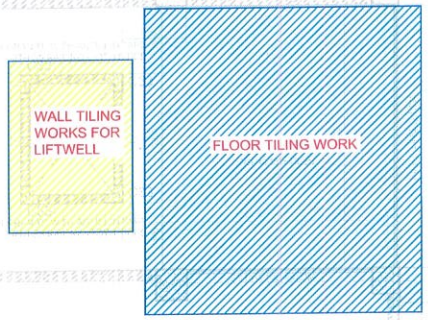
PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FRONT ELEVATION

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN — FEB-2025

DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2791



FLOOR PLAN AT EL 834.00

Contract Wing PHPA-I, Bjimthangkha

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

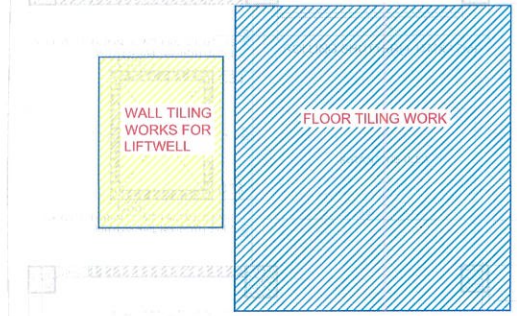
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.834.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2790	REV-0



FLOOR PLAN AT EL 830.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

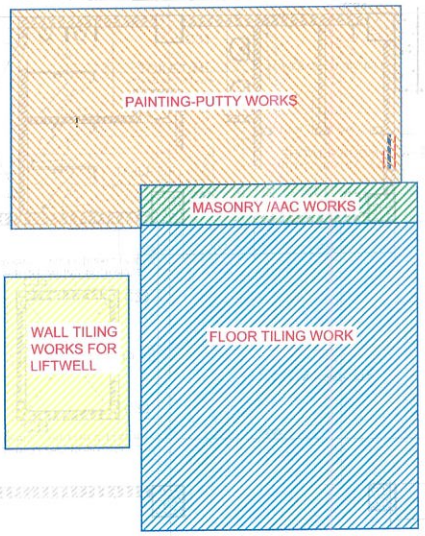
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.830.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB 2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2789	REV.0



FLOOR PLAN AT EL 838.00

Contract Wing PHPA-I, Bjimthangkha

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

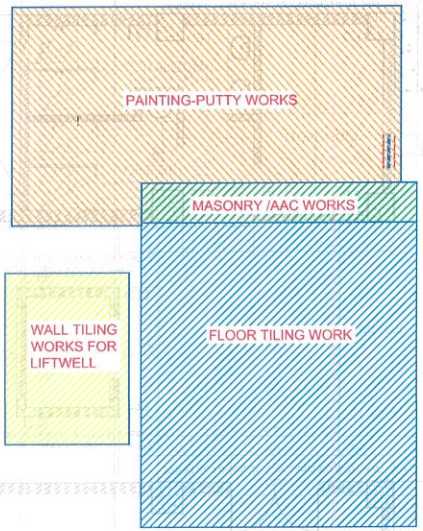
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.838.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2788	REV-0



FLOOR PLAN AT EL 843.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

(A GOVT. OF INDIA UNDERTAKING)

