# PUNJAB INFORMATION TECHNOLOGY BOARD
# (PITB)

## INVITATION TO BID
## ESTABLISHMENT OF DISASTER RECOVERY DATA CENTER AT MULTAN

Punjab Information Technology Board (PITB), Government of the Punjab, invites e-bids from eligible firms for **ESTABLISHMENT OF DISASTER RECOVERY DATA CENTER AT MULTAN (DC - 07):**

| Sr. No. | Description | Duration | Estimated Cost (Rs.) | Bid Security (Fixed) |
|---|---|---|---|---|
| 1 | Civil, Electrical, HVAC, Firefighting, Plumbing and IT/Networking Works, incl. One-Year O&M/SLA | 365 Days | 2.7 Billion | 30,000,00 |

2. The procurement shall be carried out under the Punjab Procurement Rules 2014 on **Single Stage – Two Envelope** bidding procedure, read with Regulation 6[4(a)] of the Punjab Procurement Regulations 2024. The Works comprise civil, electrical, HVAC, firefighting, plumbing/sewerage and IT/networking works, testing and commissioning, followed by one-year Operation & Maintenance / SLA services. Completion period: **365 days**.
3. Bidders (single entity or Joint Venture of up to three partners) must meet the eligibility and qualification criteria given in the Tender Document.
4. Tender Documents are available at https://ep.punjab.gov.pk, www.pitb.gov.pk and www.ppra.punjab.gov.pk and may be downloaded free of cost.
5. A **Pre-Bid Meeting** shall be held at **1130 hours** on **05 November, 2026** at PITB, Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore. Written queries should reach PITB at least seven days before the meeting. Bidders are advised to visit the project site at PITB Multan before submitting their bids.
6. Bids must be accompanied by a **Bid Security of Rs. 30,000,000/- (Fixed)**, paid online through 1Link / Online Bank Transfer as prescribed on the eP portal.
7. Technical and Financial Separate Bids, duly completed, signed, stamped, and in complete conformity with Tender Document must be **Submitted online on Punjab E-Procurement System (eP) website i.e.,** https://ep.punjab.gov.pk till **1500 hours** on **24 November, 2026** and Technical Bids shall be opened at **1530 hours** on the same date at PITB, Arfa Software Technology Park, Lahore, as per PPRA Rules, 2014. Financial Bids of technically responsive bidders only shall be opened later, on a date to be communicated.
8. Bidders are advised to ensure uploading the Bid on eP Portal, well before the submission deadline, and not wait for the last date and time to upload the bid. Bid submission on eP Portal shall entirely be the responsibility of the bidder. PITB shall not be held responsible for any issues thereof. For any assistance regarding eP Portal, system support email and phone numbers are provided hereunder.
9. Bids that are incomplete, not signed and stamped, late, or submitted by other than a specified mode will not be considered.
10. The URL of the website of the PPRA is www.ppra.punjab.gov.pk and response time shall be calculated exclusively from the date of publication of the advertisement on the website of the PPRA.
11. PEC License, Income/Sales tax registration certificates and other documents as mentioned in Tender Document must accompany the bids.
12. For electronic bids submission, bidders are requested to register at https://ep.punjab.gov.pk. For any queries regarding registration on Punjab E-Procurement System please contact at: 1248.

**Note**: PITB management may reject all bids or proposals at any time prior to the acceptance of a bid or proposal, as provided under Rule-35 of Punjab Procurement Rules, 2014.

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*Punjab Information Technology Board*
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Ph: (042) 99000000, Fax (042) 99232123 Web: www.pitb.gov.pk

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

# Bidding Documents

## For

## Procurement of Works

## Establishment of Disaster Recovery Data Center at PITB Multan (DC - 07)

**Volume-01**
**[Bidding Procedure & Conditions of Contract]**

**Punjab Information Technology Board (PITB)**

**October 2026**

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

# TABLE OF CONTENTS

**INSTRUCTIONS TO BIDDERS** ..... 1

**A. GENERAL** ..... 2

IB.1 Scope of Bid ..... 2
IB.2 Source of Funds ..... 2
IB.3 Eligible Bidders ..... 2
IB.4 One Bid per Bidder ..... 3
IB.5 Cost of Bidding ..... 3
IB.6 Site Visit ..... 3

**B. BIDDING DOCUMENTS** ..... 3

IB.7 Contents of Bidding Documents ..... 3
IB.8 Clarification of Bidding Documents ..... 4
IB.9 Amendment of Bidding Documents ..... 4

**C. PREPARATION OF BIDS** ..... 4

IB.10 Language of Bid ..... 4
IB.11 Documents Comprising the Bid ..... 5
IB.12 Bid Prices ..... 6
IB.13 Currencies of Bid and Payment ..... 6
IB.14 Bid Validity ..... 6
IB.15 Bid Security ..... 7
IB.16 Alternate Proposals by Bidder ..... 7
IB.17 Pre-Bid Meeting ..... 7
IB.18 Format and Signing of Bid ..... 8

**D. SUBMISSION OF BIDS FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDURE** ..... 8

IB.19 Sealing and Marking of Bids ..... 8
IB.20 Deadline for Submission of Bids ..... 9
IB.21 Late Bids ..... 9
IB.22 Modification, Substitution and Withdrawal of Bids ..... 10

**E. BID OPENING AND EVALUATION FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDUR** ..... 10

IB.23 Bid Opening ..... 10
IB.24 Process to be Confidential ..... 12
IB.25 Clarification of Bids ..... 12
IB.26 Examination of Bids and Determination of Responsiveness ..... 12
IB.27 Correction of Errors ..... 13
IB.28 Evaluation and Comparison of Bids ..... 13

**F. AWARD OF CONTRACT** ..... 14

IB.29 Award ..... 14
IB.30 Employer's Right to Accept any Bid and to Reject any or all Bids ..... 14
IB.31 Notification of Award ..... 14
IB.32 Performance Security ..... 15
IB.33 Signing of Contract Agreement ..... 15
IB.34 General Performance of the Bidders ..... 15
IB.35 Integrity Pact ..... 15
IB.36 Instructions not Part of Contract ..... 15
IB.37 PPRA Act, 2009 and PPR-14 will have over-riding effect ..... 16

**BID DATA SHEET** ..... 17

**LETTERS OF TECHNICAL BID / FINANCIAL BID, AND ..... 24**

**Letter of Technical Bid ..... 25**

**Letter of Financial Bid ..... 26**

Appendix-A to Bid Special Stipulations ..... 27
Appendix-B to Bid Foreign Currency Requirements ..... 30
Appendix-D to Bid Bill of Quantities ..... 33
Appendix-E to Bid Proposed Construction Schedule ..... 34
Appendix-F to Bid Method of Performing the Work ..... 35
Appendix-G to Bid List of Major Equipment – Related Items ..... 36
Appendix-G to Bid Equipment: ..... 37
Appendix-H to Bid Construction Camp and Housing Facilities ..... 38
Appendix-I to Bid List of Subcontractors ..... 39
Appendix-J to Bid Estimated Progress Payments ..... 40
Appendix-K to Bid Organization Chart for The Supervisory Staff and Labour ..... 41
Appendix-L to Bid Integrity Pact ..... 44
Appendix-M to Bid Financial Competence and Access to Financial Resources ..... 45

**FORMS ..... 72**

**FORM OF PERFORMANCE SECURITY ..... 75**

**FORM OF CONTRACT AGREEMENT ..... 77**

**MOBILIZATION ADVANCE GUARANTEE ..... 79**

**CONDITIONS OF CONTRACT ..... 81**

**PART I: GENERAL CONDITIONS ..... 81**

**PART II: PARTICULAR CONDITIONS OF CONTRACT ..... 82**

**SPECIFICATIONS - ..... 101**

**PART A - SPECIAL PROVISIONS ..... 101**

**PART B - TECHNICAL PROVISIONS ..... 101**

**DRAWINGS ..... 102**

# INSTRUCTIONS TO BIDDERS



# INSTRUCTIONS TO BIDDERS

(Note: These Instructions to Bidders along with Bid data sheet will not be part of the Contract and will cease to have effect once the contract is signed.)

## A. GENERAL

### IB.1 Scope of Bid

1.1 The Employer as defined in the Bid data sheet hereinafter called "the Employer" wishes to receive bids for the construction and completion of works and remedying any defects therein as described in these Bidding Documents, and summarized in the Bid data sheet hereinafter referred to as the "Works".

1.2 The successful bidder will be expected to complete the Works within the time specified in Appendix-A to Bid.

### IB.2 Source of Funds

2.1 The Employer has applied for/received a loan/credit/scheme from the source (s) indicated in the Bid data sheet in Pak Rupees/ various currencies towards the cost of the project specified in the Bid data sheet and it is intended that the proceeds of this loan/credit/ scheme will be applied to eligible payments under the Contract for which these Bidding Documents are issued.

### IB.3 Eligible Bidders

3.1 This Invitation for Bids is open to all bidders that are registered on Punjab e-Procurement System (e-P) https://ep.punjab.gov.pk pursuant to Regulation 7(1) of Punjab Procurement Regulations 2024, meeting the following requirements:

a. Duly licensed by the Pakistan Engineering Council (PEC) as specified in Appendix-N.

b. Incorporated with Security and Exchange Commission of Pakistan or Registrar of Firms as the case may be. [NTN Verification along with requisite Affidavit of sole-proprietorship in case of Sole-Proprietor.]

c. Registered with active status from Tax Authorities

d. Not blacklisted by the Procuring Agency.

e. Foreign firm participating in the JV shall have the nationality of an eligible country. Foreign firm shall be deemed to have the nationality of a country if the foreign firm is a national of that country; or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country.

f. A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be non-responsive. A Bidder may be considered to have a conflict of interest with one or more parties in this Bidding process, if they:

(i) are associated or have been associated, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consulting services for the preparation of the design and other documents to be used.
(ii) have controlling shareholders in common; or
(iii) receive or have received any direct or indirect subsidy from any of them; or
(iv) have the same legal representative for purposes of this Bid; or
(v) 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 Procuring Agency regarding this Bidding process;

**IB.4 One Bid per Bidder**

4.1 Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who participates in more than one bid (other than alternatives pursuant to Clause IB.16) will be disqualified.

**IB.5 Cost of Bidding**

5.1 The bidders shall bear all costs associated with the preparation and submission of their respective bids and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

**IB.6 Site Visit**

6.1 The bidders are advised to visit and examine the Site of Works and its surroundings and obtain for themselves on their own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. All cost in this respect shall be at the bidder's own expense.

6.2 The bidders and any of their personnel or agents will be granted permission by the Employer to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the bidders, their personnel and agents, will release and indemnify the Employer, his personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of such inspection.

## B. BIDDING DOCUMENTS

**IB.7 Contents of Bidding Documents**

7.1 The Bidding Documents, in addition to invitation for bids, are those stated below and should be read in conjunction with any Addenda issued in accordance with Clause IB.9.

1. Instructions to Bidders.
2. Bid data sheet.
3. General Conditions of Contract, Part-I(GCC).
4. Special Conditions of Contract, Part-II(SCC).
5. Specifications – Special Provisions.
6. Specifications – Technical Provisions.



7. Form of Bid & Appendices to Bid, including a Certificate that the bidder is not currently blacklisted by the Procuring Agency.
8. Bill of Quantities (Appendix-D to Bid).
9. Form of Bid Security.
10. Form of Contract Agreement.
11. Forms of Performance Security, Mobilization Advance and Secured Advance.
12. Drawings.

7.2 The bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of bid submission will be at the Bidder's own risk. Pursuant to Clause IB.26, bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.

**IB.8 Clarification of Bidding Documents**

8.1 Any prospective bidder requiring any clarification (s) in respect of the Bidding Documents may notify the Employer in writing at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which he receives prior to the deadline for submission of bids. The exact number of days will be mentioned in the Bid Data Sheet keeping in view the time given for submission of bids.

Copies of the Employer's response will be forwarded to all purchasers of the Bidding Documents, including a description of the enquiry but without identifying its source.

**IB.9 Amendment of Bidding Documents**

9.1 At any time at least three days prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by issuing addendum.

9.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to IB 7.1 hereof and shall be communicated in writing to all purchasers of the Bidding Documents, at least three (03) days prior to the closing date of submission of the bid. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer.

9.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids in accordance with Clause IB.20

## C. PREPARATION OF BIDS

**IB.10 Language of Bid**

10.1 The bid and all correspondence and documents related to the bid exchanged by a bidder and the Employer shall be in the bid language stipulated in the Bid data sheet and Special Conditions of Contract. Supporting documents and printed literature furnished by the bidders may be in any other language provided the same are accompanied by an accurate translation of the relevant parts in the bid language, in which case, for purposes of evaluation of the bid, the translation in bid language shall prevail.

## IB.11 Documents Comprising the Bid

11.1 The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Bid and the other the Financial Bid, containing the documents listed in Bid data sheet under the heading of IB 11.1 A & B respectively. Both envelopes to be enclosed together in an outer single envelope called the Bid. Each bidder shall furnish all the documents as specified in Bid data sheet 11.1 A & B.

Bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all partners and submitted with the bid, together with a copy of the proposed agreement. The role to be played by each partner to be specified therein; and, the concerned partner should have the requisite qualification/ experience to successfully execute the assigned task. Bids submitted by a joint venture of two (2) or more firms shall also comply with the following requirements:

(a) In case of a successful bid, the Form of JV Agreement shall be signed so as to be legally binding on all partners within 7 days of the receipt of letter of acceptance failing which the contract and the letter of acceptance shall stand void and redundant.

(b) One of the joint venture partners shall be nominated as being in charge/ lead partner; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the joint venture partners;

(c) The partner-in-charge/ lead partner shall always be duly authorized to deal with the Employer regarding all matters related with and/or incidental to the execution of Works as per the terms and Conditions of JV Agreement and in this regard to incur any and all liabilities, receive instructions, give binding undertakings and receive payments on behalf of the joint venture;

(d) All partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the Contract in accordance with the Contract terms; and, a statement to this effect shall be included in the authorization mentioned under Sub-Para (b) above as well as in the Form of Bid and in the Form of JV Agreement (in case of a successful bid); and

(e) A copy of JV agreement shall be submitted before signing of the Contract, stating the conditions under which JV will function, its period of duration, the persons authorized to represent and obligate it and which persons will be directly responsible for due performance of the Contract and can give valid receipts on behalf of the joint venture, the proportionate participation of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. The JV Agreement shall be made part of the contract. No amendments / modifications whatsoever in the joint venture agreement shall be agreed to between the joint venture partners without prior written consent of the Employer.

11.2 The Bidder shall furnish, as part of the Technical Bid, a Technical Proposal including a statement of work methods, equipment, personnel, schedule, qualification/ experience required to successfully execute the individually assigned tasks and any other information as stipulated in Bidding Forms, in sufficient detail to demonstrate

the adequacy of the Bidders' proposal to meet the work requirements and the completion time referred to in Sub-Clause 1.2 hereof.

### IB.12 Bid Prices

12.1 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole of the Works as described in IB 1.1 hereof, based on the unit rates and / or prices submitted by the bidder.

12.2 The bidders shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by a bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Bill of Quantities.

12.3 All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date of opening of the bids shall be included in the rates and prices and the total Bid Price submitted by a bidder.
Additional / reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed / deducted as per Sub-Clause 70.2 of the General Conditions of Contract Part-I.

12.4 The rates and prices quoted by the bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 70 of the Conditions of Contract. The bidders shall furnish the prescribed information for the price adjustment formulae in Appendix C to Bid and shall submit with the bids such other supporting information as required under the said clause.

### IB.13 Currencies of Bid and Payment

13.1 The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country (referred to as the "Foreign Currency Requirements") shall indicate the same in Appendix-B to Bid. However, subject to GCC clause 71.1, payments in foreign currency are not permissible.

13.2 The rates of exchange to be used by the bidder for currency conversion shall be the TT & OD Selling Rates published or authorized by the State Bank of Pakistan prevailing on the date of opening of the bids. For the purpose of payments, the exchange rates used in bid preparation shall apply for the duration of the Contract. Rule 32(2) of PPR-14 shall be applicable for rate of exchange of foreign currencies.

### IB.14 Bid Validity

14.1 Bids shall remain valid for the period stipulated in the Bid data sheet after the Date of Bid Opening specified in Clause IB.23.

14.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period which shall in no case be more than the original bid validity period or 180 days whichever is more. 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 or permitted to modify his bid, but will be required to extend the validity of his Bid Security for the period of the

extension, and in compliance with Clause IB.15 in all respects. Rule 28 of PPR-14 shall be applicable for Bid Validity period.

## IB.15 Bid Security

15.1 Each bidder shall furnish, as part of his bid, a Bid Security in the amount stipulated in the Bid data sheet in Pak Rupees or an equivalent amount in a freely convertible currency.

15.2 The Bid Security shall be, at the option of the bidder, in the form of Deposit at Call or a Bank Guarantee issued by a Scheduled Bank in Pakistan or from a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan in favor of the Employer valid for a period 30 days beyond the Bid Validity date.

15.3 Any bid not accompanied by an acceptable Bid Security shall be rejected by the Employer as non-responsive.

15.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, after expiry of grievance period or disposal of complaint if any, complying with the relevant provisions of PPR-14.

15.5 The Bid Security of the successful bidder will be returned when the bidder has furnished the required Performance Security and signed the Contract Agreement.

15.6 The Bid Security may be forfeited:

(a) If the bidder withdraws his bid except as provided in IB 22.1;
(b) If the bidder does not accept the correction of his Bid Price pursuant to IB 27.2 hereof; or
(c) In the case of successful bidder, if he fails within the specified time limit to:
  (i) Furnish the required Performance Security;
  (ii) Sign the Contract Agreement, or
  (iii) Furnish the required JV agreement within 7 days of the receipt of letter of acceptance.

## IB.16 Alternate Proposals by Bidder

16.1 No alternate proposals are allowed in single stage two envelope method.

## IB.17 Pre-Bid Meeting

17.1 The Employer may, on his own motion or at the request of any prospective bidder(s), hold a pre-bid meeting to clarify issues and to answer any questions on matters related to the Bidding Documents. The date, time and venue of pre-bid meeting, if convened, is as stipulated in the Bid data sheet. All prospective bidders or their authorized representatives shall be invited to attend such a pre-bid meeting.

17.2 The bidders are requested to submit questions, if any, in writing so as to reach the Employer not later than seven (7) days before the proposed pre-bid meeting.

17.3 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given, will be transmitted without delay to all purchasers of the Bidding Documents. Any modification of the Bidding Documents listed in IB 7.1 hereof, which may become necessary as a result of the pre-bid meeting shall be made by

the Employer exclusively through the issue of an Addendum pursuant to Clause IB.9 and not through the minutes of the pre-bid meeting.

17.4 Absence at the pre-bid meeting will not be a cause for disqualification of a bidder.

### IB.18 Format and Signing of Bid

18.1 Bidders are particularly directed that the amount entered on the Letter of Financial Bid shall be for performing the Contract strictly in accordance with the Bidding Documents.

18.2 All appendices to Bid are to be properly completed and signed.

18.3 No alteration is to be made in the Financial Bids and Technical Bids nor in the Appendices thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the bid may be rejected.

18.4 The Bidder shall prepare one original of the Technical Bid and one original of the Financial Bid comprising the Bid as described in Bid data sheet against IB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - FINANCIAL BID". In addition, the Bidder shall submit two (2) copies of the Bid and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

18.5 The Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the Bid data sheet and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid, except for unamended printed literature, shall be signed or initialed by the person signing the bid.

18.6 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

18.7 Bidders shall indicate in the space provided in the Letter of Technical and Financial Bids, their full and proper addresses at which notices may be legally served on them and to which all correspondence in connection with their bids and the Contract is to be sent.

18.8 Bidders should retain a copy of the Bidding Documents as their file copy.

## D. SUBMISSION OF BIDS FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDURE

### IB.19 Sealing and Marking of Bids

19.1 Each bidder shall submit his bid as under:

(a) ORIGINAL and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such.

(b) The envelopes containing the ORIGINAL and copies will be put in one sealed envelope and addressed / identified as given in IB 19.2 hereof.

(c) The technical bid should comprise of documents listed in IB11.1 (A) & the Financial Bid should comprise of documents listed in IB 11.1 (B) which shall be placed in separate envelopes in accordance with IB 11.1.

19.2 The inner and outer envelopes shall:

(a) Be addressed to the Employer at the address provided in the Bid data sheet;

(b) Bear the name and identification number of the contract as defined in the Bid data sheet; and

(c) Provide a warning not to open before the time and date for bid opening, as specified in the Bid data sheet.

19.3 In addition to the identification required in IB 19.2 hereof, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Clause IB.21

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

**IB.20 Deadline for Submission of Bids**

20.1 (a) Bids must be received by the Employer at the address specified no later than the time and date stipulated in the Bid data sheet.

(b) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified above. Bidders shall bear all expenses incurred in the preparation and delivery of bids. No claims will be entertained for refund of such expenses.

(c) Where delivery of a bid is by mail and the bidder wishes to receive an acknowledgment of receipt of such bid, he shall make a request for such acknowledgment in a separate letter attached to but not included in the sealed bid package.

(d) Upon request, acknowledgment of receipt of bids will be provided to those making delivery in person or by messenger.

20.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with Clause IB.9, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

**IB.21 Late Bids**

21.1 (a) Any bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.20 will be returned unopened to such bidder.

(b) Delays in the mail, delays of person in transit, or delivery of a bid to the wrong office shall not be accepted as an excuse for failure to deliver a bid at the proper place and time. It shall be the bidder's responsibility to determine the manner in which timely delivery of his bid will be accomplished either in person, by messenger or by mail.

### IB.22 Modification, Substitution and Withdrawal of Bids

22.1 Any bidder may modify, substitute or withdraw his bid after bid submission provided that the modification, substitution or written notice of withdrawal is received by the Employer prior to the deadline for submission of bids.

22.2 The modification, substitution, or notice for withdrawal of any bid shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause IB.19 with the outer and inner envelopes additionally marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" as appropriate.

22.3 No bid may be modified by a bidder after the deadline for submission of bids except in accordance with IB 22.1 and 27.2.

22.4 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in the Form of Bid may result in forfeiture of the Bid Security in pursuance to Clause IB.15.

## E. BID OPENING AND EVALUATION FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDUR

### IB.23 Bid Opening

23.1 The Employer will open the Technical Bids in public at the address, date and time specified in the Bid data sheet in the presence of Bidders` designated representatives and anyone who choose to attend. The Financial Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening.

23.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding Withdrawal Notice contains a valid authorization to request the withdrawal and is read out at bid opening.

23.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Financial Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Financial Bid will remain unopened in accordance with IB 23.1. No envelope shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.

23.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Financial Bid shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Financial Bids, both Original and Modification, will remain unopened in accordance with IB 23.1. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.



23.5 Other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:

(a) the name of the Bidder;
(b) whether there is a modification or substitution;
(c) the presence of a Bid Security, if required; and
(d) Any other details as the Employer may consider appropriate.

No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with IB 21.1. Only Technical Bids read out and recorded at bid opening, shall be considered for evaluation.

**Preliminary Examination of Technical Bids**

23.6 a) The Employer shall first examine qualification and Technical aspects of the bid as per appendix M and N submitted by the Bidder. The technical proposal examination of those bidders only shall be taken in hand who meet the minimum requirement as mentioned in appendix M and N. Only substantially responsive qualification shall be considered for further evaluation.

b) The Employer shall examine the Technical Bid to confirm that all the documents have been provided, and to determine the completeness of each document submitted.

23.7 The Employer shall confirm that all the documents and information have been provided for evaluation of Technical bid as required under these bidding documents.

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

23.9 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Document and return their Financial Bids unopened as per rule 38(2)(a)(vii) of PPR-14.

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

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

(a) The name of the Bidder;
(b) Whether there is a modification or substitution;



(c) The Bid Prices, including any discounts; and

(d) Any other details as the Employer may consider appropriate.

Only Financial Bids and discounts, read out and recorded during the opening of Financial Bids shall be considered for evaluation. No Bid shall be rejected at the opening of Financial Bids.

23.12 If this Bidding Document allows Bidders to quote separate prices for different contracts, and the award to a single Bidder of multiple contracts, the methodology to determine the lowest evaluated price of the contract combinations is that which is most economical to the Employer.