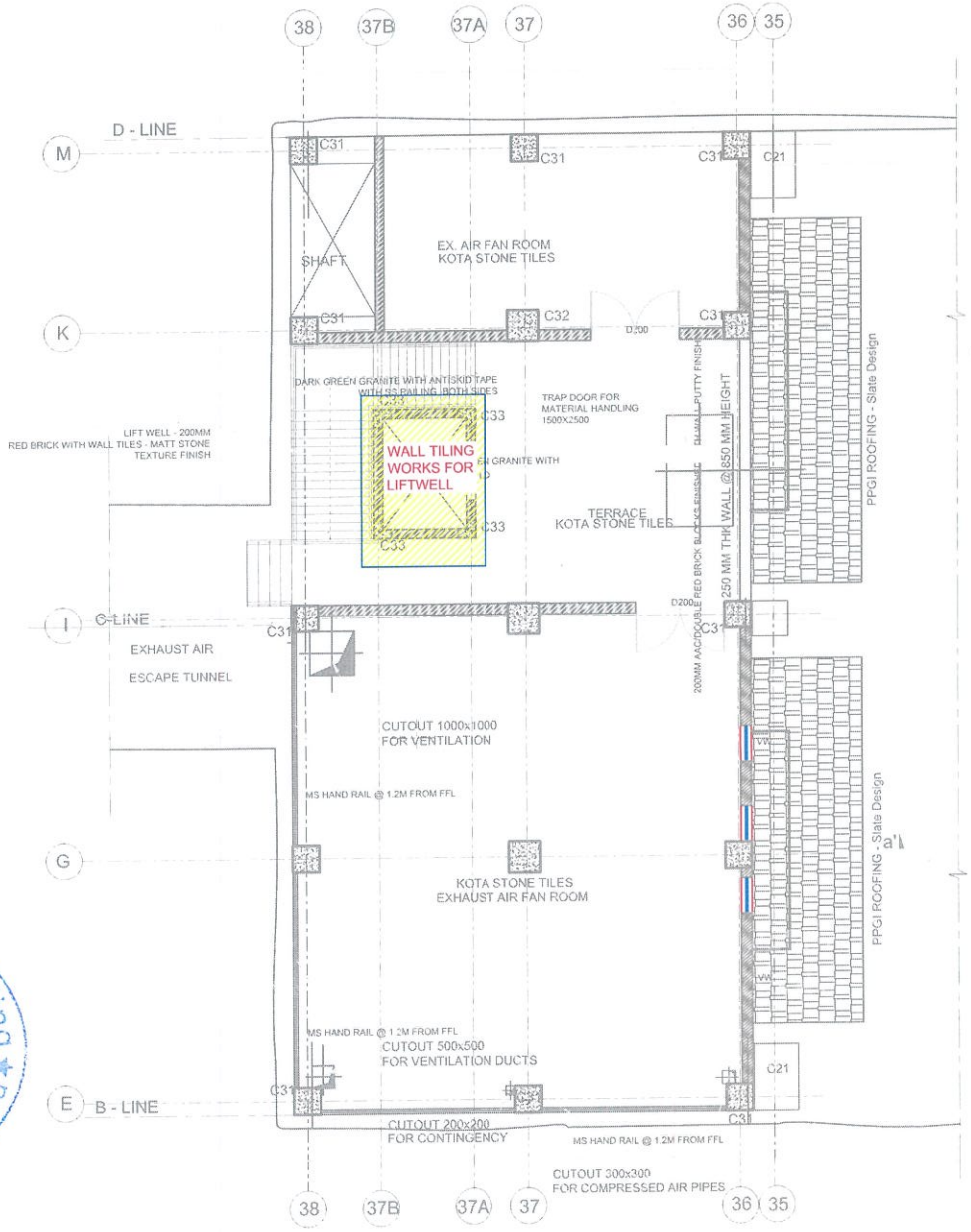
PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.843.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB'2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2787	REV.0