**IB.24 Process to be Confidential**

24.1 Information relating to the examination, clarification, evaluation and comparison of bid and recommendations for the award of a contract shall not be disclosed to bidders or any other person not officially concerned with such process before the announcement of final bid evaluation report which shall be done at least 10 days prior to the award of Contract. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made (if applicable), final evaluated prices and recommendations against all the bids evaluated. Any effort by a bidder to influence the Employer's processing of bids or award decisions may result in the rejection of such bidder's bid. Whereas any bidder feeling aggrieved may lodge a written complaint not later than five (5) days after the announcement of Technical Bid Evaluation Report and not later than ten 10 days after the announcement of Final Bid Evaluation Report. No bidder will be allowed to file grievance petition with respect to Technical Evaluation after announcement/ uploading of Final Evaluation Report. However mere fact of lodging a complaint shall not warrant suspension of the procurement process.

**IB.25 Clarification of Bids**

25.1 To assist in the examination, evaluation and comparison of bids, the Employer may, at his discretion, ask any bidder for clarification of his bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids in accordance with Clause IB.28.

25.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its bid may be rejected. Rule 33 of PPR-14 shall be applicable for clarifications.

**IB.26 Examination of Bids and Determination of Responsiveness**

26.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid is substantially responsive to the requirements of the Bidding Documents.

26.2 A substantially responsive bid is one which (i) meets the eligibility criteria; (ii) has been properly signed; (iii) is accompanied by the required Bid Security; (iv) Includes signed Integrity Pact where required as per clause IB.35; and (v) conforms to all the terms, conditions and specifications of the Bidding Documents, without material deviation or reservation (vi) meets the qualification criteria as specified in Appendix M & N. A material deviation or reservation is one (i) which affect in any substantial

way the scope, quality or performance of the Works; (ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the bidder's obligations under the Contract; (iii) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids. Only substantially responsive bid shall be considered for further evaluation.

26.3 If a bid is not substantially responsive, it may not subsequently be made responsive by correction or withdrawal of the non-conforming material deviation or reservation. The Employer may, however, seek confirmation/ clarification in writing which shall be responded in writing.

**IB.27 Correction of Errors**

27.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

(a) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and

(b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern and the unit rate will be corrected.

27.2 The amount stated in the Letter of Financial Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected Bid Price, his Bid will be rejected, and the Bid Security shall be forfeited in accordance with IB.15.6 (b) hereof.

**IB.28 Evaluation and Comparison of Bids**

28.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.26.

28.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

(a) Making any correction for errors pursuant to Clause IB.27;

(b) Excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including competitively priced Day work; and

(c) Making an appropriate adjustment for any other acceptable variation or deviation.

28.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.

28.4 If the Bid of the successful bidder is seriously unbalanced in relation to the Employer's estimate of the cost of work to be performed under the Contract, the Employer may require the bidder to produce detailed price analyses for any or all items of the

Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in Clause IB.32 be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

## F. AWARD OF CONTRACT

### IB.29 Award

29.1 Subject to Clauses IB.30 and IB.34, the Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the Bidding Documents and who has offered the lowest evaluated Bid Price, provided that such bidder has been determined to be eligible in accordance with the provisions of Clause IB.3 and qualify pursuant to IB 29.2.

29.2 The Employer, at any stage of the bid evaluation, having credible reasons for or prima facie evidence of any defect in bidder's capacities, may require the bidders to provide information concerning their professional, technical, financial, legal or managerial competence whether already pre-qualified or not:

Provided that such qualification shall only be laid down after recording reasons in writing. They shall form part of the records of that bid evaluation report.

### IB.30 Employer's Right to Accept any Bid and to Reject any or all Bids

30.1 Notwithstanding Clause IB.29, the Employer reserves the right to accept or reject any Bid by giving reasons, and to annul the bidding process and reject all bids, at any time prior to the acceptance of any bid or proposal, without thereby incurring any liability to the affected bidders or any obligation except that the grounds for rejection of all bids shall upon request be communicated to any bidder who submitted a bid, without justification of grounds. Rejection of all bids shall be notified to all bidders promptly.

### IB.31 Notification of Award

31.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder in writing ("Letter of Acceptance") that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the "Contract Price").

31.2 No Negotiation with the bidder having evaluated as lowest responsive or any other bidder shall be permitted. However, the lowest evaluated bidder may further reduce the Bid Price voluntarily without compromising the quality/ quantity.

31.3 The notification of award and its acceptance by the bidder will constitute the formation of the Contract, binding the Employer and the bidder till signing of the formal Contract Agreement.

31.4 Upon furnishing by the successful bidder of a Performance Security, the Employer will promptly notify the other bidders that their Bids have been unsuccessful and

return their bid securities. No bid security can be returned without exhausting the grievance period or without finally disposing off the complaint of the non-responsive bidder. However, bid security may be returned earlier if any bidder submits affidavit that he is satisfied with the proceedings and hence his bid security may be returned.

### IB.32 Performance Security

32.1 The successful bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Bid data sheet and the Conditions of Contract within stipulated period provided in BDS, otherwise in a period of 28 days after the receipt of Letter of Acceptance. On submission of Performance Security, the bid security of the successful bidder may be returned.

32.2 Failure of the successful bidder to comply with the requirements of IB.32.1 or IB.33 or IB.35 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. Rule 56 of PPR-14 shall be applicable for performance Security.

### IB.33 Signing of Contract Agreement

33.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will send the successful bidder the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the parties.

33.2 The formal Agreement between the Employer and the successful bidder shall be executed within 14 days after furnishing of the acceptable Performance Security and receipt of the Contract Agreement by the successful bidder from the Employer, or within such other period as may be permitted by applicable law.

### IB.34 General Performance of the Bidders

34.1 The Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts/works. The Employer may in case of consistent poor performance of any Bidder as reported by the employers of the previously awarded contracts, interalia, reject his bid and/or refer the case to the concerned forum(s). Upon such reference, the concerned forum(s) in accordance with its rules, procedures and relevant laws of the land take such action as may be deemed appropriate under the circumstances of the case including black listing of such Bidder and debarring him from participation in future bidding for similar works.

### IB.35 Integrity Pact

35.1 The Bidder shall sign and stamp the Integrity Pact provided at Appendix-L to Bid in the Bidding Documents for all procurement contracts exceeding Rupees ten Million. Failure to provide such Integrity Pact shall make the bidder non-responsive.

### IB.36 Instructions not Part of Contract

36.1 Bids shall be prepared and submitted in accordance with these Instructions which are provided to assist bidders in preparing their bids, and do not constitute part of the Bid or the Contract Documents. Submission of Bids shall be construed as evidence that the bidder has admitted all provisions of the Instruction to the Bidders.

## IB.37 PPRA Act, 2009 and PPR-14 will have over-riding effect

37.1 PPRA Act, 2009, PPR-14 (as amended up to date of advertisement), Punjab Procurement Regulations 2024 will supersede and will have an over-riding effect in case in the event of any contradiction with these Instructions, the Contract or any other part of the Bidding Documents.

# BID DATA SHEET

# Bid Data Sheet

*Instructions to Bidders*

*Clause Reference*

**1.1 Name and address of the Employer:**

Punjab Information Technology Board, acting through its Project Director, Establishment of Disaster Recovery Data Center at PITB Multan Address: Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore, Pakistan.

1.1 Name of the Project: Establishment of Disaster Recovery Data Centre at PITB Multan.

Summary of the Works: The Works comprise an integrated facility involving Construction of Civil, Structural, Electrical, HVAC, Firefighting, Plumbing, Sewerage, ICT/Networking and allied Works including One-Year mandatory Operations, Maintenance and Service Level Agreement; and the remedying of any defects therein, complete in all respects.

2.1 Name of the Borrower/Source of Financing/Funding Agency:

Source of Financing: Development Funds, Government of

Punjab, Pakistan

2.1 Amount and Type of financing: ADP

6.3 The following text as 6.3 is added after IB 6.2:

The bidder or his authorized representative shall visit and inspect the site of the Works including the areas and surroundings to be used for Contractor's Camp, on his own responsibility and at his own expense, and obtain all the information from his own sources, which may be necessary for preparing the Bid. The Employer may assist but will not take any responsibility for the supply or correctness of the information.

The Bidder shall, before submitting his Bid, satisfy himself in all respects including the following:

a) The existing facilities in the vicinity of the Site of Work, the hydrological and climatological conditions, the form and nature of the Site of Work.
b) The quantities and nature of the work and materials necessary for completion of the Works.
c) The means of access to the Site of the Work and exit from the Site.
d) The available accommodation on land for Contractor's Camp within or outside the Site of Work.
e) All necessary information as to risks, contingencies and other circumstance, which may influence or affect the tender:
f) The type and nature of soil existing in area of Work.
g) The existing condition at Site.

Each Bidder shall also enquire and satisfy himself as to the source, the quantity of supply, sufficiency of and the means of obtaining and transporting all plant, material, labour, fuel water, electricity and other matters or things required for on in connection with the Works.

In preparing the Bid, Bidders shall also consider his obligation to adequately store all materials and maintain existing facilities and all temporary Works during the period of their usage.

The Bidder must make local inquires as to the physical conditions prevailing at the site and obtain his own information on all matters and things that may in any way influence him in making a Bid and fixing the rates in the Bill of Quantities. He must also satisfy himself as to the risks, obligations and responsibilities to be undertaken in accordance the Contract to be entered into by him should his Bid be accepted.

The Bidders shall make his own investigations, enquiries and assessments, on all matters, of all conditions of existing constructions at the site and its vicinity, to his satisfaction before submitting his bid.

8.1 Clause IB 8 is deleted and replaced with following:

8.1 Any prospective bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer through Punjab e-Procurement System (e-P) https://ep.punjab.gov.pk. The Employer will respond to any request for clarification which he receives through Punjab e-Procurement System Seven (07) days prior to the deadline for submission of bids. Employer's response will be uploaded on Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk.

9.2 Sub-Clause IB 9.2 is deleted and replaced with following:

Any addendum thus issued shall be part of the Bidding Documents pursuant to IB 7.1 hereof and shall be uploaded on Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, at least five (05) days prior to the closing date of submission of the bid.

10.1 Bid language: English

11.1 Sub-Clause IB 11.1 is deleted and replaced with following:

The Bid shall comprise two proposals (Technical and Financial) submitted online simultaneously through Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, one called the Technical Bid and the other the Financial Bid, containing the documents listed in Bid data sheet under the heading of IB 11.1 A & B respectively. Each bidder shall furnish all the documents as specified in 11.1 A & B below.

11.1(A) The Bidder shall submit with its Technical Bid the following documents:

| | | |
|---|---|---|
| (a) | Letter of Technical Bid | |
| (b) | Bid Security | (IB.15) |
| (c) | Written confirmation authorizing the signatory of the Bid to commit the Bidder | (IB.18.5) |

| | | |
|---|---|---|
| (d) | PEC registration in relevant category as per requirements of Appendix-N | |
| (e) | Registration of Firm with SECP as per requirements of Appendix-N | |
| (f) | Registration with Tax Authorities as per requirements of Appendix-N | |
| (g) | Certificate that the bidder is not currently blacklisted by the Procuring Agency as per requirements of Appendix-N | |
| (h) | Pending Litigation Information as per requirements of Appendix-N | |
| (i) | No Conflict of Interest as per requirements of Appendix-N | |
| (j) | History of Non-performing Contracts as per requirements of Appendix-N | |
| (k) | Joint Venture Agreement, as applicable | |
| (l) | Special Stipulations (as filled by the Employer) | (Appendix-A) |
| (m) | Proposed Construction Schedule | (Appendix-E) |
| (n) | Method of Performing the Work | (Appendix-F) |
| (o) | List of Major/Key Equipment | (Appendix-G) |
| (p) | Construction Camp and Housing Facilities | (Appendix-H) |
| (q) | List of Sub-contractors | (Appendix-I) |
| (r) | Organization Chart for Supervisory Staff and Resume | (Appendix-K) |
| (s) | Integrity Pact | (Appendix-L) |
| (t) | Financial Competence and Access to financial Resources | (Appendix-M) |
| (u) | Past Performance, Current Commitment, Qualification & Experience and Manufacturer's Authorization Form | (Appendix-N) |
| (v) | Specifications - Technical & Special Provisions | Volume 3 |
| (w) | Bid Drawings | Volume 4 |

11.1(B) The Bidder shall submit with its Financial Bid the following documents:

| | | |
|---|---|---|
| (a) | Letter of Financial Bid | |
| (b) | Foreign Currency Requirements (If required and only in case of International Bidding) | (Appendix-B) |
| (c) | Price Adjustment under Clause 70 | (Appendix-C) |
| (d) | Bill of Quantities | (Appendix-D) |
| (e) | Estimated Progress Payments | (Appendix-J) |

11.2 Following sub-paragraph (f) is added:

Maximum number of joint venture partners shall be "three (03)". The Lead Partner (i.e., Partner-in-Charge) shall hold a valid PEC Constructor's License in the applicable category and shall have a minimum financial participation/share of forty percent (40%) in the Joint Venture under the JV Agreement. Each non-lead JV Partner shall have a minimum financial participation/share of twenty percent (25%) in the Joint Venture under the JV Agreement.

12.2 Add the following paragraph at the end of IB 12.2:

The bidder, by the act of submitting a bid, acknowledges that he has inspected the Site of Works and determined the general characteristics and conditions. The Employer will not assume any responsibility for information, interpretations and deductions the bidder may make from the information furnished by the Employer. No verbal agreement or conversation with any officer, employee or agent of the Employer either before, during or after the execution of the Contract, shall affect or modify any of the terms or obligations contained in the Contract.

12.3 Add the following paragraph at the end of IB 12.3:

The attention of the Bidder is drawn to the fact that local regulations require special formalities to be complied with in connection with the ordering, purchasing and importing of materials from outside Pakistan. Bidder will be deemed to have obtained full information about all such matters and to have allowed in his Bid for all delays, additional costs and financing charges that may arise directly or indirectly there from. Any neglect or failures on the part of the Bidder to obtain reliable information on the spot or elsewhere upon the foregoing or any other matters affecting the execution and completion of the Works, the rates, total amount and the Contract shall not relieve the Bidder whose Bid is accepted from any risks or liabilities or from the responsibility of completing and handing over the works.

The rates and prices set down by the Bidders against all the items in the Bill of Quantities are to be the full inclusive value of the finished work described thereunder and shall be deemed to include all costs of performing the Works including all taxes and duties, profits and costs of accepting the general risks, liabilities and obligations of every kind set forth or implied in the Contract.

13.1 Text under IB 13.1 is deleted in its entirety and replaced with the following:

The bid price shall be quoted by the bidder entirely in Pak rupees. All payments under the Contract shall be made in Pak rupees only.

14.1 Period of Bid Validity: 180 days from the Date of Technical Bid Opening

15.1 Amount of Bid Security: PKR 30 million paid online through 1Link / Online Bank Transfer as per the procedure prescribed by Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, through a Scheduled Bank of Pakistan in favour of the Employer.

17.1 A Pre-bid meeting shall be held at Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore, on 05 November 2026 at 11:30 a.m.

18.4 Sub-Clause IB 18.4 is deleted and replaced with the following:

The Bidder shall prepare the Technical Bid and the Financial Bid comprising the Bid as described in Bid data sheet against IB 11 and clearly mark it "TECHNICAL BID" and "FINANCIAL BID".

19 Clause IB 19 is deleted and replaced with the following:

19.1 Each bidder shall submit his bid by uploading PDF files on Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, and the bidders shall encrypt

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those entries electronically separately in the form of two encrypted packages, i.e., one Technical Bid and one Price Bid respectively. The contents of each package shall be limited to the documents prescribed in IB 11.1(A) and IB 11.1(B), respectively.

19.2 The technical bid should comprise of documents listed in IB11.1 (A) & the price bid should comprise of documents listed in IB 11.1 (B).

20.1 Sub-Clause IB 20.1 is deleted and replaced with the following:

Bids must be uploaded by the Bidders online through Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, no later than the deadline for submission of Bids as stated in the Invitation for e-Bids and Bid Data Sheet.

21 Clause IB 21 is deleted and replaced with the following:

21.1 A Bid cannot be uploaded or modified on Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, after the deadline for the submission of bids.

22.1 Sub-Clause IB 22.1 is deleted and replaced with the following:

The Bidder may modify or withdraw its electronically submitted bid through Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, before the deadline for submission of e-bids, in accordance with the system procedure.

22.2 Sub-Clause IB 22.2 is deleted

23.1 Venue, time, and date of Bid opening: As stated in the Invitation for e-Bids

23.2 Sub-Clause IB 23.2 is deleted

23.3 Sub-Clause IB 23.3 is deleted

23.4 Sub-Clause IB 23.4 is deleted

23.5 Sub-Clause 23.5 is deleted and replaced with following:

The Technical Bids shall be opened one at a time, and the following read out and recorded:

(a) the name of the Bidder;
(b) the presence of a Bid Security, if required; and
(c) Any other details as the Employer may consider appropriate.

Only Technical Bids read out and recorded at bid opening shall be considered for evaluation.

In case the e-Bid, including entries and records submitted on Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, is found corrupt, unreadable, or contains a virus, then such e-Bid shall be rejected pursuant to Regulation 8 (4) of Punjab Procurement Regulations 2024.

23.9 Sub-Clause 23.9 is deleted and replaced with the following:

The Employer shall upload the technical evaluation report at least five (05) days before the opening of Financial Bids on the Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, and the PPRA website. Financial Bids of the technically non-responsive bidders shall remain unopened in the Punjab e-Procurement System

as per rule 38(2)(a)(vii) of PPR-14.

23.11 Sub-Clause 23.11 is deleted and replaced with the following:

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

(a) The name of the Bidder;

(b) The Bid Prices, including any discounts; and

(c) Any other details as the Employer may consider appropriate.

Only Financial Bids and discounts, read out and recorded during the opening of Financial Bids shall be considered for evaluation.

In case the e-Bid, including entries and records submitted on Punjab e-Procurement System found corrupt, unreadable, or contains a virus, then such e-Bid shall be rejected pursuant to Regulation 8 (4) of Punjab Procurement Regulations 2024.

32.1 Text "28 days" stated in the first paragraph of IB 32.1 is deleted and replaced with "14 days"

32.1 Standard form and amount of Performance Security:

The Performance Security shall be equal to an amount of 05 % of the Contract Price stated in the Letter of Acceptance in the favor of the Employer. Such Security shall be in the form acceptable to the Employer of either (a) unconditional, irrevocable Bank Guarantee from any Scheduled Bank of Pakistan acceptable to the Employer or (b) unconditional, irrevocable Bank Guarantee from a bank located outside Pakistan duly counter, guaranteed by a Scheduled Bank of Pakistan, paid online through 1Link / Online Bank Transfer as per the procedure prescribed by Punjab e-Procurement System (e-P) website, i.e., https://ep.punjab.gov.pk, in favour of the Employer valid for a period till 28 days after the date of issue of Defect Liability Certificate.



# LETTERS OF TECHNICAL BID / FINANCIAL BID, AND APPENDICES TO BID



LTB-1

## Letter of Technical Bid

Date: .....

Bid Reference No: .....
(Name of Contract/Works)

To:.....

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB). The Complete Bidding Documents are binding upon us and we fully understand that the PPRA Act, 2009 and the PPR-14 and Punjab Procurement Rules and Regulations 2024 as amended upto date supersedes this bidding document, in case of any contradiction, and the same are also binding upon us;

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

(c) Our Bid consisting of the Technical Bid and the Financial Bid shall be valid for a period of _____days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) As security for due performance of the under takings and obligations of our bid, we submit here with a Bid security, in the amount specified in Bid data sheet, which is valid (at least) 30 days beyond validity of Bid itself.

(e) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process.

(f) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bid data sheet.

Name .....

In the capacity of .....

Signed .....

.....

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

Date .....

Address.....

## Letter of Financial Bid

Date: .....

Bid Reference No: .....DC-07.....
(Name of Contract/Works)

To:.....

We, the undersigned, declare that:

i. We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB)9;

ii. The total price of our Bid, excluding any discounts offered in item (iii) below is:_____

iii. The discounts offered and the methodology for their application are:_____

iv. Our Bid shall be valid for a period of ***180 days*** from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

v. If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;

vi. We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed and we do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.

vii. We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

viii. We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bid data sheet.

ix. If awarded the contract, the person named below shall act as Contractor's Representative.

Name .....

In the capacity of .....

Signed .....

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

Date .....

Address.....



**BA-1**

## Appendix-A to Bid

## Special Stipulations

## Clause

## Conditions of Contract

| | | | |
|---|---|---|---|
| 1. | Engineer's Authority to issue Variation in emergency | 2.1(b) (viii)(a) | 2% of the Total Accepted Contract Price stated in the Letter of Acceptance. |
| 2. | Law applicable | 5.1(b) | The relevant laws applied in the Province of the Punjab, Pakistan |
| 3. | Amount of Performance Security/Guarantee | 10.1 | 05 % of Total Accepted Contract Price stated in the Letter of Acceptance, including mandatory One-Year O&M/SLA Services. |
| 4. | Time for Furnishing Programme | 14.1 | Within 14 days from the date of receipt of Letter of Acceptance. |
| 5. | Minimum amount of Insurances | 23.2 | The minimum insurance amounts and deductibles shall be:<br>(a) for loss or damage to the Works, Plant and Materials: 110% of the Total Contract Price stated in the Letter of Acceptance, such sum to include an allowance for the cost of demolition and removal of debris and for professional fees.<br><br>(b) for loss or damage to Contractor's Equipment: Full replacement value.<br><br>(c) Full Replacement Value for loss of or damage to any property (other than the Works, Plant, Materials, and Contractor's Equipment) in connection with Contract: 100% of the loss occurred.<br><br>(d) for personal injury or death:<br>(i) of the Contractor's employees: PKR 500,000/- in case of the injury for each occurrence and PKR 1,500,000/- in case of loss of limb, permanent deafness, sight and disability and PKR 5,000,000/- in case of death for each occurrence. (Occurrences unlimited)<br>(ii) of other people: same as above<br>(iii)The maximum deductible amount shall be "PKR Five (5) Million" against event under Para (a) herein above whereas "Nil" against events under Para (b), (c) and (d).<br>All insurances relating to the Contract shall be placed with the National Insurance Company of Pakistan or with any other insurance company operating in Pakistan holding a minimum insurer financial strength |

| | | | |
|---|---|---|---|
| | | | rating of AA from the Pakistan Credit Rating Agency Limited (PACRA) or from VIS Credit Rating Company Limited, and acceptable to the Employer.<br>Evidence of insurance: the Contractor shall provide the Employer with evidence that the insurances required by Clauses 21, 23 and 24 have been effected before the Commencement of the Works, and shall provide the policies and the receipts for payment of the current premiums within 28 days of the date of the Engineer's Notice to Commence. |
| 6. | Time for Commencement | 41.1 | Within seven days from the date of receipt of Engineer's Notice to Commence which shall be issued within fourteen (14) days after signing of Contract Agreement.<br><br>The O&M/SLA Services shall commence from the date of the Taking-Over Certificate issued under Sub-Clause 48.1 for the Whole of the Works and shall continue for 365 calendar days. |
| 7. | Time for Possession of Site | 42.1 | The whole of the Site shall be handed over to the Contractor within fourteen (14) days of the Engineer's Notice to Commence. |
| 8. | Time for Completion | 43.1 | Twelve (12) months / 365 calendar days from the date specified in the Engineer's Notice to Commence. |
| 9. | a) Amount of Liquidated Damages | 47.1 | 0.1 % of the Contract Price stated in the Letter of Acceptance for each day of delay in completion of the Works subject to a maximum of 10% of Contract Price stated in the Letter of Acceptance.<br>Upon attainment of the maximum Liquidated Damages of 10%, the Employer shall, at its discretion, be entitled to terminate the Contract in accordance with Sub-Clause 63.1(f) of the Particular Conditions of Contract. |
| 10. | b) Amount of Bonus | 47.3 | Not Applicable |
| 11. | Taking Over of Sections or Parks | 48.2 | Not Applicable |
| 12.(a) | Defects Liability Period | 49.1 | 365 Days from the effective date of Taking Over Certificate. |
| (b) | Mandatory O&M/SLA Service Period | | 365 Days commencing on the date of Taking Over. |
| 13. | Percentage of Retention Money | 60.2 | Deduction of 05% of the amount from each Interim Payment Certificate. |

| | | | |
|---|---|---|---|
| 14. | Limit of Retention Money | 60.2 | 05 % of Contract Price stated in the Letter of Acceptance. |
| 15. | Minimum amount of Interim Payment Certificates (Running Bills) | 60.2 | PKR 50,000,000/-<br><br>The above minimum limit shall not apply to quarterly O&M/SLA service payments. |
| 16. | Time of Payment from delivery of Engineer's Interim Payment Certificate to the Employer. | 60.10 | 30 days |
| 17. | Mobilization Advance (Interest Free) | 60.12 | Interest free Mobilization advance equivalent to Ten (10) % of the Contract Price stated in the Letter of Acceptance in single installment against bank guarantee from a scheduled bank in Pakistan or from a bank located outside Pakistan duly counter-guaranteed by a scheduled bank in Pakistan within 14 days after signing of the Contract Agreement.<br>Deduction shall be made at the Amortization rate of 20% of the value of the works executed from each IPC starting from the 2nd IPC provided that Advance Payment shall be completely repaid prior to the time when 90% of the Accepted Contract Amount has been certified for payment. |

**BB-1**

## Appendix-B to Bid
## Foreign Currency Requirements

Not Applicable

## Appendix-C to Bid

## Price Adjustment Under Clause 70 of Conditions of Contract

**Applicable for Building Works Cost Only (Not Applicable to Electrical, HVAC, IT Equipment Cost):**

The source of indices and the weightages or coefficients for use in the adjustment formula under Clause 70 shall be as follows:

| Cost Element | Description | Weightages | Applicable index |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| (i) | Fixed Portion | 0.25 | |
| (ii) | Local Labour (Skilled & Unskilled) (with unskilled as representative items.) | 0.15 | Rates issued by Finance Department, Government of Punjab or other source expressly approved in the Contract by the Employer/Engineer |
| (iii) | Cement – in bags. (Portland cement shall be considered representative items for all types of cement.) | 0.09 | Rates/reference prices issued by Finance Department, Government of Punjab |
| (iv) | Reinforcing Steel. (½ "diameter round bar is the representative item for all types of steel to be used in this project.) | 0.21 | Rates/reference prices issued by Finance Department, Government of Punjab |
| (v) | High Speed Diesel (HSD) | 0.17 | Rates/reference prices issued by Finance Department, Government of Punjab |
| (vi) | Crush + Harrow Sand (Base Material) | 0.10 | Rates/reference prices issued by Finance Department, Government of Punjab |
| (vii) | Bricks | 0.03 | Rates/reference prices issued by Finance Department, Government of Punjab |
| | **Total** | **1.000** | |

**Notes:**

1) Indices for "(ii)" to "(vii)" are taken from Rates issued by Finance Department, Government of Punjab. The base cost indices or prices shall be those applying on the day 28 days prior to the latest date for submission of bids. Current indices or prices shall be those applying 30 days prior to the submission of IPC date.

2) Any fluctuation in the indices or prices of materials other than those given above shall not be subject to adjustment of the Contract Price.

3) Price adjustment under Clause 70 shall apply only to those portions of the Works expressly identified in this Appendix-C as being subject to price adjustment.

4) The following items shall be treated as **Non-Adjustable Items** and shall **not be subject to any price adjustment under Clause 70**, irrespective of any increase or decrease in their purchase price, exchange rate, freight, customs duty, import charges or other associated costs:

a. imported equipment, imported machinery and imported components;
b. foreign currency-denominated equipment and components procured from outside Pakistan;
c. generators and associated generating equipment;
d. UPS systems, batteries and associated power-conditioning equipment;
e. transformers, switchgear, protection equipment and other major electrical equipment;
f. servers, storage systems and other IT equipment;
g. active and passive ICT/networking equipment, including network switches, routers, firewalls and related equipment;
h. precision cooling equipment and other specialized data-centre cooling equipment;
i. any other equipment or component expressly identified in the BOQ, Technical Specifications or Contract as "Non-Adjustable"; and
j. any imported or foreign-origin component forming an integral part of the above equipment.

For the avoidance of doubt, no price adjustment shall be admissible in respect of foreign exchange fluctuations, changes in international prices, freight, insurance, customs duties, taxes, import charges or any other increase in the landed or delivered cost of the Non-Adjustable Items.

The Bidder shall be deemed to have fully considered all risks associated with procurement, importation, exchange-rate fluctuations, international price movements and delivery of Non-Adjustable Items in its Bid Price

5) No price adjustment shall be payable in respect of Provisional Sums, Prime Cost Sums, contingencies, advance payments, retention money or any other amount expressly excluded under the Conditions of Contract.

6) No adjustment shall be made for any cost element for which a specific index or reference price has not been identified in this Appendix-C.

7) The weightages and sources of indices stated in Appendix-C to Bid shall constitute the sole basis for price adjustment under the Contract. The Bidder shall not propose alternative weightages or sources of indices unless specifically requested by the Employer through an Addendum. No alternative weightage or source submitted by a Bidder with its Bid shall be considered or incorporated into the Contract unless expressly accepted by the Employer before award.

8) The Bidder shall not be entitled to introduce, after Bid submission, any new cost element, index, coefficient or reference price that is not expressly provided in this Appendix-C.

## Appendix-D to Bid

## Bill of Quantities

Refer to Volume 2 (Bill of Quantities)

## Appendix-E to Bid

## Proposed Construction Schedule

Pursuant to Sub-Clause 43.1 of the General Conditions of Contract, the Works shall be completed on or before the date stated in Appendix-A to Bid. The Bidder shall provide as Appendix-E to Bid, the Construction Schedule in the bar chart (CPM, PERT or any other to be specified herein) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and parts of the Works may meet Employer's completion targets in days noted below and counted from the date of receipt of Engineer's Notice to Commence (Attach sheets as required for the specified form of Construction Schedule):

| Description | Time for Completion |
|---|---|
| Building and allied Infrastructure Works complete in all respect. | 365 calendar days |
| Mandatory O&M/SLA Service Period | 365 Days commencing on the date of Taking Over |
| Section Completion | Not Applicable |

**BF-1**

## Appendix-F to Bid

## Method of Performing the Work

The Bidder is required to submit a narrative outlining the method of performing the Work. The narrative should indicate in detail and include but not be limited to:

1. Organization Chart indicating head office and field office personnel involved in procurement, management, supervision, engineering, equipment maintenance, safety and purchasing.

2. Mobilization at the Site, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.

3. The method of executing the Works, the procedures for installation of equipment and machinery and transportation of equipment and materials to the site.

4. Mobilization, deployment and establishment of O&M services, including O&M management system, records, tools and initial arrangements.

5. Quality control / Quality assurance measures to be adopted including procedures to be followed for carrying out all tests required under specifications.

**BG-1**

## Appendix-G to Bid

## List of Major Equipment – Related Items

The Bidder will provide a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment which shall be in sufficient detail to demonstrate fully that the equipment will meet all requirements of the Specifications.

### LIST OF MAJOR EQUIPMENT

| Owned Purchased or Leased | Description of Unit (Make, Model, Year) | Capacity HP Rating | Condition | Present Location or Source | Date of Delivery at Site | Period of Work on Project |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| a. Owned | | | | | | |
| b. To be Purchased | | | | | | |
| c. To be arranged on Lease | | | | | | |

**BG-2**

## Appendix-G to Bid

**Equipment:**

The Bidder must demonstrate that it has the key equipment listed hereafter:

| No. | PLANT/EQUIPMENT | | | | |
|---|---|---|---|---|---|
| | Equipment Type and Characteristics | Total Nos. available | Under Utilization on other projects, if applicable | Nos. waiting to be shifted to new project(s) | Min. Number Required for this Project |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| | | | | | |

**BH-1**

## Appendix-H to Bid

## Construction Camp and Housing Facilities

The Contractor in accordance with Clause 34 of the Conditions of Contract shall provide description of his construction camp's facilities and staff housing requirements.

The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor's construction camp.

The Bidder shall list or explain his plans for providing these facilities for the service of the Contract as follows:

1. Site Preparation (clearing, land preparation, etc.).
2. Provision of Services.
   a) Power (expected power load, etc.).
   b) Water (required amount and system proposed).
   c) Sanitation (sewage disposal system, etc.).
3. Construction of Facilities
   a) Contractor's Office. Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).
   b) Warehouses and Storage Areas (area required, type of construction and layout).
   c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.).
4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).
5. Other Items Proposed (Security services, etc.). The Contractor should mention here what are his proposed environmental measures for the project as per EPA rules like treatment of wastewater and water quality etc. The Contractor shall submit a detailed EMP (Environmental Management Plan) to describe how materials are removed from site and disposed off at a safe location, prevention for the contamination of ground and surface water in neighboring areas etc. including remedial measures for adoption.
6. Detail of testing Lab with testing equipment etc.

BI-1

## Appendix-I to Bid

## List of Subcontractors

I/We intend to subcontract the following parts of the Work to subcontractors. In my/our opinion, the subcontractors named hereunder are reliable and competent to perform that part of the work for which each is listed.

Enclosed are documentation outlining experience of subcontractors, the curriculum vitae and experience of their key personnel who will be assigned to the Contract, equipment to be supplied by them, size, location and type of contracts carried out in the past.

The Bidder may engage OEMs, their authorized service providers, and other suitably qualified specialist subcontractors for specialized works and services forming part of the Contract. Details and credentials of the proposed subcontractors, including their technical and professional capabilities and relevant experience, shall be submitted with the Bid for evaluation and approval by the Employer. Such approval shall not relieve the Contractor of its obligations and responsibilities under the Contract.

Where the Bidder proposes to subcontract any specialized portion of the Works or the mandatory Year-1 O&M/SLA Services to an OEM, authorised service provider or specialist subcontractor, the proposed entity shall demonstrate adequate technical capability, relevant experience, qualified personnel and resources to perform the specific portion of the Works/Services for which it is proposed.

The requirement shall apply, in particular, to specialist packages involving UPS and associated battery systems, diesel generating sets and ATS, precision cooling systems, fire detection and clean-agent gas suppression systems, DCIM, and other mission-critical systems where specialist/OEM expertise is required.

The specialist subcontractor's qualification shall be assessed independently of the qualifications of the Bidder/JV members. Failure of a proposed specialist subcontractor to meet the applicable mandatory requirements for its assigned critical package shall render the Bid non-responsive.

| **Part of Works (Give Details)** | **Subcontractor (With Complete Address)** |
|---|---|
| 1 | 2 |
| | |
| | |

**BJ-1**

## Appendix-J to Bid

## Estimated Progress Payments

Bidder's estimate of the value of work which would be executed by him during each of the periods stated below, based on his Programme of the Works and the Rates in the Bill of Quantities, expressed in Pakistani Rupees:

| Period | Amounts (Million PKR.) |
|---|---|
| 1 | 2 |
| 1st Month | |
| 2nd Month | |
| 3rd Month | |
| 4th Month | |
| 5th Month | |
| 6th Month | |
| 7th Month | |
| 8th Month | |
| 9th Month | |
| 10th Month | |
| 11th Month | |
| 12th Month | |
| Mandatory O&M/SLA Service Period, 1st Quarter | |
| Mandatory O&M/SLA Service Period, 2nd Quarter | |
| Mandatory O&M/SLA Service Period, 3rd Quarter | |
| Mandatory O&M/SLA Service Period, 4th Quarter | |
| **Bid Price** | |

**BK-1**

## Appendix-K to Bid

## Organization Chart for The Supervisory Staff and Labour

The Bidder to provide details of the required key personnel specified in Appendix-N using the following forms:

**Form PER – 1: Proposed Personnel**

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

| | |
|---|---|
| 1. | **Project Manager / Contractor's Representative** |
| | Name |
| 2. | **Site Engineer(s) (Civil)** |
| | Name |
| 3. | **Site Engineer(s) (Electrical)** |
| | Name |
| 4. | **Material Engineer(s)** |
| | Name |
| 5. | **Supervisor(s) (Civil) (2 Nos.)** |
| | Name |
| 6. | **IT (ICT/NETWORK) Engineer** |
| | Name |
| 7. | **HVAC/Precision Cooling Engineer** |
| | Name |
| 8. | **HSE Officer** |
| | Name |
| 9. | **Commissioning Engineer** |
| | Name |
| 10. | **Certified Data Center Professional** |
| | Name |
| 11. | **Supervisor(s) (E&M)** |
| | Name |

| | |
|---|---|
| **12.** | **Quantity Surveyor** |
| | Name |
| **13.** | **Surveyor** |
| | Name |
| **14.** | **O&M Supervisor** |
| | Name |

## Form PER – 2: Resume of Proposed Personnel

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

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

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

| From | To | Company/Project/Position/Relevant Technical and Management Experience |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

**BL-1**

## Appendix-L to Bid

## Integrity Pact

### DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS WORTH RS. 10.00 MILLION OR MORE

Contract No._____Dated _____
Contract Value: _____
Contract Title: _____

… ..... [Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of the Punjab (GoPb) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoPb through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoPb, except that which has been expressly declared pursuant hereto.

[Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoPb and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoPb under any law, contract or other instrument, be voidable at the option of GoPb.

Notwithstanding any rights and remedies exercised by GoPb in this regard, [name of Supplier] agrees to indemnify GoPb for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoPb in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoPb.

Name of Employer: ……

Signature: ……

[Seal]

Name of Contractor: ……

Signature: ……

[Seal]

**BM-1**

## Appendix-M to Bid

## Financial Competence and Access to Financial Resources

### Pass/fail Financial Criteria (Mandatory Qualification Requirements)

The financial position of the bidder shall be checked as per following details:

**1. SOUNDNESS AND ACCESS TO FINANCIAL RESOURCES:**

"The Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, fresh lines of credits, and other financial means, other than any contractual advance payments, sufficient to meet the financial requirements of the contract in the amount of his bid, that it has sufficient capacity to undertake the subject Works. As a minimum, the Bidder must show that his resources, in terms of at least his latest year working capital and line of credits, will be adequate to cover an amount equivalent to estimated Price of the works and current work commitments i.e.,

[5 x working capital + confirmed and currently available lines of credit– 40% of current contract commitments] ≥ Estimated Price of the Works

**Working capital** is the difference between current assets and current liabilities and measures the firm's ability to generate cash in the short term." Bidder shall upload on Punjab e-Procurement System last three years Audited financial statement (audited by independent Chartered Accountant firm).

**OR**

The bidder shall demonstrate access to liquid assets, readily realizable financial assets, cash and cash equivalents, unencumbered assets that can reasonably be converted into funds for execution of the Works, confirmed and currently available lines of credit from scheduled banks or other demonstrable financial resources acceptable to the Employer, net of other current contractual commitments, of not less than minimum available financial resources of **PKR 500 million** for execution of the subject Works.

For the purpose of this criterion:

Available Financial Resources = Eligible Liquid Financial Resources + Confirmed Available Credit Facilities – Current Contractual Commitments ≥ PKR 500 million

**Any line of credit indicated for this (tendered) project needs to have been certified by the Bank and the said certificate indicating confirmed available credit facilities, the amount currently utilized, the amount presently available and that the facility is available to the Bidder for financing its construction operations, is enclosed with this Appendix and uploaded on* Punjab e-Procurement System.

**2. AVERAGE ANNUAL TURNOVER**

| | |
|---|---|
| **Criteria** | **Bidders' to list their certified yearly turnover for last three years** Audited financial statements (audited by independent Chartered Accountant firm) and Income Tax Returns for last three years to be uploaded on Punjab e-Procurement System |

| | |
|---|---|
| **Minimum average annual turnover** | Pak Rupees 3,000 million, calculated as the average of the bidder's total certified payments received for contracts in progress or completed, within the last three completed financial years. |

**Notes:- In case of JV, all Partners combined shall be evaluated against the criteria requirement of SOUNDNESS AND ACCESS TO FINANCIAL RESOURCES and AVERAGE ANNUAL TURNOVER.**

**Any Bidder failing to satisfy the Pass/Fail Financial Competence and Access to Financial Resources criteria, which constitute Mandatory Qualification Requirements, shall be declared non-qualified and shall not proceed to evaluation under the Detailed Qualification Criteria and Requirements.**



## Appendix-N to Bid

## Past Performance, Current Commitment, Qualification and Experience

### 1 Eligibility & Qualification Criteria:

| No. | Criteria | Requirement | Single Entity | Mandatory Requirement | | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|---|
| | | | | Joint Venture Requirements | | |
| | | | | Each Member | Lead Member | |
| **Eligibility Criteria & Requirements** | | | | | | |
| 1.1 | PEC Registration | Valid Registration with Pakistan Engineering Council in the applicable category with specialized Codes CE-01, CE-09, CE-10, ME-01, ME- 02, EE-02, EE-04, *EE-11<br><br>(JV share of the members shall be in accordance with PEC Bye Laws).<br><br>* EE-11 General Electrical Works only | Must have valid registration with PEC in Category CB or higher with specialized codes in CE-01, CE-09, CE-10, *EE-11, ME- 01, ME-02, EE-02, EE-04 | Each of JV members participating for construction of engineering work must have valid registration with PEC. At least one (01) member of the Joint Venture shall hold valid PEC registration in Category C-1 or higher.<br>The JV members collectively shall possess the following specialized PEC Codes:<br>CE-01, CE-09, CE-10<br>ME-01, ME-02,<br>EE-02, EE-04, *EE-11<br><br>The Lead Partner and all other JV Partners shall maintain valid PEC Licenses, as applicable to their respective participation and scope of works.<br><br>In case of JV with foreign firm, | The Lead Partner (i.e., Partner-in-Charge) shall hold a valid PEC Constructor's License and shall have a minimum financial participation/share of forty percent (40%) in the Joint Venture under the JV Agreement. | In case of JV, the Bidder shall submit PEC Valid Registration License/Certificate of all JV members clearly indicating the relevant category and specialized codes, along with the JV Agreement identifying the participation and scope/responsibility of each member.<br><br>The JV Agreement shall clearly identify the Lead Partner, financial participation / share of each member, respective responsibilities and scope of work, and shall establish the joint and several liability of all JV members for due performance of the Contract.<br><br>In case of any of foreign firm, as member, if foreign firm is not registered with PEC, upload similar certificate of registration from the respective registration body of their home country, if applicable.<br>In case of JV, the Lead Partner must |

Engineering Consultancy Services Punjab (Pvt) Ltd. ESSP

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | if foreign firm is not registered with PEC, similar certificate of registration from the respective registration body of their home country is mandatory. | | hold a minimum financial participation/share of 40% in the Joint Venture under the JV Agreement, and each non-lead JV Partner shall have a minimum financial participation / share of 25% in the Joint Venture under the JV Agreement.<br>Compliance with the above PEC registration requirements shall be mandatory and shall be evaluated on a Pass/Fail basis. Failure to meet any of the mandatory requirements shall render the Bid non-responsive. |

| No. | Criteria | Requirement | Single Entity | Mandatory Requirement | | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|---|
| | | | | Joint Venture Requirements | | |
| | | | | Each Member | Lead Member | |
| **Eligibility Criteria & Requirements** | | | | | | |
| **1.2** | Non-Blacklisting / debarment | The Bidder must not be blacklisted/ debarred by the procuring agency. Individual partners / directors / owners must submit non-black listing / debarment certificates. | Must meet requirement | Must meet requirement | Must meet requirement | Affidavit on non-Judicial Stamp Paper for non-blacklisting / debarment. |
| **1.3** | Company/ Firm Registration | Incorporation with Security and Exchange Commission of Pakistan (SECP) or Registrar of Firms as the case may be [NTN Verification along with requisite Affidavit of sole-proprietorship in case of Sole-Proprietor.] | Must meet requirement | Must meet requirement.<br>In case of any of foreign firm, as member, if foreign firm is not registered with SECP or Registrar of Firms, it must have similar certificate of registration from the respective registration body of their home country. | Must meet requirement. | Certificate from SECP/ Registrar of Firms/ NTN Verification along with requisite affidavit.<br>In case of any of foreign firm, as member, if foreign firm is not registered with SECP or Registrar of Firms, upload similar certificate of registration from the respective registration body of their home country. |

| No. | Criteria | Requirement | Single Entity | Mandatory Requirement | | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|---|
| | | | | Joint Venture Requirements | | |
| | | | | Each Member | Lead Member | |
| **Eligibility Criteria & Requirements** | | | | | | |
| **1.4** | Registration with Tax Authorities | Registration and active status with Tax Authorities in Pakistan | Must meet requirement | Must meet requirement.<br>In case of any of foreign firm, as member, if foreign firm does not have certificate of registration with Income Tax and Sales Tax under relevant authority, it must have similar certificate of registration from the respective Tax Authority of their home country, if applicable. | Must meet requirement | Certificate and current status from Tax Authorities (Must be in Active Tax payer list)<br>In case of any of foreign firm, as member, if foreign firm does not have certificate of registration with Income Tax and Sales Tax under relevant authority, upload similar certificate of registration from the respective Tax Authority of their home country, if applicable. |
| **1.5** | Eligible Country | Foreign firm participating in the JV shall have the nationality of an eligible country | N/A | N/A | Foreign firm participating in the JV must meet requirement | Certificate of Incorporation<br>Note: countries with whom Government of Pakistan impose any such restrictions. Information regarding such restrictions is available at Ministry of Commerce website: https://www.commerce.gov.pk/ |

| No. | Criteria | Requirement | Single Entity | Mandatory Requirement | | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|---|
| | | | | Joint Venture Requirements | | |
| | | | | Each Member | Lead Member | |
| Eligibility Criteria & Requirements | | | | | | |
| 1.6 | Pending Litigation | No pending Litigation against the bidder. | Must meet requirement | Must meet requirement | Must meet requirement | Completed certificate of compliance & Affidavit on Stamp Paper against no pending litigation |
| 1.7 | Conflict of Interest | No conflict of Interest | Must meet requirement | Must meet requirement | Must meet requirement | Affidavit on non-Judicial Stamp Paper for no conflict of interest |
| 1.8 | One Bid per bidder | Each Bidder shall submit only one Application either by himself, or as a partner in a joint venture. | Must meet requirement | Must meet requirement | Must meet requirement | - |
| 1.9 | History of Non-Performing Contracts | Non-performance of a contract did not occur as a result of contractor's default since 1st January 2020. | Must meet requirement | Must meet requirement | Must meet requirement | Affidavit on non-Judicial Stamp paper for no History of Non-Performing Contracts. |

| | | | | | |
|---|---|---|---|---|---|
| **1.10** | Financial Capabilities<br><br>(**Mandatory Qualification Requirements**) | i. The Applicant shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, confirmed fresh lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as **Pak Rs. 500 million** (Five Hundred million) for the subject contract net of the Applicants other commitments.<br><br>ii. The bidder should have minimum average annual turnover of Pak Rs.3,000 million (Three Thousand million) during the last three completed financial years.<br><br>The audited balance sheets, for the last three (03) years shall be submitted to demonstrate the current soundness of the | Must meet requirement | Must meet requirement<br><br>(All Members Combined) | Shall be provided by the bidder on Form FIN – 3.1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Applicant's financial position and indicate its prospective long-term profitability. | | | | |
| 1.11 | Manufacturer's Authorization | i. The Bidder shall submit, as part of its Bid, a Manufacturer's Authorization Letter specifically issued for this Tender, in the name of the Bidder or, in the case of a Joint Venture, in the name of the Joint Venture or of the JV partner specifically responsible for the relevant package under the JV arrangement. The Authorization Letter shall be issued by the manufacturer or by an authorized regional/country office of the manufacturer having authority to issue such authorization, for the equipment comprising each of the following critical packages, as | **Must meet requirement** | **The Member responsible for the relevant equipment package must meet requirement.** | **Must meet requirement for all JV Members combined.** | Duly completed and signed Manufacturer's Authorization Letter on the manufacturer's or its duly authorized regional/country office's official letterhead, shall be uploaded on the Punjab e-Procurement System (e-P) for each of the following four mandatory packages:<br>(a) UPS Systems and Associated Battery Systems;<br>(b) Diesel Generating Sets and Automatic Transfer Switchgear (ATS);<br>(c) Precision Cooling Systems and Associated Condensing Units; and<br>(d) Fire Detection and Clean-Agent Gas Suppression Systems<br>In the case of a Joint Venture, the Authorization shall be submitted in the name of the Joint Venture or the JV partner specifically responsible for the relevant package under the Joint Venture Agreement. Where the Authorization is issued in the name of a JV partner other than the Lead Partner, the Bid shall clearly identify such partner's responsibility for the relevant package.<br>The Manufacturer's Authorization shall be evaluated on a Pass/Fail basis. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | applicable to the proposed equipment: (a) Uninterruptible Power Supply (UPS) systems and associated battery systems;<br>(b) Diesel Generating Sets and Automatic Transfer Switchgear (ATS);<br>(c) Precision Cooling equipment/systems, including in-row, in-rack and floor-mounted units and the associated condensing units; and<br>(d) Fire Detection and Clean-Agent Gas Suppression system.<br>ii. Each Manufacturer's Authorization Letter shall specifically identify the Tender and confirm that:<br>(a) the manufacturer authorizes the Bidder/JV partner to offer and supply the proposed equipment for this Contract;<br>(b) the manufacturer's | | | | Failure to upload a duly completed and compliant Manufacturer's Authorization for any one of the four mandatory packages shall render the Bid non-responsive.<br>The Manufacturer's Authorization shall be substantially in the prescribed form included in Appendix-N to Bid and shall contain all information and confirmations specified therein. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | standard warranty for the offered equipment shall be issued in the name of PITB as the Employer, end customer/end user and warranty beneficiary, and shall commence from the date stated in the Taking-Over Certificate issued under Sub-Clause 48.1; and<br><br>(c) authorized after-sales technical support service and spare-parts support for the offered/proposed equipment shall be available in Pakistan throughout the applicable warranty period.<br><br>ii. The Manufacturer's Authorization Letter shall be a **mandatory eligibility/qualification requirement**. Failure to submit a compliant Manufacturer's Authorization Letter for any of the four specified critical | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | packages shall render the Bid **non-responsive**. | | | | |
| **1.12** | Data Centre and Mission-Critical Facility Delivery Experience | The Bidder shall have completed, commissioned, and handed over during the ten (10) years at least three (03) distinct integrated Data Centre facilities comprising:<br>(a) at least one (01) facility with not fewer than forty (40) IT racks; and<br>(b) at least two (02) facilities, each with not fewer than twenty (20) IT racks;' with an aggregate contract value of not less than PKR 3,000 million.<br>The Contract for Qualifying Facility shall include the installation, testing and commissioning of<br>(i) Uninterruptible Power Supply (UPS) with associated battery system;<br>(ii) standby diesel generation with automatic transfer;<br>(iii) precision cooling | **Must meet requirement** | **Not applicable to each member individually.**<br>**The Qualifying Facilities experience of all JV members shall be evaluated in aggregate.** | **The Qualifying Facilities experience of all JV members shall be evaluated in aggregate.** | For each Qualifying Facility, the Bidder shall submit the Contract Agreement or Work Order, Taking-Over/Completion Certificate, BoQs, and Employer's or supervising Consultant's certification confirming completion, commissioning and handover of the facility and identifying operational rack quantity,<br>the UPS with associated battery system, standby diesel generation with automatic transfer, and precision/close-control cooling installed and commissioned under the contract.<br>In case of a Joint Venture, the Qualifying Facilities experience of all members combined shall be evaluated.<br>Commissioning or Integrated systems test report or certificate, or equivalent record, countersigned by the Employer or the supervising Consultant of that facility. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | serving the technical/data center environment;<br>(iv) Fire suppression system; and<br>(v) Integrated DCIM | | | | |