Contract Wing PHPA-I, Bjimthangkha



FLOOR PLAN AT EL 866.50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

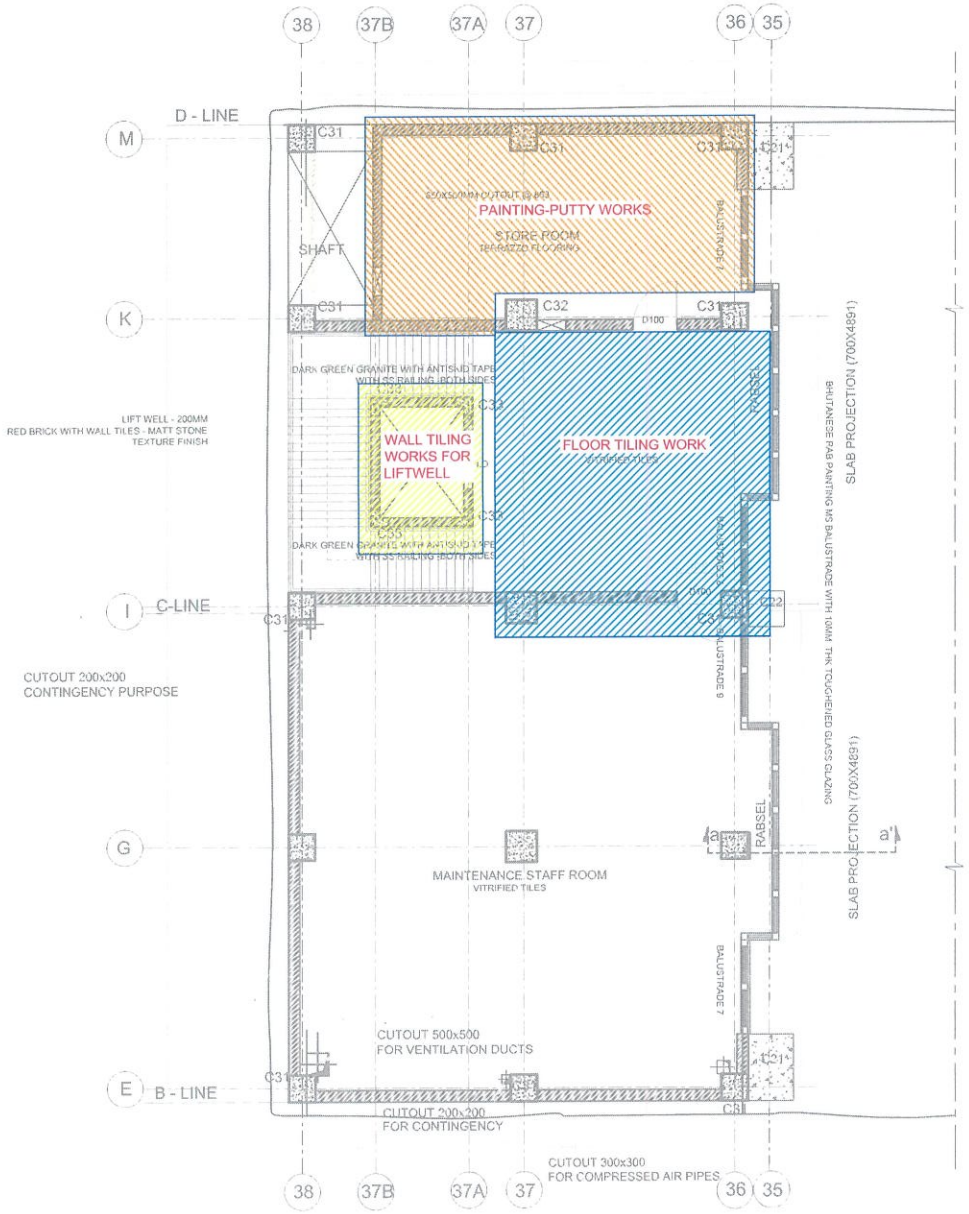
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.866.50

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2786	REV-0



FLOOR PLAN AT EL 862.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing PHPA-I, Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