**Note:**
Definition of a **Qualifying Facility**: For the purposes of this criterion, a comparable Qualifying Facility means a Data Centre, Disaster Recovery Data Center (a facility requiring continuous availability and incorporating critical power, standby generation and precision cooling infrastructure), in which the Bidder or in the case of a Joint Venture the relevant JV member, under a single contract, was responsible for the installation, integration, testing and commissioning of all of the following components:
(a) an Uninterruptible Power Supply (UPS) system with battery autonomy;
(b) Power, standby diesel generation with automatic transfer to the standby supply;
(c) precision cooling serving the technical space;
(d) Fire suppression system; and
(e) Integrated DCIM.
A facility in which the Bidder's scope was limited to civil or building works, or to the supply of equipment without its installation and commissioning, is not a qualifying facility.

In case the bidder is a Joint Venture, the qualifying experience of the all JV members shall be aggregated and evaluated for this criterion. However, that each claimed project was executed by the relevant JV member under a single contract and is supported by the required documentary evidence. The responsibility of the relevant JV member for the claimed experience shall be identified in the Bid/JV documentation.

In case of contracts executed by the bidder in form of a JV or subcontractor, the role of the bidder based on scope, role and financial participation/share shall be considered to evaluate the criteria requirement. Experience of subsidiaries, parent companies, affiliates or unrelated subcontractors shall not be used to satisfy the bidder's core qualification unless expressly permitted by these Bidding Documents.

## FORM OF MANUFACTURER'S AUTHORISATION

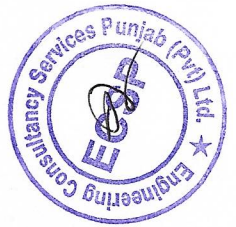
*[To be submitted on the Manufacturer's / Authorized Regional or Country Office's official letterhead]*

**Tender No.:** ___DC-07_____

**Tender Title:** _____

**Package:**

- □ (a) Uninterruptible Power Supply (UPS) Systems and Associated Battery Systems
- □ (b) Diesel Generating Sets and Automatic Transfer Switchgear (ATS)
- □ (c) Precision Cooling Systems and Associated Condensing Units



☐ (d) Fire Detection and Clean-Agent Gas Suppression Systems

**Date:** _____

**TO:**

Punjab Information Technology Board (PITB)
Government of the Punjab
Lahore, Pakistan

## MANUFACTURER'S AUTHORISATION

We, [Name of Manufacturer], a duly established manufacturer of [description of equipment/system], having our principal place of business at [full address], hereby confirm that:

**1. Authorization of Bidder**

We hereby authorize [Name and full address of Bidder] to submit a Bid for the above-mentioned Tender for the supply, installation, testing, commissioning and associated services of the following equipment manufactured/supplied by us:

**Manufacturer:** _____
**Brand:** _____
**Model(s)/Series:** _____
**Country of Manufacture:** _____
**Description:** _____

**2. Tender-Specific Authorization**

This Authorization is issued specifically for Tender No. _____ and is valid solely for the above-mentioned procurement by Punjab Information Technology Board (PITB).

**3. Joint Venture – Where Applicable**

Where the Bidder is a Joint Venture, this Authorization is issued in favour of:

Joint Venture Name: _____

or, where applicable, the JV partner specifically responsible for this package:

JV Partner: _____

**4. Supply of Offered Equipment**

We confirm that the equipment identified above is offered for this Contract and that, subject to the terms of the Contract, we shall supply/support the offered equipment through the authorized Bidder.

**5. Manufacturer's Warranty**

We confirm that the manufacturer's standard warranty applicable to the offered equipment shall be issued/registered in the name of Punjab Information Technology Board (PITB) as the Employer, end customer/end user and warranty beneficiary.

The warranty shall commence from the date stated in the Taking-Over Certificate issued under Sub-Clause 48.1, unless a longer or otherwise more favourable warranty period is expressly provided in our offer or the Contract.

**6. After-Sales Technical Support**

We confirm that authorized after-sales technical support for the offered equipment shall be available in Pakistan throughout the applicable warranty period.

Authorized service organization / partner in Pakistan:

Name: _____

Address: _____

Telephone: _____

Email: _____

**7. Spare Parts Support**

We confirm that genuine/recommended spare parts and technical support for the offered equipment shall be available in Pakistan throughout the applicable warranty period, subject to the terms of the manufacturer's warranty and applicable support arrangements.

**8. Warranty and Support Coordination**

We confirm our commitment to support the Contractor and PITB in the administration, diagnosis and resolution of warranty-related matters and technical issues concerning the offered equipment during the applicable warranty period.

**9. Validity of Authorization**

This Manufacturer's Authorization shall remain valid for the purposes of this Tender and, if the Bidder is awarded the Contract, shall remain applicable in accordance with the warranty and support obligations stated herein and the Contract.

We certify that the information provided in this Manufacturer's Authorization is true and correct and that the undersigned is duly authorized to issue this Authorization on behalf of the Manufacturer.

**FOR AND ON BEHALF OF THE MANUFACTURER**

**Name of Manufacturer:** _____

**Name of Authorized Signatory:** _____

**Designation:** _____

**Signature:** _____



**Official Seal/Stamp:** _____
**Telephone:** _____
**Email:** _____
**Manufacturer's Website:** _____
**Date:** _____

**Note:**

This Manufacturer's Authorization shall be submitted separately for each of the four specified critical packages. The Authorization shall be issued on the manufacturer's or its authorized regional/country office's official letterhead and signed by a duly authorized representative. A generic, undated, non-tender-specific or otherwise incomplete authorization shall not be considered a compliant Manufacturer's Authorization.

This Manufacturer's Authorization forms part of the Bid and, where the Bidder is awarded the Contract, the commitments contained herein shall be binding upon the Contractor and shall be read together with the applicable provisions of the Contract.

The Bidder must meet the Eligibility Criteria & Requirement to be declared responsive. Any Bidder failing to satisfy the Pass/Fail Financial Competence and Access to Financial Resources criteria as mentioned in Appendix – M, which constitute Mandatory Qualification Requirements, shall be declared non-qualified and shall not proceed to evaluation under the following Detailed Qualification Criteria and Requirements.

## 2. Detailed Qualification Criteria & Requirements

The Bidders to be substantially responsive must score at least 60 marks overall (in aggregate) and minimum 50 % score in each category as specified below:

| Sr. No. | Category | Weightage/Marks | Minimum Required Score |
|---|---|---|---|
| 1. | Working Experience of Contracts of Similar Nature and Complexity | 50 | 25 |
| 2. | Personnel Capabilities | 25 | 13 |
| 3. | Equipment Capabilities | 25 | 13 |
| | **Total:** | **100** | **60** |

**Note:** The figure of 60 shown in the total row of the table above is the aggregate threshold and is not the sum of the category minimums. Failure to meet either requirement shall render the Bid non-responsive.

The qualifications of other firms such as the bidder's subsidiaries, parent entities, affiliates or subcontractors shall not be permitted and shall not be counted towards the Bidder's marks.

This does not prevent the Bidder from engaging OEMs, their authorised service providers or specialist subcontractors to perform parts of the Works or the O&M/SLA Services in accordance with Appendix-I to Bid and Clause 4 of the Conditions of Contract, and the Manufacturer's Authorisation required by item 1.11 of clause 1 above is not reliance on a subcontractor's qualifications for the purposes of this paragraph.

## 2.1 Working Experience of Contracts of Similar Nature and Complexity (Total 50 Marks)

Credit Marks for working experience shall be awarded on the basis of following qualifications:

| Sr. No. | Criteria | Requirement | Maximum Points | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|
| 1 | Working Experience of Contracts of Similar Nature and Complexity | Number of successfully completed contracts of value not less than Rs.1,200 million, during the last ten years. The contract(s) shall involve construction of multi-storey / reinforced-concrete-frame building(s) having substantial MEP/HVAC/Electrical Works supported by contract award/work order and completion/taking-over evidence.<br><br>(The contract shall include MEP/HVAC/Electrical Works having a completed value of not less than Rs.250 million.<br><br>Only contracts satisfying **both** the minimum overall contract value of **Rs.1,200 million** and the minimum relevant MEP/HVAC/Electrical/Fire Protection component value of **Rs.250 million** shall be counted for scoring purposes.)<br><br>Note: In case the bidder is a Joint Venture, the working experience of all members combined shall be evaluated. Whereas, one of the indicated Contract must be executed by the leader of the JV. | 50 Marks for three or more contracts meeting the minimum requirement<br><br>3 5 Marks for two contracts meeting the minimum requirement.<br><br>25 Marks for one contract meeting the minimum requirement. | Completed attached Form for Contracts of Similar Nature and Complexity.<br><br>The bidder must submit Project Award Letter/ Work Orders / Contract Agreement & Completion Certificates/ Taking Over Certificates, Engineer's/Employer's certification and any other documents necessary for confirming scope of works.<br><br>The bidder must provide detailed scope of works and/or BOQ identifying the relevant scope of MEP/HVAC/Electrical work components.<br><br>The bidder must submit joint venture agreement in case of projects completed as a partner of joint venture clearly showing scope of works and percentage share of all partners of joint venture. To comply with the criteria, the share of bidder under the joint venture for similar works must be equal or exceeding the qualification criteria and requirement. |
| | | **Sub-total:** | **50 marks** | |

Note;

- In case the bidder is a Joint Venture, the qualifying experience of the all JV members shall be aggregated and evaluated for this criterion. However, that each claimed project was executed by the relevant JV member under a single contract and is supported by the required documentary evidence. The responsibility of the relevant JV member for the claimed experience shall be identified in the Bid/JV documentation.
- In case of contracts executed by the bidder in form of a JV or subcontractor, the role of the bidder based on scope, role and financial participation/share shall be considered to evaluate the criteria requirement. Experience of subsidiaries, parent companies, affiliates or unrelated subcontractors shall not be used to satisfy the bidder's core qualification unless expressly permitted by these Bidding Documents.



## 2.2 Personnel Capabilities (Total 25 Marks)

| Sr. No. | Personnel | Required Number | Maximum Marks | Criteria for Evaluation | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|
| 1 | **Project Manager**<br>• BSc Civil Engineering<br>• registration with PEC as Registered Engineer<br>• at least 10 years of professional and relevant experience of building and infrastructure works<br>• currently working with bidder | 01 | 03 marks | No marks will be awarded for personnel not fully meeting any of the corresponding criteria requirement. | Details of each personnel to be provided on specified format under Appendix-K of the Bidding Documents.<br><br>The Bidder shall submit the documentary evidence of relevant PEC registration (where applicable), CV, qualification of the proposed candidates, professional experience and relevant project experience, together with evidence of employment, as applicable. |
| 2 | **Site Engineer (Civil)**<br>• BSc Civil Engineering<br>• registration with PEC as Registered Engineer<br>• at least 5 years of professional and relevant experience of building and infrastructure works<br>• currently working with bidder | 01 | 02 marks | | |
| 3 | **Site Engineer (Electrical)**<br>• BSc Electrical Engineering<br>• registration with PEC as Registered Engineer<br>• at least 5 years of professional and relevant experience<br>• currently working with bidder | 01 | 02 marks | | |
| 4 | **Material (QA/QC) Engineer**<br>• BSc Civil/ Geological Engineering<br>• registration with PEC as Registered Engineer<br>• at least 5 years of professional and relevant experience of building and infrastructure works<br>• currently working with bidder | 01 | 02 marks | | |



| Sr. No. | Personnel | Required Number | Maximum Marks | Criteria for Evaluation | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|
| 5 | **IT (ICT/Network) Engineer**<br>• B.Sc./B.E in IT/Computer Engineering/Software Engineering/Computer Science/ Software Engineering/ Electrical Engineering/ Telecommunications Engineering<br>• registration with PEC as Registered Engineer (if applicable)<br>• at least 05 years of professional and relevant experience in data center/ ICT infrastructure experience<br>• currently employed by the Bidder | 01 | 2.5 marks | | |
| 6 | **HVAC/ Precision Cooling Engineer**<br>• BSc Mechanical/ Electrical Engineering<br>• registration with PEC as Registered Engineer<br>• at least 5 years of professional and relevant experience of HVACs works | 01 | 2.5 marks | | |
| 7 | **Commissioning Engineer**<br>• B.Sc./B.E. in Electrical or Mechanical Engineering, duly registered with the Pakistan Engineering Council (PEC) as a Registered Engineer.<br>Minimum five (5) years of professional and relevant experience, including responsibility for the integrated systems testing and commissioning of at least one critical facility/Data Centre or mission-critical facilities incorporating uninterruptible power supply and associated battery systems, standby generation with automatic transfer and | 01 | 2.5 marks | | |

| | | | |
|---|---|---|---|
| | precision/close-control cooling systems.<br>• currently employed by the Bidder | | |
| 8 | **Certified Data Centre Professional (CDCP)**<br>A member of the proposed team shall hold a current CDCP, Certified Data Centre Specialist (CDCS) or equivalent internationally recognized data center design, operations or specialist certification. | 01 | 02 marks |
| 9 | **HSE Officer**<br>• BSc Environmental Sciences/ Engineering<br>• at least 5 years of professional and relevant experience. | 01 | 01 mark |
| 10 | **Supervisor (Civil)**<br>• Diploma in Civil (DAE)<br>• at least 5 years of professional and relevant experience of building and infrastructure works | 01 | 01 mark |
| 11 | **Supervisor (E&M)**<br>• Diploma in Electrical (DAE)<br>• at least 5 years of professional and relevant experience of building and infrastructure works | 01 | 01 mark |
| 12 | **Quantity Surveyor**<br>• Diploma (DAE)<br>• at least 5 years of professional and relevant experience of building and infrastructure works estimation | 01 | 01 mark |



| | | | | | |
|---|---|---|---|---|---|
| 13 | **Surveyor**<br>• Diploma in Civil (DAE)<br>• at least 5 years of professional and relevant experience of building and infrastructure works | 01 | 01 mark | | |
| 14 | **O&M Supervisor**<br>• Diploma in Electrical/ IT/ Computer Science (DAE)<br>at least 5 years of professional and relevant experience in O&M of Integrated building Services and infrastructure works | 01 | 1.5 marks | | |
| | | **Sub-total:** | **25 marks** | | |

Note;

- Bidder obtaining less than minimum passing marks for Personnel Capability Requirements shall be declared non-responsive.
- In case the bidder is a Joint Venture, the personnel capabilities of all members combined shall be evaluated.
- Each person proposed against items 1 to 14 of this table shall be currently employed by the Bidder, or in the case of a Joint Venture by one of its members, as at the deadline for submission of Bids. Evidence of employment shall be uploaded on the Punjab e-Procurement System, being the latest salary slip, the contract of employment, or the Employees Old-Age Benefits Institution or Provincial Employees Social Security record, for each person proposed.

## 2.3 Equipment Capabilities (Total 25 Marks)

Credit Marks shall be granted on the basis of the following criteria for various kinds of equipment relevant to the Contract

| Sr. No. | Equipment Type and Characteristics | Equipment Available | Maximum Marks | Criteria for Evaluation | Documentation Uploading Requirements on e-P |
|---|---|---|---|---|---|
| 1 | Excavators | 02 | 02 marks | Marks for an | Details of each equipment to |

| | | | | | |
|---|---|---|---|---|---|
| | | | (01 mark for each) | equipment type shall be pro-rated for Equipment at Sr.No. 1 & 2. | be provided on specified format under Appendix-G of the Bidding Documents<br>Documentary evidence of ownership/lease/rental of the corresponding equipment. |
| 2 | Dumpers | 02 | 02 marks<br>(01 mark for each) | | |
| 3 | Concrete Batching Plant (min. 0.5 meters cube capacity) | 01 | 03 marks | | |
| 4 | Tower / Mobile Crane | 01 | 03 marks | | |
| 5 | Scaffolding | 10,000 sq ft. | 02 marks | | |
| 6 | Insulation Resistance Tester, 5 kV | 01 | 03 marks | | |
| 7 | Earth / Ground Resistance Tester | 01 | 02 marks | | |
| 8 | Three-phase Power Quality Analyser | 01 | 02 marks | | |
| 9 | Thermographic (infrared) camera | 01 | 02 marks | | |
| 10 | Airflow measurement set — Anemometer with temperature and humidity data logging | 01 | 02marks | | |
| 11 | Low-voltage cable test set or cable fault locator | 01 | 02 marks | | |
| | | **Sub-total:** | **25 marks** | | |

Note;

- Bidder obtaining less than minimum passing marks for Equipment Requirements shall be declared non-responsive.
- In case the bidder is a Joint Venture, the equipment capabilities of all members combined shall be evaluated.

The Bidder must meet the Qualification Criteria & Requirement to be declared responsive.

## Form for Contracts of Similar Nature and Complexity

| Name of Bidder or partner of a joint venture |
|---|

Use a separate sheet for each contract.

| | |
|---|---|
| 1 | Name of Contract |
| | Country |
| 2 | Name of Employer |
| 3 | Employer Address<br>---------- |
| 4 | Nature of works and special features relevant to the contract<br>---------- |
| 5 | Contract Role (Tick One)<br>(a) Sole Contractor (b) Sub- Contractor (c) Partner in a Joint Venture |
| 6 | Value of the total contract (in specified currencies) at completion, for current contract<br>Currency..... ...Currency..... Currency..... |
| 7 | Contract cost at completion in Pak/Rs..... |
| 8 | Date of Award..... |
| 9 | Date of Completion..... |
| 10 | Contract Duration (Years and Months) _____Years _____Months |
| 11 | Specified Requirements---------- |

## Form for Annual Construction Turnover

| Annual Construction Turnover | | |
|---|---|---|
| **Year** | **Turnover (in actual currency)** | **Equivalent Rupees in Million.** |
| 2025-2024 | | |
| 2024-2023 | | |
| 2023-2022 | | |

**Note:** In case of Joint Venture, each member shall provide separate form.

## Form for Current Commitment

| Present Commitment | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sr No.** | **Name of ongoing project(s)** | **Name of Employer** | **Date of** | | **Progress** | | **Remarks regarding delays if applicable** | **Satisfactory performance certificate from employer (Minimum requirement)** |
| | | | **Start** | **Completion** | **%Age as planned** | **%Age at actual** | | |
| 1. | | | | | | | | |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| | | | | | | | | |

**Note:** In case of Joint Venture, each member shall provide separate form.



## Form FIN – 3.1:

### Form for Contract Specific Credit line

(Banks letter pad to be used)

To,
Project Director PITB.
Dated:

**To Whom It May Concern**

This is certified that M/s (name and address of Bidder) are maintaining their Accounts) with us to our entire satisfaction. Upon award of the Contract for the "*Establishment of Disaster Recovery Data Center for PITB at Multan*" to (**Name of Bidder**), We will provide credit facilities up to Rs. ____Million for the execution of the Works during the Contract period.

Authorized Signature
Stamp & Seal of Bank

Note: The above specimen shall be on original Bank letterhead and to be issued by a scheduled bank in Pakistan



# FORMS

**BID SECURITY**

**PERFORMANCE SECURITY**

**CONTRACT AGREEMENT**

**MOBILIZATION ADVANCE GUARANTEE/BOND**

**AND**

**INDEMNITY BOND FOR SECURED ADVANCE**



## BID SECURITY
## (Bank Guarantee) (Not Applicable)

Security Executed on _____
(Date)

Name of Surety (Bank) with Address: _____
(Scheduled Bank in Pakistan)

Name of Principal (Bidder) with Address _____

_____

Penal Sum of Security Rupees. _____(Rs. _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto _____
(hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated _____for Bid No. _____for_____(Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum from a Scheduled Bank in Pakistan or from a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan, to the Employer, conditioned as under:

(1) that the Bid Security shall remain in force up to and including the date 30 days after the deadline for validity of bids as stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived;

(2) that the Bid Security of unsuccessful Bidders will be returned by the Employer after expiry of its validity or upon signing of the Contract Agreement; and

(3) that in the event of failure of the successful Bidder to execute the proposed Contract Agreement for such work and furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to Clause 15.6 of the Instruction to Bidders for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefore, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within fourteen (14) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Surety shall forthwith pay the Employer, the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

sent by the Employer by registered post duly addressed to the Surety at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Bidder) has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Surety shall pay without objection the said sum upon demand from the Employer forthwith and without any reference to the Principal (Bidder) or any other person.