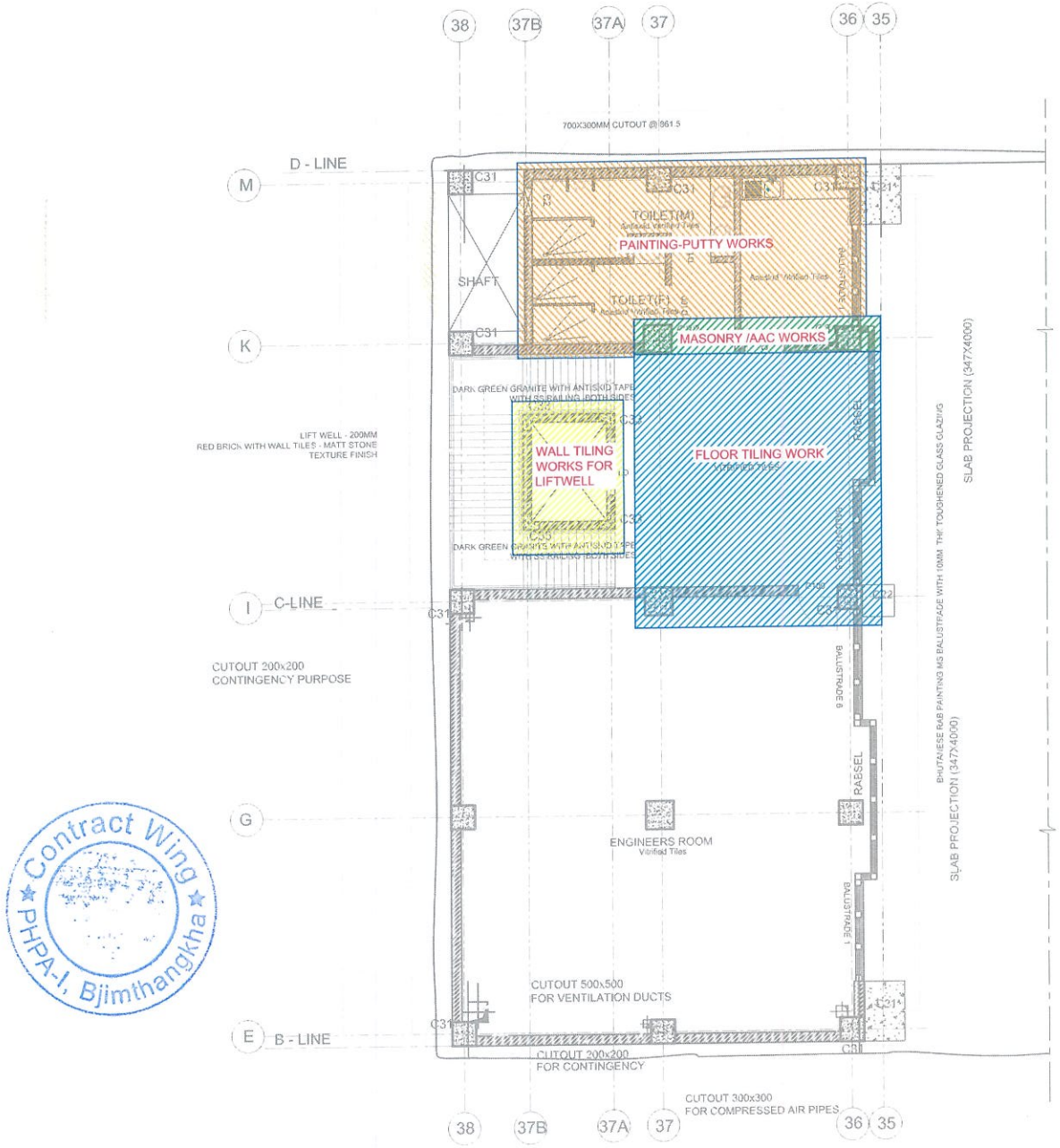
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.862.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2785	REV-0



FLOOR PLAN AT EL 857.50

Contract Wing ★ PHPA-I, Bjimthangkha ★

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

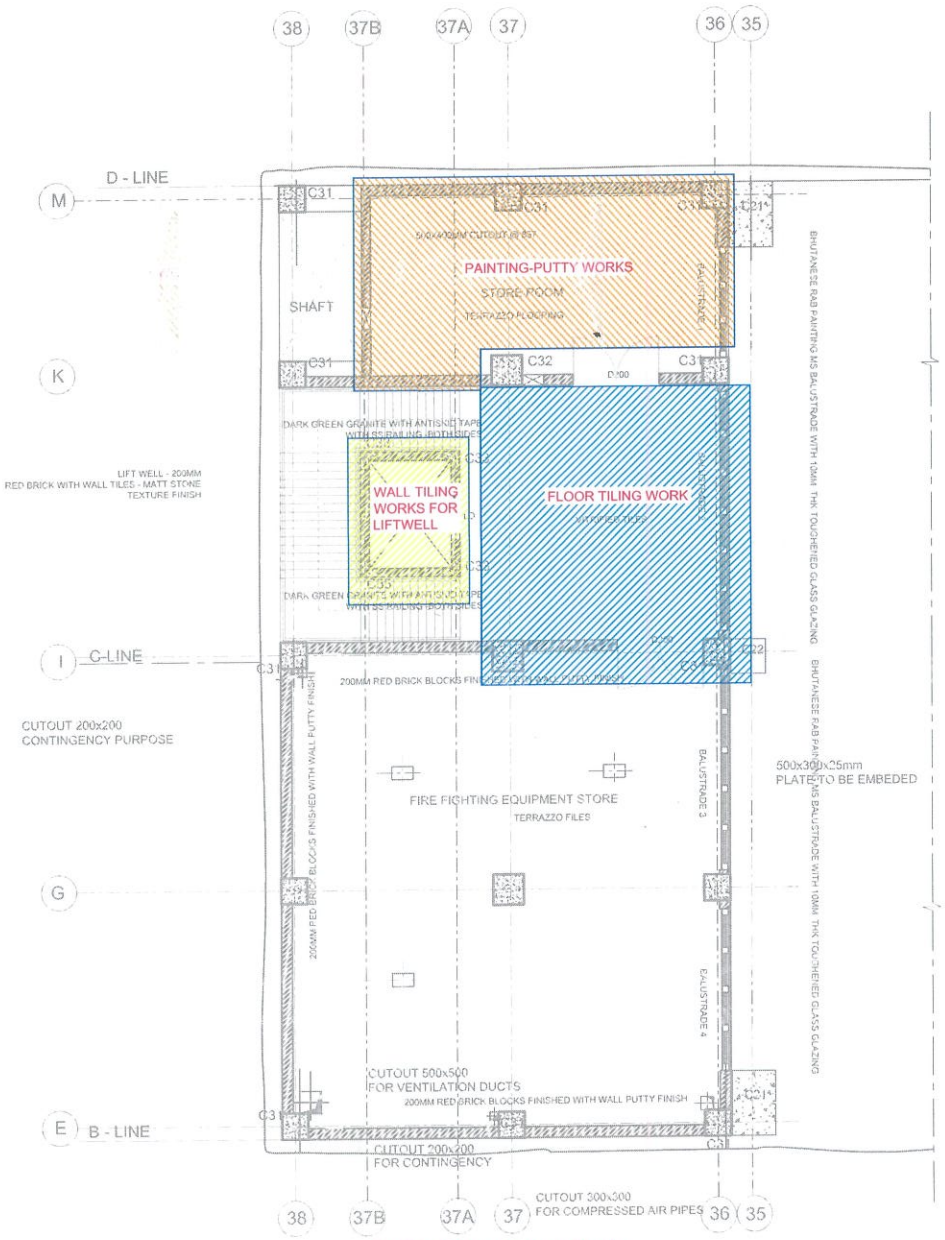
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.857.50