IN WITNESS WHEREOF, the above bounden Surety has executed the instrument under its seal on the date indicated above, the name and seal of the Surety being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

SURETY (Bank)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address



## FORM OF PERFORMANCE SECURITY
## (Bank Guarantee)

Guarantee No._____

Executed on _____

Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address:_____
(Scheduled Bank in Pakistan)

Name of Principal (Contractor) with address:_____

Penal Sum of Security (express in words and figures)_____

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for _____ _____ (Name of Contract) for the _____

_____(Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfil all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 49, Defects Liability, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____ (the Guarantor), waiving all objections and defences under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's

written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Guarantor (Bank)

Witness:

1. _____

_____
Corporate Secretary (Seal)

2. _____

_____
Name, Title & Address

Signature _____

Name _____

Title _____

_____
Corporate Guarantor (Seal)



## FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of_____(month) 20_____ between _____ (hereafter called the "Employer") of the one part and _____(hereafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz "_____" should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnesseth as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents after incorporating addenda / Clarification as agreed or otherwise, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Contract, viz:

   (a) The Contract Agreement;
   (b) The Letter of Acceptance;
   (c) The completed Form of Bid (Technical & Financial);
   (d) Special Stipulations (Appendix-A to Bid);
   (e) The Particular Conditions of Contract – Part II;
   (f) The General Conditions – Part I;
   (g) The priced Bill of Quantities (Appendix-D to Bid);
   (h) The completed Appendices to Bid (B, C, E to N);
   (i) The Drawings;
   (j) The Specifications – Technical & Special Provisions
   (k) The Joint Venture Agreement (if applicable)

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor

_____

(Seal)

Signature of Employer

_____

(Seal)



Signed, Sealed and Delivered in the presence of:

Witness:

_____

(Name, Title and Address)

Witness:

_____

(Name, Title and Address)



## MOBILIZATION ADVANCE GUARANTEE
(Unconditional Bank Guarantee)

Guarantee No. _____ Date _____
WHEREAS _____ (hereinafter called the 'Employer') has entered into a Contract for _____ (Particulars of Contract) with _____ (hereinafter called the "Contractor').

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Pak Rupees _____ (PKR _____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____ (hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor.

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of PKR _____ (Pak Rupees _____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

GUARANTOR

1. Signature _____
2. Name _____
3. Title _____

WITNESS

1. _____
Corporate Secretary (Seal)

2. _____
(Name Title & Address)

_____
Corporate Guarantor (Seal)

## INDEMNITY BOND FOR SECURED ADVANCE AGAINST MATERIALS BROUGHT AT SITE

(ON NON-JUDICIAL STAMP PAPER)

This Deed of Indemnity is issued by M/s. _____ _____ *(Name of the Contractor)* in favour of *M/s.* _____ *(Name of the Employer).*

**Whereas** _____ (hereinafter called the Employer) has paid the Secured Advance against the cost of material through any Bank or like agency by any other method by virtue of the terms of the contract existing between the parties. The details of the material and their price for which secured advance is being sought for the period _____ till consumption of the material is as under: -

1. _____ at Rs._____ per _____ = Rs.
2. _____ at Rs._____ per _____ = Rs.
3. _____ at Rs._____ per _____ = Rs.
4. _____ at Rs._____ per _____ = Rs.

**THEREFORE, THIS DEED OF INDEMNITY WITHNESSETH AS FOLLOWS:**

I/We _____ of M/s. _____ do hereby indemnify M/s _____ for all losses due to thefts, arson, pilferage, loss due to flood and inundation, shortage, deterioration and depreciation etc. through any act of Man or God or slump in the Market of any or all the materials financed or paid by the Employer on our request for financing payment against material.

I/We _____ shall indemnify _____ against any or all claims, action damages arising out of or resulting to the said material.

I/We _____ further declare that we will faithfully abide by the above declaration and solemnly affirm that we will not remove, sell, pilferage any of the materials against which M/s _____ has paid us such a secured advance and will not pledge the same with any Bank, Finance Corporation, Firm, Company, Individual or the like agency or create any change whereon in any from what so ever.

I/We _____ do hereby also declare that in the event of my/our infringement of the declaration made above _____ will be entitled to forfeit all such material and also proceed against me/us according to the relevant clause pertaining to breach of contract and further invoke the power or seek any remedies secured of _____ under the contract Agreement signed with us or otherwise available under law.

Place _____ Dated _____

Contractor _____



# CONDITIONS OF CONTRACT

## PART I: GENERAL CONDITIONS

**FIDIC**

**4th Edition 1987**
**Reprinted 1988 with Editorial Amendments**
**Reprinted 1992 with Further Amendments**

**(To be procured by the Contractor)**

**Copies of the FIDIC Conditions of Contract can be obtained from:**

**FIDIC Secretariat– International Federation of Consulting Engineers**
**Secretariat Switzerland**

**International Federation of Consulting Engineers (FIDIC)**
FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland
Fax: +41 22 799 49 054
Telephone: +41 22 799 49 01
E-mail: fidic@fidic.org
www.fidic.org

# PART II: PARTICULAR CONDITIONS OF CONTRACT

## 1.1 Definitions

(a) (i) The Employer is: Project Director, Establishment of Disaster Recovery Data Center at PITB at Multan, Punjab Information Technology Board (PITB)

(a) (iv) The Engineer is: Project Director/Project Manager, Engineering Consultancy Services Punjab (ECSP)

or any other competent person appointed by the Employer, and notified to the Contractor, to act in replacement of the Engineer. Provided always that except in cases of professional misconduct, the outgoing Engineers is to formulate his certifications/ recommendations in relation to all outstanding matters, disputes and claims relating to the execution of the Works during his tenure.

The following paragraph is added:

(a) (vi) "Bidder or Tenderer" means any person or persons, company, corporation, firm or Joint venture submitting a Bid or Tender.

(b) (v) The following is added at the end of the paragraph:

The word "Tender" is synonymous with "Bid" and the word "Tender Documents" with "Bidding Documents".

The following paragraph is added:

(b) (ix) "Programme" means the programme to be submitted by the Contractor in accordance with Sub-Clause 14.1 and any approved revisions thereto.

(e) (i) The text is deleted and substituted with the following:

"Contract Price" means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works subject to such additions thereto or deductions there from as may be made and remedying of any defects therein in accordance with the provisions of the Contract.

## 2.1 Engineer's Duties and Authority

With reference to Sub-Clause 2.1(b), the following provisions shall also apply:
The Engineer shall obtain the specific approval of the Employer before carrying out his duties in accordance with the following Clauses. The Employer may further vary according to need of the project;

(i) Consenting to the sub-letting of any part of the Works under Sub-Clause 4.1 "Subcontracting".

(ii) Certifying additional cost determined under Sub-Clauses 12.2 "Not Foreseeable Physical Obstructions or conditions"

(iii) Any action under Clause 10 "Performance Security" and Clauses 21, 23, 24 & 25 "Insurance" of sorts.

(iv) Any action under Clause 40 "Suspension"

(v) Any action under Clause 44 "Extension of Time for Completion"

(vi) Any action under Clause 47 "Liquidated Damages for Delay" or payment of Bonus for Early Completion of Works (SCC Sub-Clause 47.3)

(vii) Issuance of "Taking over Certificate" under Clause 48.

(viii) Issuing a Variation Order under Clause 51 except:

a) in an emergency* situation, as stated here below, or

b) if such variation would increase the Contract Price by the amount stated in the Appendix-A to Bid.

(ix) Fixing rates or prices under Clause 52.

(x) Extra payment as a result of Contractor's claims Clause

(xi) Release of Retention Money to the Contractor under Sub-Clause 60.3 "Payment of Retention Money".

(xii) Issuance of "Final Payment Certificate" under Sub-Clause 60.8.

(xiii) Issuance of "Defect Liability Certificate" under Sub-Clause 62.1.

(xiv) Any change in the ratios of Contract currency proportions and payments thereof under clause 72 "Currency and Rate of Exchange".

* (If in the opinion of the Engineer an emergency occurs affecting the safety of life or of the Works or of adjoining property, the Engineer may, without relieving the Contractor of any of his duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.)

## 2.2 Engineer's Representative

Add the following paragraph:
The Employer shall ensure that the Engineer's Representative is a professional engineer as defined in the Pakistan Engineering Council Act 1975 (V of 1976).

The following Sub-Clauses 2.7 and 2.8 are added:

## 2.7 Engineer Not Liable

Approval, reviews and inspection by the Engineer of any part of the Works does not relieve the Contractor from his sole responsibility and liability for the supply of materials, plant and equipment for construction of the Works and their parts in accordance with the Contract and neither the Engineer's authority to act nor any decision made by him in good faith as provided for under the Contract whether to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their representatives or

employees or any other person performing any portion of the Works. However, the Engineer shall also be held responsible for his unlawful, non-factual and unreasonable decisions.

**2.8 Replacement of the Engineer**

"If the Employer intends to replace the Engineer, the Employer shall, not less than 14 days before the intended date of replacement, give notice to the Contractor, of the name, address and relevant experience of the intended replacement Engineer. The Employer shall not replace the Engineer with a person against whom the Contractor raises reasonable objection by notice to the Employer, with supporting particulars."

**5.1 Language(s) and Law**

(a) The Contract Documents shall be drawn up in the English language.
(b) The Contract shall be subjected to the Laws of Islamic Republic of Pakistan

**5.2 Priority of Contract Documents**

The documents listed at (1) to (6) of the Sub-Clause are deleted and substituted with the following:

(1) The Contract Agreement;
(2) The Letter of Acceptance;
(3) The completed Forms of Bid (Letters of technical & Financial Bid);
(4) Special Stipulations (Appendix-A to Bid);
(5) The Particular Conditions of Contract – Part II;
(6) The General Conditions – Part I;
(7) The priced Bill of Quantities (Appendix-D to Bid);
(8) The completed Appendices to Bid (B, C, E to N);
(9) The Drawings;
(10) The Specifications, including Technical Specifications and Special Provisions; and
(11) The Joint Venture Agreement, where applicable

In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by a drawing of later date regardless of scale. All Drawings and Specifications shall be interpreted in conformity with the Contract and these Conditions. Addendum, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract. In the event of any discrepancy between an Addendum and the corresponding provisions of the Bidding Documents, the provisions of the Addendum shall prevail.

The following Sub-Clauses 6.6 and 6.7 are added

**6.6 Shop Drawings**

The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract. A copy shall be submitted to the Employer as well.

Review and approval by the Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and that the Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

**6.7 As-Built Drawings**

At the completion of the Works under the Contract, the Contractor shall furnish to the Engineer 6 copies and one reproducible of all drawings amended to conform with the Works as built. A set shall be provided to the Employer as well. The price of such Drawings shall be deemed to be included in the Contract Price.

**10.1 Performance Security/Guarantee**

The text is deleted and substituted with the following:

The Contractor shall provide Performance Security/Guarantee to the Employer in the prescribed form. The said Security/Guarantee shall be furnished or caused to be furnished by the Contractor within 14 days after the receipt of the Letter of Acceptance. The Performance Security/Guarantee shall be of an amount equal to 05% of the Total Accepted Contract Price stated in the Letter of Acceptance, including mandatory Year-1 O&M/SLA Services. Such Security/Guarantee shall, at the option of the bidder, be in the form of either (a) bank guarantee of the specified form from any Scheduled Bank in Pakistan or (b) bank guarantee of the specified form from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan to the Employer valid for a period till 28 days after the date of issue of Defect Liability Certificate.
The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

The following Sub-Clause 10.4 is added:

**10.4 Performance Security Binding on Variations and Changes**

The Performance Security shall be binding irrespective of changes in the quantities or variations in the Works or extensions in Time for Completion of the Works which are granted or agreed upon under the provisions of the Contract.

**14.1 Programme to be submitted**

The programme shall be submitted within 14 days from the date of receipt of Letter of Acceptance, which shall be in the form of:

i) a CPM identifying the critical path/activities.

**14.3 Cash Flow Estimate to be submitted**

The detailed Cash Flow Estimate shall be submitted within 21 days from the date of receipt of Letter of Acceptance

The following Sub-Clause 14.5 is added:

**14.5 Detailed Programme and Monthly Progress Report**

a) For purposes of Sub-Clause 14.1, the Contractor shall submit to the Engineer, the Employer and the Administrative Department, the detailed programme for the following:

(1) Execution of Works;
(2) Labour Employment;
(3) Local Material Procurement;
(4) Material Imports, if any; and
(5) Other details as required by the Engineer.

(b) During the period of the Contract, the Contractor shall submit to the Engineer, the Employer and the Administrative Department, not later than the 8th day of the following month, 10 copies each of Monthly Progress Reports covering with a copy to the employer:

(1) A Construction Schedule indicating the monthly progress in percentage;
(2) Description of all work carried out since the last report;
(3) Description of the work planned for the next 56 days sufficiently detailed to enable the Engineer to determine his programme of inspection and testing;
(4) Monthly summary of daily job record;
(5) Photographs to illustrate progress; and
(6) Information about problems and difficulties encountered, if any, and proposals to overcome the same.

(c) During the period of the Contract, the Contractor shall keep a daily record of the work progress, which shall be made available to the Engineer, the Employer and the Administrative Department, as and when requested. The daily record shall include particulars of weather conditions, number of men working, deliveries of materials, quantity, location and assignment of Contractor's equipment.

(d) The Contractor shall submit monthly O&M/SLA report, including manpower deployment records, preventive and corrective maintenance records, incident and fault records, SLA performance, OEM/service reports, critical spare inventory, consumable records, pending issues and other documents required under the Contract.

The following Sub-Clauses 15.2 and 15.3 are added:

**15.2 Language Ability of Contractor's Representative**

The Contractor's Authorized representative shall be fluent in the English language. Alternately an interpreter with ability of English language shall be provided by the Contractor on full time basis.

**15.3 Contractor's Representative**

The Contractor's authorised representative and his other professional engineers working at Site shall register themselves with the Pakistan Engineering Council.

The Contractor's authorised representative at Site shall be authorised to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.

The following Sub-Clauses 16.3 and 16.4 are added:

**16.3 Language Ability of Superintending Staff of Contractor**

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of the English language. If the Contractor's superintending staff are not fluent in English language, the Contractor shall make competent interpreters available

during all working hours in a number deemed sufficient by the Engineer.

**16.4 Employment of Local Personnel**

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour from sources within Pakistan.
The following Sub-Clauses 19.3 and 19.4 are added:

**19.3 Safety Precautions**

In order to provide for the safety, health and welfare of' persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorise or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose.

The Contractor shall make, maintain and submit reports to the Engineer concerning safety, health and welfare of persons and damage to property, as the Engineer may from time to time prescribe.

**19.4 Lighting Work at Night**

In the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night-work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer's Representative.

**20.4 Employer's Risks**




The Employer's risks are:

Delete the text and substitute with the following:

(a) insofar as they directly affect the execution of the Works in Pakistan:

(i) war and hostilities (whether war be declared or not), invasion, act of foreign enemies,
(ii) rebellion, revolution, insurrection, or military or usurped power, or civil war,
(iii) ionizing radiations, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof,
(iv) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
(v) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors and arising from the conduct of the Works;

(b) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;

(c) 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 or for which the Contractor is responsible; [For all those projects where funding is available, the Design Consultants shall be made responsible for any design faults. It shall be ensured that the Design Consultants remain available for Top Supervision and rectification of any subsequent faults/ issues till the successful completion of the project/ closing of the contract including defect liability period if any];

(d) any operation of the forces of nature (insofar as it occurs on the Site) which an experienced contractor:

(i) could not have reasonably foreseen, or
(ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:
(a) prevent loss or damage to physical property from occurring by taking appropriate measures, or
(b) insure against.

**21.1 Insurance of Works and Contractor's Equipment**

In the first line of Sub-Clause 21.1 add "prior to Commencement of the Works" after "The Contractor shall", and add "in the joint names" after "insure" in second line.

After paragraph (c), add new paragraph (d) as follows:

d) Such insurance shall provide for compensation to be payable in the types and proportions of currencies needed to cover the loss or damage incurred.

**21.4 Exclusions**

The text is deleted and substituted with the following:

There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by the risks listed under Sub-Clause 20.4 paras (a) (i) to (iv).

The following Sub-Clause 25.5 is added:

**25.5 Insurance Company**

The Contractor shall be obliged to place all insurances relating to the Contract (including, but not limited to, the insurances referred to in Clauses 21, 23 and 24) with National Insurance Company of Pakistan or any other insurance company operating in Pakistan holding a minimum insurer financial strength rating of AA from PACRA or VIS and acceptable to the Employer.

Costs of such insurances shall be borne by the Contractor.

The following Sub-Clause 31.3 is added:

**31.3 Co-operation with other Contractors**

During the execution of the Works, the Contractor shall co-operate fully with other contractors working for the Employer at and in the vicinity of the Site and also shall provide adequate precautionary facilities not to make himself a nuisance to local residents and other contractors.

The following Sub-Clauses 34.2 to 34.12 are added:

**34.2 Rates of Wages and Conditions of Labour**

The Contractor shall pay rates of wages and observe conditions of labour not less favourable than those established for the trade or industry where the work is carried out. In the absence of any rates of wages or conditions of labour so established, the Contractor shall pay rates of wages and observe conditions of labour which are not less favourable than the general level of wages and conditions observed by other employers whose general circumstances in the trade or in industry in which the Contractor is engaged are similar.

**34.3 Employment of Persons in the Service of Others**

The Contractor shall not recruit his staff and labour from amongst the persons in the services of the Employer or the Engineer; except with the prior written consent of the Employer or the Engineer, as the case may be.

**34.4 Housing for Labour**

Save insofar as the Contract otherwise provides, the Contractor shall provide and maintain such housing accommodation and amenities as he may consider necessary for all his supervisory staff and labour, employed for the purposes of or in connection with the Contract including all fencing, electricity supply, sanitation, cookhouses, fire prevention, water supply and other requirements in connection with such housing accommodation or amenities. On completion of the Contract, these facilities shall be handed over to the Employer or if the Employer so desires, the temporary camps or housing provided by the Contractor shall be removed and the Site reinstated to its original condition, all to the approval of the Engineer.

**34.5 Health and Safety**

Due precautions shall be taken by the Contractor, and at his own cost, to ensure the safety of his staff and labour at all times throughout the period of the Contract. The Contractor shall further ensure that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.

**34.6 Epidemics**

In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities, for purpose of dealing with and overcoming the same.

**34.7 Supply of Water**

The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer or his representative adequate supply of drinking and other water for the use of his staff and labour.

**34.8 Alcoholic Liquor or 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 Subcontractors, agents, staff or labour.

**34.9 Arms and Ammunition**

The Contractor shall not give, or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

**34.10 Festivals and Religious Customs**

The Contractor shall in all dealings with his staff and labour have due regard to all recognised festivals, days of rest and religious and other customs.

**34.11 Disorderly Conduct**

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

**34.12 Compliance by Subcontractors**

The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.

The following Sub-Clauses 35.2 and 35.3 are added:

**35.2 Records of Safety and Health**

The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.

**35.3 Reporting of Accidents**

The Contractor shall report to the Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means.

The following Sub-Clause 36.6 is added:

**36.6 Use of Pakistani Materials and Services**

The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services, available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.

**41.1 Commencement of Works**

The text is deleted and substituted with the following:



The Contractor shall commence the Works on Site within the period named in Appendix-A to Bid from the date of receipt by him from the Engineer of a written Notice to Commence. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

The following Sub-Clause 47.3 is deleted:

**47.3 Bonus for Early Completion of Works**

Not Applicable

**48.2 Taking Over of Sections or Parts**

Not Applicable

**51.2 Instructions for Variations**

At the end of the first sentence, after the word "Engineer", the words "in writing" are added.

**52.1 Valuation of Variations**

In the tenth line, after the words "Engineer shall" the following is added:
Within a period not exceeding one-eighth of the completion time subject to a minimum of 56 days from the date of disagreement whichever is later.

**53.4 Failure to Comply**

This Sub-Clause is deleted in its entirety.

**54.5 Conditions of Hire of Contractor's Equipment**

The following paragraph is added:

The Contractor shall, upon request by the Engineer at any time in relation to any item of hired Contractor's Equipment, forthwith notify the Engineer in writing the name and address of the Owner of the equipment and shall certify that the agreement for the hire thereof contains a provision in accordance with the requirements set forth above.

The following Sub-Clauses 59.4 & 59.5 are added:

**59.4 Payments to Nominated Subcontractors**

The Contractor shall pay to the nominated Subcontractor the amounts which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with Clause 58 [Provisional Sums], except as stated in Sub-Clause 59.5 [Certification of Payments].

**59.5 Certification of Payments & Nominated Subcontractors**

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

a) submits reasonable evidence to the Engineer, or

b) i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and
ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,

then the Employer may (at his sole discretion) pay direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has failed to submit the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

**60.1 Monthly Statements**

In the first line after the word "shall", the following is added:

"on the basis of the joint measurement of work done under Clause 56.1,"

In Para (c) the words "the Appendix to Tender" are deleted and substituted with the words "Sub-Cause 60.11 (a)(6) hereof".

(in case Clause 60.11 is applicable)

The following text is added:

PAYMENT FOR MANDATORY ONE-YEAR O&M/SLA SERVICES:

The Contract Price shall include the price of the mandatory one (01) year Operations, Maintenance, Warranty Management and Service Level Agreement (O&M/SLA) Services specified in the Contract.

The O&M/SLA Services shall commence from the date of issuance of the Taking-Over Certificate under Sub-Clause 48.1 and shall continue for a period of 365 calendar days.

The accepted Year-1 O&M/SLA price shall be paid quarterly in arrears in four (04) equal quarterly instalments, subject to satisfactory performance of the O&M/SLA Services and certification by the Engineer/Employer. If **P** represents the accepted total price for the mandatory Year-1 O&M/SLA Services:

*Quarterly O&M/SLA Service Price = P ÷ 4*

Each quarterly payment shall be supported by the Contractor's Quarterly O&M/SLA Report and such records and documents as required under the Contract, including manpower deployment and attendance records, preventive and corrective maintenance records, incident and fault records, SLA performance, OEM/service reports, critical spare inventory, consumable records and details of pending issues.

The amount otherwise payable for each quarter shall be subject to applicable SLA deductions, retention money and other deductions expressly provided under the

Contract.

*Net Quarterly O&M/SLA Payment = Certified Quarterly O&M/SLA Amount – Applicable SLA Deductions – Other Contractual Deductions*

No payment shall be made for any period during which the corresponding O&M/SLA Services or contractual obligations have not been provided and/or satisfactorily performed or certified in accordance with the Contract.

The mandatory O&M/SLA Services shall be additional to and shall not replace, reduce or limit the Contractor's obligations under Clause 49 relating to the Defects Liability Period. Payment for the O&M/SLA Services shall not relieve the Contractor of any obligation to remedy defects in accordance with the Contract.

The Year-1 O&M/SLA price shall be firm and fixed throughout the O&M/SLA Service Period and shall not be subject to price adjustment under Sub-Clause 70.

The minimum IPC/payment threshold applicable to the Works shall not apply to the quarterly payments for the O&M/SLA Services.

**60.2 Monthly Payments**

In the first line, "28" is substituted by "14".

**60.10 Time for Payment**

The text is deleted and substituted with the following:

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other terms of the Contract, shall , subject to Clause 47, be paid by the Employer to the Contractor within 30 days after such Interim Payment Certificate or the Final Certificate as has been jointly verified by Employer and Contractor, provided that the work is satisfactory and the Contractor has not indulged in Corrupt Practices as defined in Section 2 of the PPRA Act 2009. In the event of the failure of the Employer to make payment within the times stated, the provisions w.r.t. dispute resolution may be invoked.

The following Sub-Clause 60.11 and 60.12 are added:

**60.11 Secured Advance on Materials**

(a) The Contractor shall be entitled to receive from the Employer Secured Advance against an indemnity bond acceptable to the Employer of such sum as the Engineer may consider proper in respect of non-perishable materials brought at the Site but not yet incorporated in the Permanent Works provided that:

(1) The materials are in accordance with the Specifications for the Permanent Works;

(2) Such materials have been delivered to the Site and are properly stored and protected against loss or damage or deterioration to the satisfaction of the Engineer but at the risk and cost of the Contractor;

(3) The Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer, and such records shall be available for inspection by the Engineer;

(4) The Contractor shall submit with his monthly statement the estimated

value of the materials on Site together with such documents as may be required by the Engineer for the purpose of valuation of materials and providing evidence of ownership and payment therefor;

(5) Ownership of such materials shall be deemed to vest in the Employer and these materials shall not be removed from the Site or otherwise disposed of without written permission of the Employer; and

(6) The sum payable for such materials on Site shall not exceed 75 % of the (i) landed cost of imported materials, or (ii) ex-factory / ex-warehouse price of locally manufactured or produced materials, or (iii) market price of other materials.

(b) The recovery of Secured Advance paid to the Contractor under the above provisions shall be effected from the monthly payments on actual consumption basis.

**60.12 Financial Assistance to Contractor**

(a) An interest-free Mobilization Advance shall be limited to the maximum of ten (10) % of the sum of the Accepted Contract price stated in the Letter of Acceptance shall be paid by The Employer to The Contractor in single installment upon submission by the Contractor of a Mobilization Advance Guarantee for the full amount of the Advance in the specified form from a Scheduled Bank in Pakistan acceptable to The Employer.

(b) Deduction shall be made at the Amortization rate of 20% of the value of the works executed of each IPC starting from the 2nd IPC provided that Advance Payment shall be completely repaid prior to the time when 90% of the Accepted Contract Amount has been certified for payment.

**63.1 Default of Contractor**

The following paras are added at the end of the Sub-Clause:

(f) the Employer is entitled to terminate the Contract at his discretion/prerogative upon attaining of maximum Liquidated Damages (LDS) of 10%.

(g) the Employer shall also be entitled to terminate the Contract for default upon the aggregate SLA deductions applicable to the mandatory Year-1 O&M/SLA Services reaching the ceiling specified under Sub-Clause 16.1.6 of O&M/SLA Requirement specified under Volume 3 "Technical Specifications" of the Contract Documents.

Provided further that in addition to the action taken by the Employer against the Contractor under this Clause, the Employer may also refer the case of default of the Contractor to Pakistan Engineering Council for punitive action under the Construction and Operation of Engineering Works Bye-Laws 1987, as amended from time to time.

**65.2 Special Risks**

The text is deleted and substituted with the following:

The Special Risks are the risks defined under Sub-Clause 20.4 sub paragraphs (a) (i) to (a) (v).

**67. 3 Arbitration**

In the sixth to eight lines, the words "shall be finally settled ..... appointed under such Rules" are deleted and substituted with the following:

shall be finally settled under the provisions of the Arbitration Act, 1940 as amended or any statutory modification or re-enactment thereof for the time being in force.

The following paragraph is added:

The place of arbitration shall be Lahore, Pakistan.

**68.1 Notice to Contractor**

The following paragraph is added:

For the purposes of this Sub-Clause, the Contractor shall, immediately after receipt of Letter of Acceptance, intimate in writing to the Employer and the Engineer by registered post, the address of his principal place of business or any change in such address during the period of the Contract.

**68.2 Notice to Employer and Engineer**

For the purposes of this Sub-Clause, the respective address are:

**a)** The Employer: Project Director, Establishment of Disaster Recovery Data Center at PITB Multan, Punjab Information Technology Board, 11th Floor, Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore

**b)** The Engineer: Project Director/Project Manager
Engineering Consultancy Services Punjab (ECSP)
Address, to be notified later.

**70.1 Increase or Decrease of Cost**

Sub-Clause 70.1 is deleted in its entirety, and substituted with the following:

The amounts payable to the Contractor, pursuant to Sub-Clause 60.1, shall be adjusted in respect of the rise or fall in the cost of labor, materials, and other inputs to the Works, by applying to such amount the formula prescribed in this Sub-Clause.

**(a) Other Changes in Cost**

To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other Clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise or fall of costs.

**(b) Adjustment Formula**

The adjustment to the monthly statements in respect of changes in cost shall be determined from the following formula: -

$$Pn = A + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{En}{Eo} + \ldots\ldots\ldots\ldots$$

Where:

Pn is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Paragraph 60.1 (a), and with Paragraphs 60.1 (b) and (e), where any variations and daywork are not otherwise subject to adjustment;

A is a constant, specified in Appendix-C to Bid, representing the nonadjustable portion in contractual payments;

b, c, d, etc., are weightages or coefficients representing the estimated proportion of each cost element (labour, cement and reinforcing steel etc.) in the Works or Sections thereof, net of Provisional Sums and Prime Cost; the sum of A, b, c, d, etc., shall be one;

Ln, Mn, En, etc., are the current cost indices or reference prices of the cost elements for month "n", determined pursuant to Sub-Clause 70.1(d), applicable to each cost element; and

Lo, Mo, Eo, etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 70.1(d).

For the purpose of calculating any adjustment in the Contract Price under this Sub-Clause 70.1, the value of all Non-Adjustable Items identified in Appendix-C to Bid and/or expressly identified as Non-Adjustable in the BOQ, Technical Specifications or other Contract Documents shall be excluded from the amount eligible for price adjustment. Accordingly, the price adjustment factor shall be applied only to the net amount of the Works remaining after deduction of the value of such Non-Adjustable Items, Provisional Sums and Prime Cost Sums, as applicable. No price adjustment shall be admissible in respect of the cost of such Non-Adjustable Items.

**(c) Sources of Indices and Weightages**

The sources of indices shall be those listed in Appendix-C to Bid, as approved by the Engineer. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightages and Source of Indices if different than those given in Appendix-C to Bid, which shall be subject to approval by the Engineer.

**(d) Base, Current, and Provisional Indices**

The base cost indices or prices shall be those prevailing on the day 30 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 30 days prior to the last day of the period to which a particular monthly statement is related. If at any time the current indices are not available,

Provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.

**(e) Adjustment after Completion**

If the Contractor fails to complete the Works within the Time for Completion prescribed under Clause 43, adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favorable to the Employer, provided that if an extension of time is granted pursuant to Clause 44, the above provision shall apply only to adjustments made after the expiry of such extension of time.

**(f) Weightages**

The weightages for each of the factors of cost given in Appendix-C to Bid shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work executed or instructed under Clause 51. Such adjustment(s) shall have to be agreed in the variation order.

The provisions of this Clause relating to Price Adjustment shall apply only to the Works and shall not apply to the O&M/SLA Services. The rates and prices quoted for the mandatory Year-1 O&M/SLA Services shall be firm and fixed throughout the O&M/SLA Service Period of 365 calendar days and shall not be subject to any price adjustment, escalation or other adjustment on account of changes in the prices of labour, materials, equipment, fuel, utilities, inflation, exchange rates or any other cost factors.

The following Sub-Clauses 73.1, 73.2, 74.1, 75.1, 76.1, 77.1, 78.1, 78.2, 78.3, 78.4, 78.5, and 78.6 are added:

**73.1 Payment of all taxes/ rates/ fees: Income Tax, Sales tax etc.**

The Contractor, Subcontractors and their employees shall be responsible for payment of all applicable (federal & provincial) taxes/ rates/ fees: income tax, sales tax and other taxes/ rates/ fees etc. arising out of the Contract and the rates and prices stated in the Contract shall be deemed to cover all such expenses till the closing of contract, including the defect liability period if any.

**73.2 Customs Duty & Taxes**

The prices tendered by the Contractor shall include all import license fees, custom duties, excise duties, sales taxes, surcharges, business taxes, income and other taxes that are levied according to the laws and regulations of Pakistan on the Contractor's Equipment, material and supplies (both permanent, temporary and consumable) acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve The Contractor from his responsibility to pay any tax that may be levied in the country on profits made by him in respect of the Contract.

**74.1 Integrity Pact**

If the Contractor or any of his Subcontractors, agents or servants is found to have

violated or involved in violation of the Integrity Pact signed by the Contractor as Appendix-L to his Bid, then the Employer shall be entitled to:

(a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by the Contractor or any of his Subcontractors, agents or servants;

(b) terminate the Contract; and

(c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agents or servants.

The termination under Sub-Para (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clauses 63.1 to 63.4 and the payment under Sub-Clause 63.3 shall be made after having deducted the amounts due to the Employer under Sub-Para (a) and (c) of this Sub-Clause.

**75.1 Termination of Contract for Employer's Convenience**

The Employer shall be entitled to terminate the Contract at any time for the Employer's convenience after giving 56 days prior notice to the Contractor, with a copy to the Engineer. In the event of such termination, the Contractor:

(a) shall proceed as provided in Sub-Clause 65.7 hereof; and

(b) shall be paid by the Employer as provided in Sub-Clause 65.8 hereof.

**76.1 Liability of Contractor**

The Contractor or his Subcontractors or assigns shall follow strictly, all relevant labour laws including the Workmen's Compensation Act and the Employer shall be fully indemnified for all claims, damages etc. arising out of any dispute between the Contractor, his Subcontractors or assigns and the labour employed by them.

**77.1 Joint and Several Liability**

If the Contractor is a joint venture of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfilment of the terms of the Contract and shall designate one of such persons to act as leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.

**78.1 Details to be Confidential**

The Contractor with Site access shall prohibit photography, videography, drone survey and publication of layouts, security drawings or system architecture without the Employer's prior written consent; require return or certified destruction of all security-sensitive drawings and data at completion; and provide that the obligation survives completion and termination indefinitely. The Contractor and its sub-contractors shall treat the details of the Contract as private and confidential, and shall not publish or disclose the same or any particulars thereof in any trade or technical paper or elsewhere without the prior consent in writing of the Employer or the Engineer.

**78.2 Conditions for Taking Over**

Taking-over of the Works shall be conditional upon successful completion of all tests and commissioning required by the Specifications, including integrated testing of civil, electrical, HVAC, fire protection, security, networking/ICT and other systems forming part of the Works. Individual component testing shall not by itself constitute completion.

### 78.3 Testing, Defects and Warranty

Before issuance of the Taking-Over Certificate, the Contractor shall complete all Works and rectify all notified defects affecting safe or intended operation, obtain all required statutory approvals/certificates falling within the Contractor's scope, submit approved as-built drawings, operation and maintenance manuals, test and commissioning records, warranties, asset registers and other close-out documentation specified in the Contract.

The Contractor shall remain fully responsible for the performance of the Works and all supplied equipment and systems during the Defects Liability Period. Any equipment, component or installation failing to meet the specified performance criteria shall be repaired, replaced, retested and recommissioned at the Contractor's cost. Replacement or repair shall not relieve the Contractor of any remaining contractual obligations.

### 78.4 Data Centre Security and Confidentiality

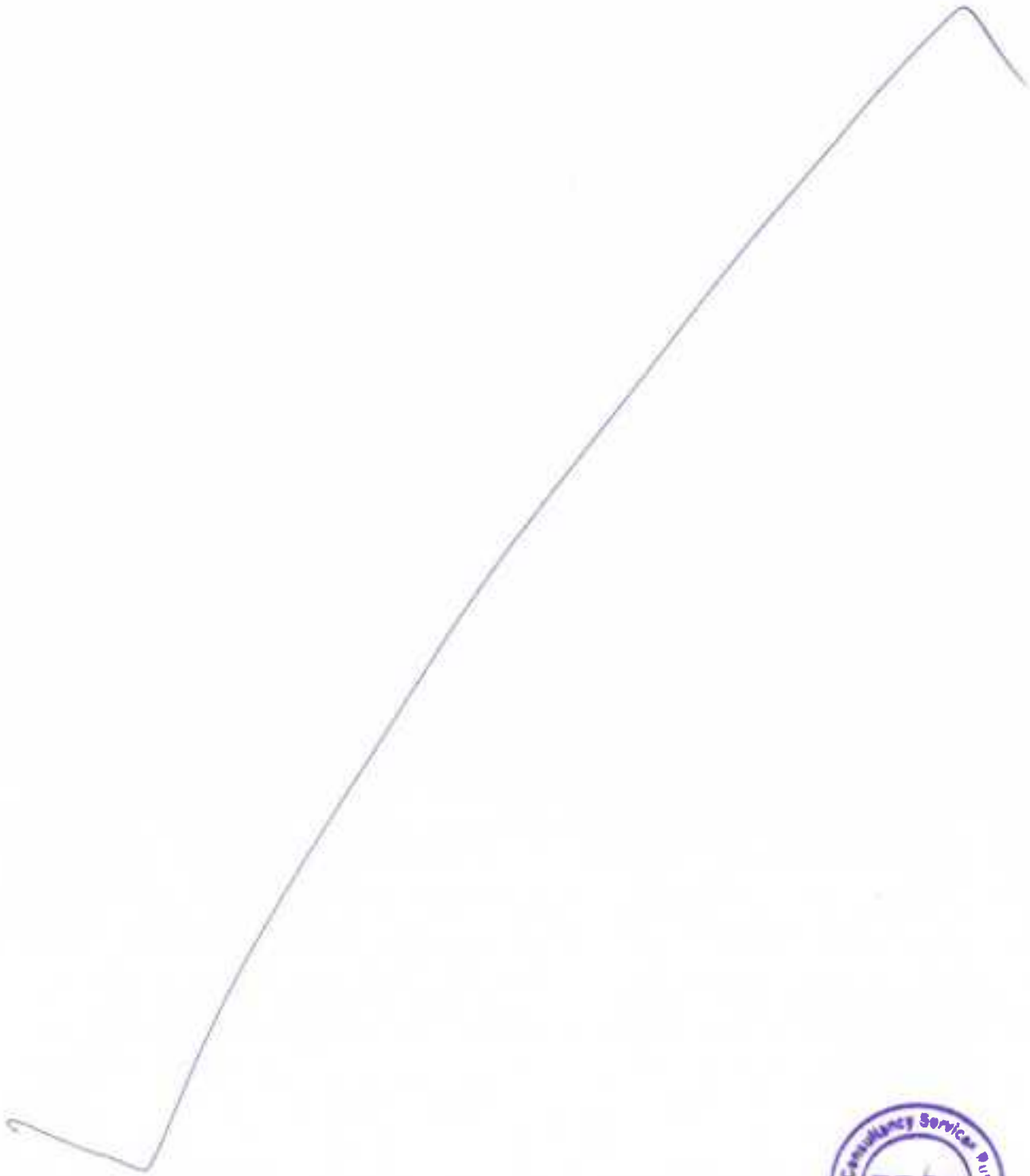
The Contractor shall comply with all site security, access-control, confidentiality and information-security requirements of the Employer. Access to restricted areas shall be limited to authorized personnel. No photography, videography, drone operation, scanning, copying, publication or disclosure of security layouts, network diagrams, system architecture, credentials or other sensitive information shall be permitted except with the Employer's prior written authorization. These obligations shall survive completion and termination of the Contract.

### 78.5 Resolution of Technical Ambiguities

Where an ambiguity or inconsistency arises between the Specifications, Drawings and other technical documents concerning required performance, interfaces or scope, the matter shall be referred to the Engineer for a written determination in accordance with the Contract. No change in Contract Price or scope shall arise unless authorized under the Contract.

### 78.6 Handover and Final Documentation

Final payment and release of retention shall be subject to the Contractor having fulfilled the applicable completion, testing, defect rectification, documentation, and handover obligations stated in the Contract, without prejudice to the Employer's rights in respect of latent defects or surviving obligations.



# SPECIFICATIONS -

# (SPECIAL PROVISIONS & TECHNICAL PROVISIONS)

Refer Volume 3 of Bidding Documents for Specifications-Special Provisions & Technical Provisions

## PART A - SPECIAL PROVISIONS

Refer Volume 3 (A) of Bidding Documents for Specifications-Special Provisions

## PART B - TECHNICAL PROVISIONS

Refer Volume 3 (B1) & 3 (B2) of Bidding Documents for Specifications-Technical Provisions

Standard Specifications for Road and Bridge Construction, C & W, Punjab. Year 1971 & 2022

(MRS 2nd Bi-Annual 2026, District Multan)
**(To be obtained by the Bidders)**

An original copy of the above publications to be procured by the successful Contractor and shall be accordingly incorporated in the Contract Documents.

**For Specifications of Non-Schedule items refer to Volume 2 & 3 of Bidding Documents**

Note:

**Specifications of Schedule and Non-Schedule Items**

The specifications and description of Schedule Items included in the BOQ shall be deemed to be as provided in the applicable Market Rate System (MRS), published by the Finance Department, of the Government of Punjab, as referred to in the Bidding Documents. For Non-Schedule Items, the specifications, description, quality, standards, materials, workmanship and other requirements shall be strictly as specified in the respective BOQ item description and the relevant Technical Specifications forming part of the Bidding Documents.

Where a Non-Schedule Item is not covered by the MRS, the Contractor shall execute such item strictly in accordance with the specifications and requirements stated in the BOQ and Technical Specifications, including the applicable codes, standards and manufacturer's recommendations, where specified.

# DRAWINGS

Refer Volume 4 of Bidding Documents for Drawings

# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTRE AT PITB MULTAN

## VOLUME 2

## BILL OF QUANTITIES (BOQ)



**ESTABLISHMENT OF DISASTER RECOVERY DATA CENTER AT PITB MULTAN**

**APPENDIX-D TO BID**

**BILL OF QUANTITIES**

## PREAMBLE, BASIS OF PRICING, MEASUREMENT AND PAYMENT

This Preamble forms an integral part of Appendix-D to Bid (Bill of Quantities) and shall be read together with the Instructions to Bidders, Conditions of Contract, Special Conditions of Contract, Drawings, Technical Specifications, Special Provisions and all other Contract Documents. It establishes the common basis on which the Bidder shall determine and enter its rates and prices. The Bidder shall satisfy itself that all costs necessary to execute, complete, test, commission, take over and, where applicable, operate and maintain the Works in accordance with the Contract are appropriately included in the priced Bill of Quantities.

### A. GENERAL PROVISIONS

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Drawings, Technical Specifications, Special Provisions and all other Bidding/Contract Documents. The description of an item in the Bill of Quantities shall not be read in isolation from the requirements stated elsewhere in the Contract.
2. The quantities stated in the Bill of Quantities are estimated quantities for bidding purposes only, except where an item is expressly identified as a Lump Sum or otherwise stated in the Contract. Payment for measured Work shall be based on the actual quantities of Work executed, measured in accordance with the Contract, verified by the Engineer and valued at the applicable rates and prices in the priced Bill of Quantities or, where expressly permitted by the Contract, at rates determined in accordance with the Contract.
3. The rates and prices entered in the priced Bill of Quantities shall be deemed to include all costs, expenses, overheads, profit, risks and obligations necessary for complete execution of the respective item, including Contractor's plant, labour, supervision, materials, wastage, loading and unloading, transportation, storage, handling, protection, temporary works, testing, commissioning, documentation, compliance with Codes and Standards, insurance, taxes, duties, fees, levies and all other incidental costs, except only those items expressly identified for separate payment.
4. All duties, taxes and other levies payable by the Contractor under the Contract, or otherwise applicable to the Works, based on the applicable tax position as at the date specified in the Contract/Bidding Documents, shall be deemed included in the rates and prices, subject to any adjustment expressly allowed under the Contract.
5. A rate or price shall be entered against every item in the priced Bill of Quantities, whether or not a quantity is stated. Where the Bidder omits a rate or price against an item for which a quantity is stated, the cost of executing that item shall be deemed to be included in other related rates and prices and no separate payment shall be made, except as otherwise expressly provided in the Contract.
6. Where the Bill of Quantities does not repeat all requirements relating to an item, the Bidder shall refer to the relevant Drawings, Specifications, Special Provisions, manufacturer requirements and other Contract Documents before pricing the item. No omission from an individual BOQ description shall relieve the Contractor from complying with the corresponding Contract requirement.
7. The cost of complying with all requirements of the Contract that are not separately itemized in the Bill of Quantities shall be deemed to be distributed among the relevant rates and prices, unless the Contract expressly provides for separate measurement and payment.



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8. No item shall be priced or paid more than once. Where a requirement is expressly included in a separate BOQ item, the same cost shall not also be included as a separately recoverable amount under another item. Conversely, inclusion of an incidental cost in a rate shall not relieve the Contractor from executing the corresponding requirement.

## B. MEASUREMENT AND BASIS OF PAYMENT

1. Unless otherwise stated in the relevant BOQ item, measurement shall be in the units stated in the Bill of Quantities and shall be based on the dimensions and quantities of the completed and accepted Work in accordance with the Contract. No allowance shall be made for off-cuts, laps, wastage, excess excavation, temporary supports, temporary works or other non-measurable losses unless expressly stated in the Specifications or the relevant method of measurement.

2. Where a BOQ item is described as Lump Sum (LS), the rate/amount shall include the complete cost of all labour, materials, plant, equipment, supervision, temporary works, testing, commissioning, documentation and other requirements necessary to complete that item in all respects. A Lump Sum item shall not be remeasured merely because the Contractor's actual cost or quantity differs from the Contractor's estimate.

3. Where a BOQ item is stated on a per-unit basis, the tendered unit rate shall be deemed to cover the complete supply, installation, testing, commissioning and completion of the described unit, including all ancillary components and accessories necessary for proper functioning, unless those components are expressly measured and paid under separate BOQ items.

4. Payment shall be made only for Work that has been executed in accordance with the Contract, measured/valued as required, and certified in accordance with the Conditions of Contract. No payment shall be due for defective, rejected, incomplete or unaccepted Work except to the extent expressly allowed under the Contract.

5. Temporary works, temporary supports, access arrangements, lifting, scaffolding, shoring, dewatering, protection of existing or completed Work, temporary power/water and similar requirements shall be deemed included in the relevant rates unless a specific BOQ item is provided.

## C. PROVISIONAL SUMS, PRIME COST ITEMS AND VARIATIONS

1. Provisional Sums, where included in the Bill of Quantities and identified as such, shall be expended in whole or in part only as directed by the Engineer and in accordance with the Conditions of Contract. The Contractor shall not assume any entitlement to the full amount of a Provisional Sum.

2. The Contractor's attendance, supervision, profit, overhead and other costs relating to a Provisional Sum shall be included in the manner expressly stated in the relevant BOQ item or Contract provision. No additional amount shall be due merely because a Provisional Sum has been included in the BOQ.

3. Any work not specifically measured in the Bill of Quantities but required by an instruction under the Contract shall be dealt with as a Variation or otherwise in accordance with the applicable valuation provisions of the Contract.

## D. SPECIFICATIONS, STANDARDS AND ITEM DESCRIPTIONS

1. For Schedule Items, the applicable rates shall be based on the requirements of the applicable MRS Multan (2nd Bi-annual 2026), together with the relevant Technical Specifications, Drawings and Special Provisions forming part of the Contract.

2. For Non-Schedule Items, the rates shall be based on the complete requirements stated in the BOQ item description and the applicable Drawings, Technical Specifications, Special Provisions,

Codes/Standards and manufacturer's requirements. The Bidder shall include all components and accessories necessary for a complete and operational installation.

3. Where a particular standard is specified in the Contract, the Contractor shall comply with the latest edition/edition expressly stated in the Contract. Where more than one applicable standard is referenced, the more stringent requirement shall apply to the extent permitted by the Contract and subject to the Engineer's determination where an inconsistency exists.

4. Manufacturer's recommended installation, testing, commissioning, calibration, maintenance, environmental and operating requirements shall be complied with where applicable and shall be deemed included in the relevant rates and prices.

## E. DATA CENTRE-SPECIFIC PRICING REQUIREMENTS

Because the Works constitute an integrated Disaster Recovery Data Center, bidders shall price each system and item as a complete, coordinated and operational installation. Unless a particular component or service is expressly separately measured and paid in the BOQ, the relevant rate shall include all ancillary items, interfaces and activities necessary for the intended performance of the complete system.

| System / Work Package | Pricing Basis / Inclusions |
|---|---|
| Civil/Architectural and Building Works | Rates shall include all associated substructure/superstructure, finishes, doors, access provisions, fire-rated and security-rated construction, penetrations, sleeves, builders' work, supports, equipment foundations/plinths, equipment rooms, service spaces, making good and coordination with MEP/ICT systems as required by the Contract. |
| Electrical Infrastructure | Rates for electrical equipment/systems shall include all accessories, supports, cables/conductors, terminations, glands, lugs, labels, earthing/bonding, protection, control wiring, interconnections, testing, settings, calibration, commissioning and all components required for a complete operational installation. |
| UPS and Battery Systems | Rates shall include the complete UPS system, associated battery systems, battery cabinets/racks, bypass arrangements, controls, monitoring interfaces, accessories, interconnections, testing, commissioning, battery testing and OEM requirements, except where expressly separately itemized. |
| Diesel Generator and ATS/AMF Systems | Rates shall include complete generator sets and associated ATS/AMF, controls, protection, fuel-related systems within the specified scope, exhaust arrangements, acoustic provisions where specified, starting systems, cabling, earthing, synchronization/load-sharing components where specified, testing and commissioning. |
| Precision Cooling | Rates shall include complete cooling units and associated outdoor/condensing units, controls, |



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| System / Work Package | Pricing Basis / Inclusions |
|---|---|
| | piping, valves, insulation, supports, condensate arrangements, refrigerant/charging, leak testing, commissioning, balancing and required control/monitoring interfaces, unless separately measured. |
| Fire Detection and Suppression | Rates shall include complete detection, alarm, clean-agent suppression and associated controls, piping, nozzles, cylinders/containers, release systems, interfaces, testing, discharge/system integrity testing where required, certification and commissioning as specified. |
| DCIM/BMS, ICT and ELV | Rates shall include software, firmware, licences/subscriptions required by the Contract, gateways, controllers, sensors, interfaces, panels, communications, structured cabling within the specified scope, configuration, database setup, graphics, alarms, integration and testing necessary to deliver the specified functionality. |
| Security Systems | Rates shall include complete CCTV/VSS, access control and associated equipment, cabling, readers, controllers, recording/storage where specified, integration, configuration, testing and commissioning, including all accessories necessary for operation. |

**F. TESTING, COMMISSIONING, INTEGRATION AND CERTIFICATION**

1. Unless expressly separately itemized, the rates for all Plant, equipment and systems shall include all costs of pre-commissioning, commissioning, functional testing, performance testing, calibration, FAT, SAT, Integrated Systems Testing (IST), retesting and associated documentation required by the Contract.