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2784	REV-0



FLOOR PLAN AT EL 853.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

PHPA-I, Bjimthangkha ★ Contract Wing ★

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

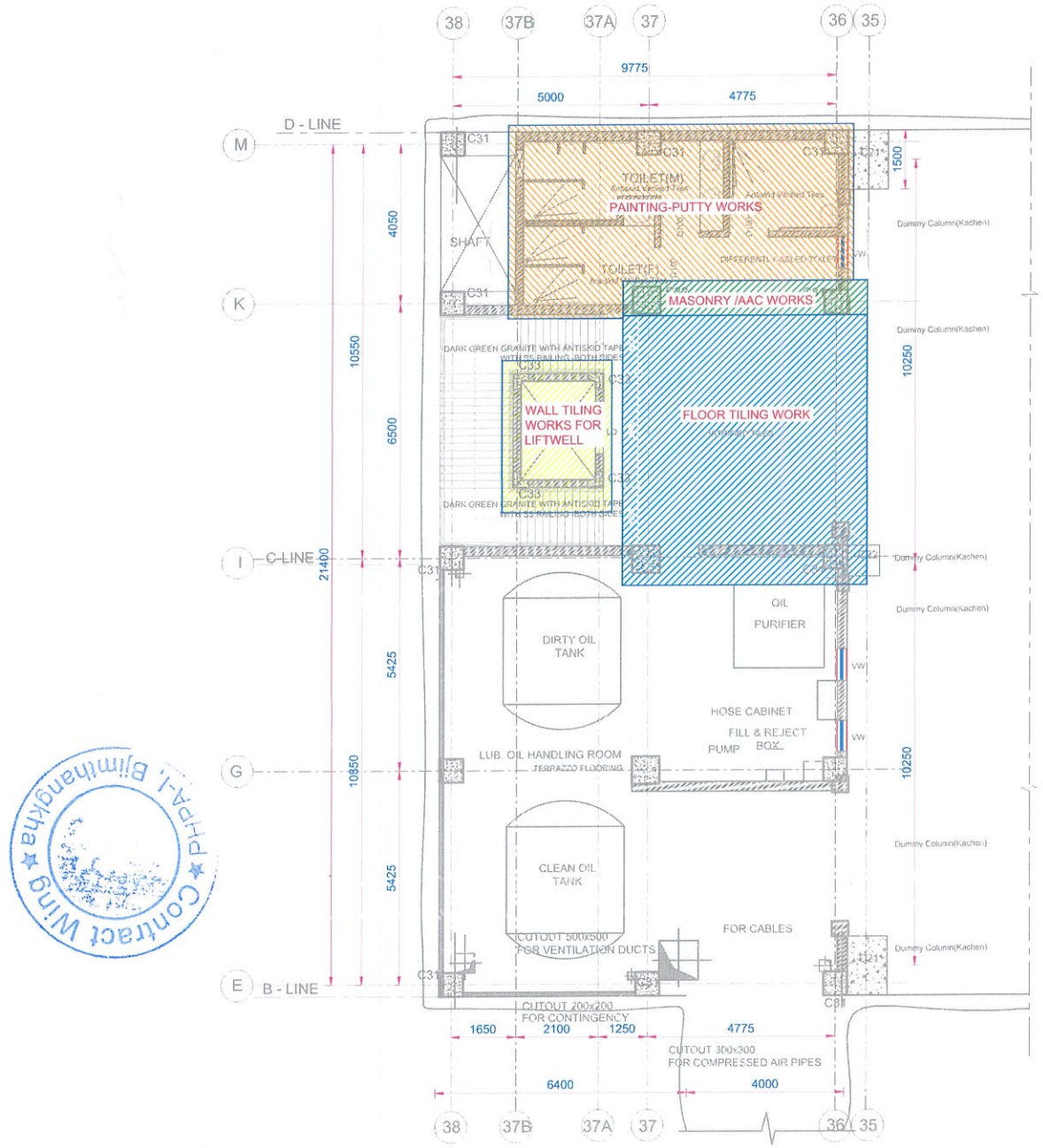
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.853.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2783	REV-0



FLOOR PLAN AT EL 848.00

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, ELEVATIONS & CHAINAGE ARE IN METERS.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING.
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.

Contract Wing PHPA-I Bjimthangkha

FOR TENDER PURPOSE

PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS

WAPCOS

(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU-I H.E. PROJECT (BHUTAN)

MACHINE HALL ANNEXE BAY
FLOOR PLAN AT EL.848.00

DRAWN	DESIGNED	E&M CLEARANCE	CHECKED	APPROVED

WAPCOS PROJECT OFFICE, BJIMTHANGKHA, BHUTAN	FEB-2025
DRG. NO.: WAP/PHEP-I/MC-III/BALANCEWORKS/T/2782	REV-0