2. The Contractor shall include in the relevant rates all labour, specialist personnel, calibrated instruments, test equipment, temporary arrangements, consumables, temporary loads/simulators, third-party specialist services and other resources required to carry out the specified tests.

3. For the Data Center's fault-tolerant and Rating IV requirements, the priced rates shall include the Contractor's obligations for integrated testing of critical power, cooling, telecommunications and associated control/monitoring systems, including demonstration of the specified redundancy and single-fault tolerance, where required by the Contract.

4. Where the Contract requires independent certification/assessment of the completed Data Center, all costs of coordination, submission of records, attendance, corrective actions, retesting and obtaining the required certification/assessment shall be deemed included in the relevant rates or specifically priced BOQ items, as applicable.

5. Testing, inspection, witnessing or acceptance by the Engineer/Employer shall not constitute acceptance of defective or non-conforming Work and shall not relieve the Contractor of its obligations under the Contract.

## G. OEM, WARRANTY, SOFTWARE, LICENCES AND SUPPORT

1. Rates for equipment and systems shall include all OEM/manufacturer warranties, certificates, installation requirements, technical support, factory/site services and documentation specified in the Contract.

2. Where the Contract requires warranties, support entitlements, licences or subscriptions to be registered in the name of PITB as end customer/end user and warranty beneficiary, the cost and administration of such registration shall be included in the relevant rates.

3. All software, firmware, licences, subscriptions, keys, entitlement IDs, updates and support required for the specified functionality and for the period stated in the Contract shall be included in the relevant equipment/system rate or separately itemized BOQ item, as applicable. No functionality necessary for compliance with the Contract shall be withheld on the basis that it was not separately described in the BOQ where the Contract expressly requires that functionality.

4. Where an OEM or authorised service provider is required for installation, testing, commissioning, preventive maintenance or warranty support, the cost of such specialist services shall be included in the applicable rate or the separately priced O&M/SLA item, as applicable.

## H. CRITICAL SPARES, CONSUMABLES, TOOLS AND DIAGNOSTIC EQUIPMENT

1. The Bidder shall develop and submit with its Bid a comprehensive Initial Critical Spare Parts List for all critical systems and equipment, based on OEM recommendations, the proposed installations and the Year-1 O&M/SLA requirements. The Bidder shall determine the required type and quantity of such spares and include the complete cost in its Bid Price. The final list shall be subject to the Engineer/Employer's approval and shall be supplied, delivered, inspected, identified, stored and handed over to PITB in accordance with the Contract.

2. Routine O&M consumables, maintenance materials, lubricants, filters, belts, seals, gaskets, fuses, lamps, refrigerants and other recurring items required for Year-1 O&M/SLA shall be included in the mandatory Year-1 O&M/SLA BOQ price unless expressly excluded by the Contract.

3. The Bidder shall identify and provide all special maintenance tools, diagnostic equipment and calibrated test instruments required for the mandatory Year-1 O&M/SLA Services, based on OEM requirements and the Contractor's proposed O&M methodology. The complete cost thereof, including procurement, delivery, calibration, maintenance and use during the O&M/SLA Service Period, shall be included in the Bid Price, notwithstanding that such items are not separately identified in the Bill of Quantities. Equipment already included as permanent Works shall not be separately charged as O&M tools.

4. No item of spare, consumable, repair, replacement or support covered by the original equipment price or OEM warranty/support entitlement shall be priced or paid twice.

## I. MANDATORY ONE-YEAR O&M/SLA SERVICES

1. The mandatory Year-1 O&M/SLA Services shall be priced separately in the BOQ and shall form part of the Contract Price. The price shall cover the complete service obligation for 365 calendar days commencing on the Taking-Over Certificate under Sub-Clause 48.1.

2. The Year-1 O&M/SLA price shall include all required manpower, relievers/substitutes, 24x7x365 monitoring and response, preventive and corrective maintenance, OEM coordination, warranty management, incident management, reporting, routine maintenance materials and consumables, repairs and replacements, maintenance of required redundancy and availability, and all other O&M/SLA obligations stated in the Contract, except only expressly stated exclusions.



3. The O&M/SLA price shall be firm and fixed throughout the O&M/SLA Service Period and shall not be subject to price adjustment under Clause 70, unless expressly provided otherwise in the Contract.

4. The Bidder shall not embed the Year-1 O&M/SLA price in the rates of permanent equipment/items where a separate BOQ item for O&M/SLA Services is provided. Conversely, no element expressly included in the O&M/SLA BOQ item shall be claimed separately under permanent Works items unless the Contract expressly provides otherwise.

5. The basis of payment for the Year-1 O&M/SLA Services shall be as stated in the Conditions of Contract/Special Provisions. SLA deductions, retention and other contractual deductions shall be applied in accordance with the Contract.

## J. OEMs, AUTHORISED SERVICE PROVIDERS AND SPECIALIST SUBCONTRACTORS

1. Where the Bidder proposes to engage OEMs, authorised service providers or specialist subcontractors for specialised portions of the Works or O&M/SLA Services, the associated costs shall be included in the relevant BOQ rates unless a separate BOQ item is provided.

2. Approval of a subcontractor shall not relieve the Contractor of any obligation, responsibility or liability under the Contract. The Contractor shall remain the single point of responsibility for the complete and integrated performance of the Works and the O&M/SLA Services.

3. Where Manufacturer's Authorisation is a mandatory bidding requirement for a specified package, the rates shall include all obligations arising from the authorised OEM/service arrangement, including supply, installation, testing, commissioning, warranty support, after-sales service and technical assistance required by the Contract.

## K. SITE, TEMPORARY WORKS, UTILITIES, PROTECTION AND HSE

1. Rates shall include all costs associated with mobilisation, demobilisation, site establishment, offices, stores, workshops, temporary services, communications, security, welfare, access, temporary power and water, temporary drainage and other facilities required for execution of the Works, except where separately itemized.

2. Rates shall include all costs for protection of the Works, Plant, equipment, materials, completed areas and adjacent property from damage, weather, contamination, theft or unauthorized access.

3. Rates shall include compliance with all applicable health, safety, environmental, fire, security and site-access requirements stated in the Contract, including PPE, permits, barricading, housekeeping, waste removal and safe disposal.

4. All loading, unloading, internal transport, lifting, cranage, hoisting, positioning and final placement of Plant and equipment shall be included in the relevant rates.

## L. DRAWINGS, SHOP/COORDINATION DOCUMENTS, TEST RECORDS, TRAINING AND HANDOVER

1. Rates shall include preparation, submission, revision and finalization of shop drawings, coordination drawings, equipment schedules, method statements, inspection/test plans, commissioning procedures and other execution documents required by the Contract. Such documents shall support execution of the Employer's design and shall not be construed as transferring overall design responsibility from the Employer where the Contract is Employer-designed.

2. Rates shall include all as-built drawings, single-line diagrams, schematics, equipment schedules, asset registers, O&M manuals, operating procedures, maintenance schedules, test certificates, commissioning records, warranties, licences, entitlement information and other handover documentation required by the Contract.

3. Rates shall include all training required for PITB personnel, including specialist/OEM training where required, training materials, manuals, demonstrations and attendance certificates.

4. All final handover documentation shall be provided in the format and number of copies/electronic media stated in the Contract and shall be updated to reflect the actual installed and commissioned configuration.

## M. PRICE ADJUSTMENT, FINANCING COSTS AND CURRENCY

1. Where price adjustment is permitted under Clause 70 and Appendix-C to Bid, adjustment shall be calculated only in the manner and for the components expressly identified therein. No separate escalation or adjustment shall be allowed merely because the Contractor's actual costs differ from the tendered rates.

2. Rates and prices shall be deemed to include the Contractor's financing, cash-flow, banking, letter-of-credit, import documentation, foreign exchange conversion, freight and similar commercial costs necessary to perform the Contract, except where the Contract expressly provides a separate entitlement or adjustment.

3. The Year-1 O&M/SLA price is firm and fixed for the full 365-day O&M/SLA Service Period and is not subject to price adjustment.

## N. ERRORS, OMISSIONS, AMBIGUITIES AND DISCREPANCIES

1. The Bidder shall examine the complete Bidding Documents before pricing the BOQ. Any discrepancy, ambiguity or apparent omission identified during the bidding period shall be raised through the clarification process prescribed in the Bidding Documents.

2. Where a BOQ description is abbreviated, the complete requirement shall be determined by reference to the relevant Contract Documents. The Bidder shall price the item to achieve the specified final performance and completeness.

3. After award, interpretation of ambiguities or inconsistencies shall be dealt with under the Conditions of Contract and the Engineer's authority. The Bidder shall not assume that an omission in the BOQ description creates a separate entitlement where the requirement is otherwise expressly included in the Contract.

4. Nothing in this Preamble shall be construed to amend the risk allocation, measurement provisions, Variation provisions, price-adjustment provisions or other express rights and obligations established by the Conditions of Contract.

## O. ABBREVIATIONS USED IN THE BILL OF QUANTITIES

| Abbreviation | Meaning |
|---|---|
| AASHTO | American Association of State Highway and Transportation Officials |
| ATS | Automatic Transfer Switch |
| BMS | Building Management System |
| BS | British Standard |
| COC | Conditions of Contract |
| CM / cu.m | Cubic Metre |
| DCIM | Data Center Infrastructure Management |

| Abbreviation | Meaning |
|---|---|
| DG | Diesel Generator |
| EO | Extra |
| FAT | Factory Acceptance Test |
| HSD | High Speed Diesel |
| HP | Horse Power |
| HVAC | Heating, Ventilation and Air Conditioning |
| ICT | Information and Communications Technology |
| IST | Integrated Systems Testing |
| LS | Lump Sum |
| M / RM / LM | Metre / Running Metre / Linear Metre |
| MC | Medium-Curing |
| MRS | Market Rate System |
| N/A | Not Applicable |
| No. | Number |
| O&M | Operations and Maintenance |
| OPC | Ordinary Portland Cement |
| PDU | Power Distribution Unit |
| PITB | Punjab Information Technology Board |
| PM/CM | Preventive Maintenance / Corrective Maintenance |
| RC | Reinforced Concrete |
| RPP | Remote Power Panel |
| RCC | Reinforced Cement Concrete |
| RS / PKR | Pakistani Rupees |
| SAT | Site Acceptance Test |
| SP | Special Provisions |
| SM / sq.m | Square Metre |
| SLA | Service Level Agreement |
| SRPC | Sulphate-Resisting Portland Cement |
| UPS | Uninterruptible Power Supply |
| VSS | Video Surveillance System |



Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

## P. WORK ITEMS AND RATE BUILD-UP

1. The BOQ contains the principal work items for the Project and the prices shall be based on the complete scope of those items in conjunction with the Contract Documents.

2. For Schedule Items, the applicable MRS Multan (2nd Bi-annual 2026) and relevant Standard General Specifications shall be used only to the extent expressly applicable to the item. For Non-Schedule Items, the BOQ description together with the Technical Specifications, Drawings and Special Provisions shall govern.

3. Where a non-schedule work item is required pursuant to a duly instructed Variation, the applicable valuation shall be determined in accordance with the Conditions of Contract and the applicable contractual method of valuation.

4. Each BOQ rate shall be sufficient to deliver the item in a complete, functional, tested and accepted condition. Where an item represents a system rather than a single physical component, the rate shall include all necessary interfaces, accessories, controls, supports, cabling, connectors, software/firmware, testing and commissioning required for the system to perform its specified function.

5. Where the BOQ contains separate items for components that are commonly installed as part of a system, those components shall be priced separately only to the extent expressly identified. The Contractor shall coordinate the separate items so that the complete system is delivered without gaps in scope.

## Q. ORDER OF APPLICATION FOR PRICING

For the purpose of preparing the Bid, the Bidder shall price the BOQ in accordance with the following sequence: (a) the explicit BOQ item description and stated unit/quantity; (b) the applicable Drawings and Technical Specifications; (c) the Special Provisions and other Contract requirements applicable to that item; (d) applicable manufacturer/OEM requirements; and (e) the general provisions of this Preamble. Where an inconsistency remains, the Contract's document-precedence provisions shall govern.

The Bidder is deemed to have allowed in its rates and prices for every obligation necessary for the complete and successful execution, testing, commissioning, handover and Year-1 O&M/SLA performance of the Project. The purpose of this Preamble is to establish a common pricing basis and reduce ambiguity; it does not relieve either Party from complying with the express provisions of the Contract.



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**GRAND SUMMARY**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No | DESCRIPTION | SCHEDULE ITEMS | NON SCHEDULE ITEMS | AMOUNT (RS) |
|---|---|---|---|---|
| 1 | CIVIL WORKS | | | |
| 2 | ELECTRICAL WORK | | | |
| 3 | INTERAL BUILDING PLUMBING WORK | | | |
| 4 | FIRE PROTECTION SYSTEM | | | |
| 5 | AIR CONDITIONING SYSTEM | | | |
| 6 | NETWORKING SYSTEM | | | |
| 7 | O & M COST DURING SLA | | | |
| | **Total** | | | |
| | **Total Amount (In Million)** | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**SUMMARY OF CIVIL WORKS**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No | DESCRIPTION | SCHEDULE ITEMS | NON SCHEDULE ITEMS | AMOUNT (RS) |
|---|---|---|---|---|
| 1 | BUILDING WORKS | | | |
| 2 | BOUNDARY WALL | | | |
| 3 | MAIN GATE & GUARD ROOM | | | |
| 4 | ROAD WORK | | | |
| 5 | TUBEWELL & ROOM | | | |
| 6 | EXTERNAL SEWERAGE SYSTEM | | | |
| 7 | UNDER GROUND WATER TANK AND PUMP ROOM | | | |
| 8 | UNDER GROUND FIRE FIGHTING TANK AND ROOM | | | |
| | **SUB TOTAL** | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | | **3. EARTHWORK (EXCAVATION & EMBANKMENT)** | | | | |
| 3/21 1a-ii | | Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead upto one chain (30 m) and lift upto 5 ft. (1.5 m) 1) By Manual. ii) in ordinary soil. | P.Cft | 76,994.31 | | |
| 3/21-2aii | | Depth from 5.1 ft (1.5m) to 15 ft (4.5 m):- ii) Ordinary soil | P.Cft | 20,965.78 | | |
| 3/15 i | | Filling, watering and ramming earth under floors:-i) with surplus earth from foundation, etc. | P.Cft | 48,980.05 | | |
| 3/15 ii | | Filling, watering and ramming earth under floors:- ii) with new earth excavated from outside, lead upto one chain (30 m). i/c lead upto 5 km | P.Cft | 143,301.55 | | |
| | **6. CONCRETE** | | | | | |
| 6/5 i | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8 i/c Lead upto 355 km | | | | |
| | | Foundation | P.Cft | 4,408.95 | | |
| 6/2 | | Dry rammed brick or stone ballast, 1½" to 2"( 40 mm to 50mm) gauge, i/c Lead upto 355 km | | | | |
| | | Ground Floor | P.Cft | 6,749.99 | | |
| 6/5 f | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (f) Ratio 1: 2: 4 i/c Lead upto 355 km | | | | |
| | | Ground Floor | P.Cft | 5,113.63 | | |
| 6/9 cvi | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) ( c) Substructure (Foundations, Raft, Strip and Footing Beams). (vi) 3000 PSI i/c Lead upto 355 km | | | | |
| | | Foundation | P.Cft | 27,181.18 | | |
| 6/9 av | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-. (vi) 3000 PSI i/c Lead upto 360 km | | | | |
| | i | Ground Floor | P.Cft | 32,552.51 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 6/9-b v-i | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a Retaining/ Shear walls laid in situ or precast laid in position, or prestressed members cast ( Formwork on both sides) (vi) 3000 PSI i/c Lead upto 355 km | P.Cft | 7,041.10 | | |
| 6/12 bii | | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- | P.Kg | 305,448.54 | | |
| 6/32 ii | | Providing and embedding 10" (250mm) wide PVC water stopper in expansion joints of RCC structures (Retaining walls, water tanks, Slabs) complete in all respect. ii) 10 mm thick | Metre | 426.00 | | |
| 9/46-aii | | Providing and applying torch-on water proofing bitumenous membrane of specified thickness (made of Roof-Grip/ Euro Bit) duly lapped/ connected by heating with Torch over ps-6 primer i/c preparation/ smoothen the surface complete in all respect as approved and directed by the Engineer Incharge. a) Plain ii) 4 mm thick | P.Sft | 5,440.00 | | |
| | **7. BRICK WORK** | | | | | |
| 7/4 i | | Pacca brick work in foundation and plinth in:- i) Cement, sand mortar:- Ratio 1:5 | P.Cft | 11,849.11 | | |
| 7/5 i | | Pacca brick work in ground floor:- i) cement, sand mortar:- Ratio 1:4 | | | | |
| | | Ground Floor | P.Cft | 52,023.03 | | |
| | **9. ROOFING** | | | | | |
| 9/5 | | Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs.per %Sft. or 1.72 Kg/Sq.m bitumen coating sand blinded. | | | | |
| | | Roof Area | P.Sft | 23,175.00 | | |
| 9/15 | | Khuras on roof 2'x2'x6" (600 x 600 x 150 mm) | | | | |
| | | Roof Area | Each | 26.00 | | |
| 19/44-iv | | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized Polyvinyl Chloride ) Nikasi/ SWV pipe, Dadex / Popular / Beta or approved equivalent manufacturer, plain / Bell Ended / Z - Joints conforming to BS 4514 / BS 5255 - EN 1329 including the cost of specials and Solvents complete in all respects, as per drawings & specifications and / or as approved and directed by the Engineer Incharge. | | | | |
| | | 110 mm Rain Water down pipe. | P.Rft | 528.00 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 9/48-ii | | Providing and fixing false ceiling comprises of Gypsum board laminated sheet of size 2'x2'/2'x3'/ 3'x3'of specified design and thickness i/c cost of fixtures i.e galvanized angle 1" x 1" at wall sides, galvanized tee 1¼" x 1"and 1 ½" x 1" both at 4' c/c ( made of Taiwan CKM or equivalent), hanging with G.I/Copper wire 16 SWG, G.I hook, Rawal Plug etc: complete in all respects as approved and directed by the Engineer Incharge. iv) 12 mm thick | P.Sft | 4,018.63 | | |
| | **10. FLOORING** | | | | | |
| 10/3 | i | Supplying and filling sand under floor; or plugging in wells. | P.Cft | 6,749.99 | | |
| 10/22-b-i | | Providing & Laying mosaic flooring consisiting of one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips,laid over 1"(25 mm) thick flooring of 1:2:4 cement concrete including rubbing and polishing complete with finishing :- b) 1½"(40 mm) thick mosaic flooring, consisting of ½ " (13mm) mosaic topping, (i) using grey cement | P.Sft | 1,482.44 | | |
| 10/34-aii | | Mosaic dado or skirting with one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips, laid over ½"(13 mm) thick cement plaster 1:3, including rubbing and polishing, complete with finishing: (a) using grey cement: ii) ½"(13 mm) thick | P.Sft | 3,582.10 | | |
| 10/46-aiii | | Providing and laying superb quality Porcelain glazed tiles flooring of MASTER brand of specified size in approved design, Color and Shade with adhesive/bond over 3/4" thick (1:3) cement plaster i/c the cost of sealer for finishing the jointsi/ccutting grinding complete in all respect as approved and directed by the Engineer Incharge. a) Full body Glazed tiles (iii) 600mm x 600 mm (24"x24") Qty Toilet | | | | |
| | i | Ground Floor | P.Sft | 442.19 | | |
| 10/35-aiii | | Providing and laying superb quality Porcelain glazed tiles of Master/ Stile brand or approved equivalent manufacturer, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2"thick (1:2) cement plaster i/c the cost of and sealer for finishing the joints, cutting grinding complete in all respect as approved and directed by the Engineer Incharge.. a) Full body Glazed tiles (iii) 600mm x 600 mm (24"x24") | | | | |
| | i | Ground Floor | P.Sft | 1,236.68 | | |
| 10/46-aiv | | Providing and laying superb quality Porcelain glazed tiles flooring of MASTER brand of specified size in approved design, Color and Shade with adhesive/bond over 3/4" thick (1:3) cement plaster i/c the cost of sealer for finishing the jointsi/ccutting grinding complete in all respect as approved and directed by the Engineer Incharge. a) Full body Glazed tiles (iv) 600mmx 1200 mm (24"x48") | | | | |
| | i | Ground Floor | P.Sft | 7,902.13 | | |
| 10/35-aiv | | Providing and laying superb quality Porcelain glazed tiles of Master/ Stile brand or approved equivalent manufacturer, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2"thick (1:2) cement plaster i/c the cost of and sealer for finishing the joints, cutting grinding complete in all respect as approved and directed by the Engineer Incharge.. a) Full body Glazed tiles (iv) 600mmx 1200 mm (24"x48") | | | | |
| | i | Ground Floor | P.Sft | 6,363.25 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 10/48-iii | | Providing and laying of specific thickness full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge. iii) 3/4" thick Granite | | | | |
| | i | Ground Floor | P.Sft | 955.38 | | |
| 10/22-b-i | | Providing & Laying mosaic flooring consisiting of one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips,laid over 1"(25 mm) thick flooring of 1:2:4 cement concrete including rubbing and polishing complete with finishing :- b) 3"(40 mm) thick mosaic flooring, consisting of ½ " (13mm) mosaic topping, (i) using grey cement **(double parts 317.93*2=635.86)** | P.Sft | 11,633.00 | | |
| | **11. SURFACE RENDERING** | | | | | |
| 11/12-b | | Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, upto 20' height. b) 1:3 | | | | |
| | i | Ground Floor | P.Sft | 14,997.44 | | |
| | | **Internal Wall plaster** | | | | |
| 11/9 b | | Cement plaster 1:4 upto 20' (6.00 m) height:- b) ½" (13 mm) thick | | | | |
| | i | Ground Floor | P.Sft | 84,660.76 | | |
| | | **External Wall plaster** | | | | |
| 11/9 c | | Cement plaster 1:4 upto 20' (6.00 m) height:- c) ¾" (20 mm) thick | | | | |
| | i | Ground Floor | P.Sft | 14,320.51 | | |
| | | **Painting on plastered walls** | | | | |
| 11/23 | | Priming coat of chalk under distemper. | P.Sft | 99,658.20 | | |
| 13/31-a | | Preparing surface and painting with Plastic Emulsion Paint:- first coat | P.Sft | 45,027.50 | | |
| 13/31-b | | 2nd coat | P.Sft | 45,027.50 | | |
| 11/40 | | Providing & applying 1.5 mm thick fine textured high quality Sandtex Coating formed of special Acrylic base protective decorative coating of approved colour & shade with trowel having top class finish over well cleaned plastered surface i/c preparation and cleaning the surface, complete in all respect as approved and directed by the Engineer Incharge. | P.Sft | 4,303.88 | | |
| 11/56 | | Providing, fabricating, supplying and fixing of indoor wall-mounted Signage of specified thickness, comprising of high-quality acrylic/ACP base with bilingual text and icon with single side UV printing/CNC engraving, complete in all respects as per approved design by the Engineer Incharge. ii) Size 8 mm thick | P.Sq Inch | 7,200.00 | | |
| | **12. WOOD WORK** | | | | | |
| 12/13 | | Providing and fixing 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge. | P.Sft | 148.75 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE | Amount |
|---|---|---|---|---|---|---|
| | | | | | Rs. | Rs. |
| 12/17-ii | | Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS ox,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge. (ii) 10.5 " wide | P.Sft | 148.75 | | |
| 12/64 | | Providing and fixing Imported Mortice Lever Handle Lock with back plate (Machine, Cylinders, Lever Handles (Pair) and backplate (Pair) of approved quality, design & finish, including the cost of all accessories to complete the job as shown on drawing and as per specification, complete in all respect, as approved and directed by the Engineer Incharge. | P.Each | 5.00 | | |
| 12/66 | | Providing and laying Stainless Steel kick plate 18 swg (grade-304) of approved size, fixed with screws, complete in all respect as per Specifications, as approved and directed by the Engineer Incharge. | P.Sft | 5.78 | | |
| 12/67 | | Providing and fixing S.S Magnetic Door Stopper including cost of screws, rawal bolt, pvc plug etc., complete in all respect as per approved specifications and as approved by the Engineer incharge. | P.Each | 5.00 | | |
| | **13. PAINTING AND VARNISHING** | | | | | |
| 13/33 ai+ii | | Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: **i) 1st coat** | P.Sft | 3,913.25 | | |
| | | **2nd coat** | P.Sft | 3,913.25 | | |
| 13/5 d | | Painting new surface:- Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:- i) priming coat. | P.Sft | 13,290.16 | | |
| | | ii) each subsequent coat of paint. 2 coat | P.Sft | 13,290.16 | | |
| | **25 IRON WORK** | | | | | |
| 25/10+11 | | Fabrication of heavy steel / Iron work, with angle, tees, flat iron round iron and sheet iron for making trusses, girders, tanks, etc., including cutting, drilling, revitting, handling, assembling and fixing, including Erection and fitting in position iron trusses, staging of water tanks, etc. | P.Sft | 33,225.39 | | |
| 25/52 | | Providing and fitting all types of glazed aluminium windows of anodised / powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm 'thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardwareetc., as approved by the Engineer in charge. | P.Sft | 24.00 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 25/55 | | Providing and fixing 2 mm thick Double glazed aluminium windows of anodize / powder coated partly fixed and party sliding using deluxe section of 100mm x 40mm x2 mm using frame (70501) at bottom, (70502) at Top & Side made of Pakistan Cables/Alcop or approved equivalent anufacturer having Leaf Frame size 31mm x 60mm x2 mm (70506) at Top & Bottom, 35mm x 60mm x2mm (70505) at center and 35mm x 60mm x2 mm(70503) at sides, fixing one side Tempered and one side clear double glass, and air tight using double tape, chemical strips, Silicon using approved latches, wheels for channel, stopper, brush channel angle joint and hardware etc.( excluding the cost of Fly Proofing). Complete in all respect as approved and directed by the Engineer Incharge. b) 5mm thick Tempered Glass **(Add extra Rs.9.00 P.Sft for tempering of 1mm earh, 2x9x6=108+2763.65=2871.65 Rs)** | P.Sft | 166.98 | | |
| 25/53 | | Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect. | P.Sft | 190.98 | | |
| 25/68 | | Providing and fixing MS louvered door comprising of 3/4"x3/4"x2" louvers of 16 SWG MS sheet welded with door frame of size 2"x4" 16 SWG MS pipe with lock rail i/c the cost of handles, 1" dia MS sliding bolt ,three coats of fire proof paint complete in all respect as approved and directed by the Engineer Incharge. | P.Sft | 864.00 | | |
| 25/69 | | Providing and fixing 12 mm Tempered Glass Door frameless comprising of aluminium H-section (D48) at bottom, H-type S.S framless handles both side (approved), top pivot hinges, bottom concealed floor machine hinges, s.s patch fitting, D glass door lock (approved) and all the cost of using approved standard fittings, accessories etc., and hardware any required, as shown on drawings, complete in all respect as per Specifications, as approved by the Engineer. | P.Sft | 555.00 | | |
| 25/71 | | Providing and fixing imported 4mm thick Aluminum Composite Panel (ACP) Cladding with fire retarding core, fire rated, pvdf coating, aluminium profile skin front 0.5mm, rear 0.5mm, of approved colour and shade including aluminium brackets, anchor bolts and nuts, aluminium profile, topping screw rod sponge and silicon filling of joints etc., complete in all respect as per approved specifications and as approved by the Engineer incharge. | P.Sft | 13,290.16 | | |
| 25/38 | | Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge. | P.Rft | 305.00 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 25/63 | | Providing and fixing 5.00 ft dia MS spiral stair comprising of triangular steps made of 1-1/4"x1-1/4"x3/16" duly welded with 3/8"MS squar bars steps, supported/welded with main vertical post of 4" dia GI pipe (Medium Quality) embeded in PCC in ground i/c the cost of pipe railing comprising of 2" dia MS pipe of 16 SWG supportrd with 2 no 5/8" squar bars in each step, i/c fixing & painting complete in all respects as approved and directed by the Engineer Incharge(Measurement will be made above ground level). | P.Rft | 25.00 | | |
| | **26. MISCELLANEOUS** | | | | | |
| 26/43 | | Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspensi on concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250)= 540Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect. asapproved by the Engineer Incharge. | P.Sft | 59,910.28 | | |
| 26/50-i | | Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge. i) WPC Door 5mm wall thickness | P.Sft | 120.00 | | |
| | **19. PLUMBING, SANITARY INSTALLATION & GAS FITTINGS** | | | | | |
| 19/37-iii | | Supply and fitting of cast iron manhole cover square / circular with frame, etc. complete. iii) 60 cm (24") | Each | 2.00 | | |
| | **21. SEWERAGE** | | | | | |
| 21/11 | | Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels. | Each | 10.00 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**BUILDING WORKS**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | | **NON-SCHEDULE ITEMS** | | | | |
| NS-1 | | Fire Exit & Rated Door<br>Metal sheet: prime<br>All structure frame: 16 gauge<br>Door outer frame: 14 gauge<br>Door thickness with insulation material: 45mm<br>Inside rock wool insulation material<br>Clear vision glass panel: w= 8" x h= 12"<br>Glass thickness 12mm<br>Glass outer frame: MS<br>Paint: Powder Coated<br>Fire Rating Dooe 60-120 Minute<br>Panic Bar Imported from China<br>Door Lock Imported<br>Fire Rated Door Closer Imported UL Listed<br>Fire Rated Door Glass Size (254mm x 254mm)<br>Installation Charges complete with material | P.Sft | 2,516.00 | | |
| NS-2 | | Providing & laying Jambolan board 2" thick on walls insulation as shown on drawings complete in all respect as per approved specifications and as approved by the Engineer incharge.( density of around 35 kg/m³,) | P.Sft | 14,320.51 | | |
| NS-3 | | Providing & laying Jambolan board 2" thick on Rool insulation as shown on drawings complete in all respect as per approved specifications and as approved by the Engineer incharge.( density of around 35 kg/m³,) | P.Sft | 23,175.00 | | |
| NS-4 | | Providing and applying UL-263 Fire Retardant Paint of colour & shade and other necessary materialas required at site, i/c cost of all types of labour, scaffolding, applying at any height in any floor overwell cleaned plastered surface i/c preparation and cleaning the surface, complete in all respect, as shown on drawings, as per Specifications, as approved by The Engineer. | P.Sft | 99,658.20 | | |
| | | **NON-SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BOUNDARY WALL/MAIN GATE AND GUARD ROOM**

**BILL OF QUANTITIES**

**SUMMARY OF COST**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No | DESCRIPTION | AMOUNT (RS) | AMOUNT (RS) |
|---|---|---|---|
| SCHEDULE ITEMS | | | |
| 1 | CIVIL WORKS (Boundary Wall) | | |
| 2 | CIVIL WORKS (Main Gate & Guard Room) | | |
| | **Total Schedule Items** | | |
| | **Net Total** | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BOUNDARY WALL**

**BILL OF QUANTITIES**

**CIVIL WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE | Amount |
|---|---|---|---|---|---|---|
| | | | | | Rs. | Rs. |
| | **3. EARTHWORK (EXCAVATION & EMBANKMENT)** | | | | | |
| 3/47-b | | Cutting and removing trees within a distance of 100 ft. (30 m) b) Above 2½ ft. to 6 ft. (760 to 1800 mm) girth. | Nos | 7.00 | | |
| 3/49-a | | Jungle clearance and removing within 100 ft. (30 m). a) Ordinary | P.Sft | 15,887.50 | | |
| 3/21-bii | | Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead 'upto one chain (30 m) and lift upto 5 ft. (1.5 m) 1) Depth upto 5ft (1.5m), a) By Manual. iii) Hard soil or Soft murum | P.Cft | 79,437.50 | | |
| 3/15 i | | Filling, watering and ramming earth under floors:-i) with surplus earth from foundation etc. | P.Cft | 39,718.75 | | |
| 3/15 ii | | Filling, watering and ramming earth under floors: ii) with new earth excavated from outside, lead upto (30m). i/c Lead upto 8 km | P.Cft | - | | |
| | **6. CONCRETE** | | | | | |
| 6/5 f | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (f) Ratio 1: 2: 4 i/c Lead upto 355 km | | | | |
| | | Foundation | P.Cft | 3,971.88 | | |
| 6/9 c-vi | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) ( c) Substructure (Foundations, Raft, Strip and Footing Beams). (vi) 3000 PSI i/c Lead upto 355 km | P.Cft | 26,691.00 | | |
| 6/9-a-v | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-. (vi) 3000 PSI i/c Lead upto 355 km | P.Cft | 22,242.50 | | |
| 6/9-a-v | | Columns | P.Cft | 5,354.00 | | |
| 6/12 bii | | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- (b) Deformed bars (ii) (Grade-60) | P.Kg | 177,113.50 | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BOUNDARY WALL**

**BILL OF QUANTITIES**

**CIVIL WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE | Amount |
|---|---|---|---|---|---|---|
| | | | | | Rs. | Rs. |
| | **7. BRICK WORK** | | | | | |
| 7/7-i | | Pacca brick work other than building upto 10ft. (3 m) height. i) cement, sand mortar:- Ratio 1:3 | Cft | 12,575.00 | | |
| | **11. SURFACE RENDERING** | | | | | |
| | | **Wall plaster** | | | | |
| 11/9 c | | Cement plaster 1:4 upto 20' (6.00 m) height:- c) ¾" (20 mm) thick | P.Sft | 43,743.58 | | |
| | **13. PAINTING AND VARNISHING** | | | | | |
| 13/33 a | | Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: i) 1st coat | P.Sft | 43,743.58 | | |
| | | **ii) 2nd coat** | P.Sft | 43,743.58 | | |
| | **25. IRON WORK** | | | | | |
| 25/74 | | Providing and fixing barbed wire fencing on compound wall, consisting of 1½"x1½"x3/16" (40x40x5mm) angle iron post 3' (900 mm) long, 4' (1200 mm) apart embedded in cement concrete 1:4:8 base of size 6"x6"x9" (150x150x225 mm) and 4 rows of barbed wire, including binding wire, painting posts, etc. complete in all respects. | Rft | 2,542.00 | | |
| | **26. MISCELLANEOUS** | | | | | |
| 26/43 | | Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspensi on concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250)= 540Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect. asapproved by the Engineer Incharge. | P.Sft | 27,326.50 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ENTRANCE GATE & GUARD ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | **3. EARTHWORK (EXCAVATION & EMBANKMENT)** | | | | | |
| 3/21-1aiii | | Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead 'upto one chain (30 m) and lift upto 5 ft. (1.5 m) 1) Depth upto 5ft (1.5m), a) By Manual. iii) Hard soil or Soft murum | P.Cft | 2,355.00 | | |
| 3/15 i | | Filling, watering and ramming earth under floors:-i) with surplus earth from foundation etc. | P.Cft | 1,648.50 | | |
| 3/15 ii | | Filling, watering and ramming earth under floors: ii) with new earth excavated from outside, lead upto (30m). i/c Lead upto 8 km | P.Cft | 1,136.00 | | |
| | **6. CONCRETE** | | | | | |
| 6/5 i | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8 i/c Lead upto 355 km | | | | |
| | | Foundation | P.Cft | 196.25 | | |
| 6/2 | | Dry rammed brick or stone ballast, 1½" to 2"( 40 mm to 50 mm) gauge. | P.Cft | 93.72 | | |
| 6/5 f | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (f) Ratio 1: 2: 4 i/c Lead upto 355 km | P.Cft | 48.28 | | |
| 6/9 c-vi | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) ( c) Substructure (Foundations, Raft, Strip and Footing Beams). (vi) 3000 PSI i/c Lead upto 30 km | P.Cft | 372.38 | | |
| 6/9-a-v | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-. (vi) 3000 PSI i/c Lead upto 30 km | P.Cft | 923.55 | | |
| 6/12 bii | | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- (b) Deformed bars (ii) (Grade-60) | P.Kg | 5,645.47 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ENTRANCE GATE & GUARD ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | **7. BRICK WORK** | | | | | |
| 7/4 i | | Pacca brick work in foundation and plinth in:- i) Cement, sand mortar:- Ratio 1:5 | P.Cft | 1,046.13 | | |
| 7/5 i | | Pacca brick work in ground floor:- i) cement, sand mortar:- Ratio 1:4 | P.Cft | 356.25 | | |
| | **9. ROOFING** | | | | | |
| 9/35 iii | | Providing and laying roof insulation, comprising of single layer of tiles 9"x4½"x1½" (225x113x40 mm) grouted with cement sand mortar 1:3 laid over 2" (50 mm) thick earth (including mud plaster) over thermopore sheet, over polythene sheet 300 gauge over a layer of bitumen, complete in all respects:- **iii) Thermopore sheet 1" (25 mm) thic** | P.Sft | 284.00 | | |
| 9/15 | | Khuras on roof 2'x2'x6" (600 x 600 x 150 mm) | Each | 4.00 | | |
| 9/20 a | | Cast iron rain water downpipe fixed in position, excluding heads and shoes, but including painting and clamps, etc:- | | | | |
| | | a) 4" dia (100 mm) cast iron down pipe. | Rft | 44.00 | | |
| 9/21 | | Rain water down pipe cast iron head fixed in place, including cost of clamp holdfast and painting. | Each | 4.00 | | |
| 9/22 | | Shoes, bends or offsets for cast iron rain water down pipe, including fixing and painting. | Each | 4.00 | | |
| | **10. FLOORING** | | | | | |
| 10/3 | | Supplying and filling sand under floor; or plugging in wells. | P.Cft | 284.00 | | |
| 10/46 | | Providing and laying superb quality Porcelain glazed tiles flooring of MASTER brand of specified size in approved design, Color and Shade with adhesive/bond over 3/4" thick (1:3) cement plaster i/c the cost of sealer for finishing the jointsi/ccutting grinding complete in all respect as approved and directed by the Engineer Incharge. a) Full body Glazed tiles (iii) 600mmx 600 mm | P.Sft | 293.00 | | |
| 10/35 | | Providing and laying superb quality Porcelain glazed tiles of Master/ Stile brand or approved equivalent manufacturer, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2"thick (1:2) cement plaster i/c the cost of and sealer for finishing the joints, cutting grinding complete in all respect as approved and directed by the Engineer Incharge.. a) Full body Glazed tiles (iii) 600mmx 600 mm | P.Sft | 353.09 | | |
| 10/48iii | | Providing and laying Prepolished Granite of specified thicknes sand shade of full width of approved quality laid with adhesive bond over 3/4" thick (1:2) cement sand mortor bed, complete in all respect as approved and directed by the Engineer Incharge. (i) 3/4" thick | P.Sft | 84.75 | | |
| | **11. SURFACE RENDERING** | | | | | |
| 11/12 b | | Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, upto 20' height. b) 1:3 | P.Sft | 284.00 | | |
| | | **Wall plaster** | | | | |
| 11/9 b | | Cement plaster 1:4 upto 20' (6.00 m) height:- b) ½" (13 mm) thick | P.Sft | 1,284.50 | | |
| | | **External Wall** | | | | |
| 11/9 c | | Cement plaster 1:4 upto 20' (6.00 m) height:- c) ¾" (20 mm) thick | P.Sft | 1,820.00 | | |

Engineering Consultancy Services (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ENTRANCE GATE & GUARD ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | | **Painting on plastered walls** | | | | |
| 11/23 | | Priming coat of chalk under distemper. | P.Sft | 1,568.50 | | |
| 11/24ii | | Distempering:- a) new surface:- ii) two coat | P.Sft | 1,568.50 | | |
| | **12. WOOD WORK** | | | | | |
| 12/68 | | Providing and fixing 40mm factory made Solid Core Laminated Doors, with Vision Panel, comprising of door frame (soft wood in style and rails) with tubular board filling, MDF Laminated board Pressed on both sides, 2mm thick PVC lipping with edging machine, complete in all respect as per approved specifications and as approved by the Engineer incharge. | P.Sft | 84.00 | | |
| 12/17ii | | Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1- 1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge. (ii) 10.5 " wide | P.Sft | 84.00 | | |
| 12/35 c | | Providing and fixing door stops of 1½" (40 mm) dia rubber block. | Each | 4.00 | | |
| 12/64 | | Providing and fixing Imported Mortise Lever Handle Lock with back plate (Machine, Cylinders, Lever Handles (Pair) and backplate (Pair)) of approved quality, design & finish, including the cost of all accessories to complete the job as shown on drawing and as per specification, complete in all respect, as approved and directed by the Engineer Incharge. | Each | 4.00 | | |
| | **13. PAINTING AND VARNISHING** | | | | | |
| 13/33 a | | Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: a) new surface: **i) 1st coat** | P.Sft | 1,820.00 | | |
| 13/33 a ii | | **ii) 2nd coat** | P.Sft | 1,820.00 | | |
| 13/5 d | | Painting new surface:- Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:- | | | | |
| | i) | priming coat. | P.Sft | 1,180.00 | | |
| | ii) | each subsequent coat of paint. Three coat | P.Sft | 1,180.00 | | |
| | **25. IRON WORK** | | | | | |
| 25/52 | | Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge.ii) | P.Sft | | | |
| 25/53 | | Providing and fixing Aluminum Fly screen comprising of Fiber/Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer/powder coated of size1-1/2"x1/2" and 1.6 mm thick with rubber gasket i/c cost of Hard wares as approved and directed by the engineer incharge. complete in all respect. | P.Sft | 35.50 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ENTRANCE GATE & GUARD ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | Sr.No | DESCRIPTION | UNIT | Quantity | RATE | Amount |
|---|---|---|---|---|---|---|
| | | | | | Rs. | Rs. |
| 25/58 | | Providing and fixing M.S. grill fabricated with MS Square polished Vertical/horizontal Bars of specified size @ 4" c/c ' passed through punched holes in MS Patti of 1-1/4"x1/8" i/c the cost of 1-1/4"x1/8" MS patti for Frame of windows and painting 3 coat complete in all respect as approved and directed by the Engineer Incharge. (ii) 1/2" Square Bars | P.Sft | 71.00 | | |
| 25/31 | | Making and fixing steel grated door with 1/16" thick (1.5mm) sheeting, including angle iron frame 2"x2"x3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre, with locking arrangement (Only Quantity Gate) | P.Sft | 590.00 | | |
| | **26. MISCELLANEOUS** | | | | | |
| 26/43 | | Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspensi on concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250)= 540Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect. asapproved by the Engineer Incharge | P.Sft | 2,430.50 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**ROAD WORK**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

**SUMMARY OF COST**

| SR.No | DESCRIPTION | AMOUNT (RS.) |
|---|---|---|
| 1 | **EARTHWORKS** | |
| | a. Cost based on MRS, 2nd BI-ANNUAL-2026 | |
| 2 | **BASE & SUB BASE** | |
| | a. Cost based on MRS, 2nd BI-ANNUAL-2026 | |
| 3 | **SURFACE COURSES AND PAVEMENT** | |
| | a. Cost based on MRS, 2nd BI-ANNUAL-2026 | |
| 4 | **ANCILLARY WORKS** | |
| | a. Cost based on MRS, 2nd BI-ANNUAL-2026 | |
| | **Total Cost based on MRS 2nd BI-ANNUAL-2026** | |
| | **TOTAL CONSTRUCTION COST (RS.) =** | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

# ROAD WORK

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

**EARTHWORKS**

| Item No. | Description | Unit | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|
| 3/53. | Clearing and Grubbing | P.Sft | 114,574.77 | | |
| 3/54. | Compaction of natural ground | P.Sft | 114,574.77 | | |
| 3/47. | Cutting and removing trees within a distance of 100 ft. (30 m) | | | | |
| a | upto 2½ ft. (760 mm) girth. | Each | 30.00 | | |
| b | above 2½ ft. to 6 ft. (760 to 1800 mm) girth. | Each | 10.00 | | |
| 3/48. | Uprooting stump and removing within 100 ft. (30 m) from 2 ft. to 6 ft. (600 to 1800 mm) girth. | Each | 40.00 | | |
| 3/05 i +3/17 | Earthowrk in ordinary soil for embankments lead up to 100 ft. (30 m), including ploughing and mixing with blade grade or disc harrow or other suitable equipment, and compaction by mechanical means at optimum moisture content and dressing to designed section, complete in all respects:-i) 95% to 100% maximum modified AASHTO dry density. Lead 5km | P.Cft | 561,416.37 | | |
| 3/05 ii +3/17 | Earthowrk in ordinary soil for embankments lead up to 100 ft. (30 m), including ploughing and mixing with blade grade or disc harrow or other suitable equipment, and compaction by mechanical means at optimum moisture content and dressing to designed section, complete in all respects:-ii) 90% maximum modified AASHTO dry density. Lead 5km | P.Cft | 240,607.02 | | |
| | | | | **Total** | |

Engineering Consultancy Services Punjab (Pvt.) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**ROAD WORK**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

**SUB-BASE & BASE COURSE**

| Item No. | Description | Unit | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|
| 18/3-aii +1/1 | Providing and laying Sub-base Course of stone product of approved quality and grade, including placing, mixing, spreading and compaction of Sub-base Material to required depth, camber, grade to achieve 100% maximum modified AASHO dry density, including carriage of all material to site of work except gravel and. aggregate. ii) Crushed stone aggregate. i/c Lead upto 135 Km | P.Cft | 55,736 | | |
| 18/04-a +1/1 | Providing and laying Base Course of stone aggregate of approved quality and grade, and supply and spreading of stone screening, including placing, mixing, spreading and compaction of base course material to required depth, camber and grade to achieve 100% maximum modified AASHO dry density, including carriage of all materials to site of work except gravel and. aggregate. i/c Lead upto 135 Km | P.Cft | 41,618 | | |
| | | | | **Total Rs.** | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**ROAD WORK**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

**SURFACE COURSES AND PAVEMENT**

| Item No. | Description | Unit | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|
| 18/06. | Providing and laying bituminous priming coat, using 10 lbs. kerosene oil and 10 lbs. binder per 100 Sft. or 0.5 Kg kerosene and 0.5 Kg binder per square metre. | P.Sft | 62,426.50 | | |
| 18/10-a iv +1/1 | Providing and laying plant premixed bituminous carpet, including compaction and finishing to required camber, grade and density. (iv) 4.5% Bitumen i/c Lead upto 30 Km (2" thickness) | per 50mm thickness per Sft | 62,426.50 | | |
| | | | | | |
| **Total Rs.** | | | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**ROAD WORK**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

**ANCILLARY WORKS RELATED TO ROADS**

| Item No. | Description | Unit | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|
| 6/53 b iii | Providing and fixing precast Edge Kerb Stone (4"to 6" thick), of 3500 PSI Compressive Strength, embeded in PCC 1:2:4 over lean concrete 1:4:8 etc complete in all respect. B) With Painting, (iii) (300x150x450mm high) | Rft | 7240.00 | | |
| 18/25 A | Providing, fabrication and fixing pole mounted Direction Board / road delineator of any shape and size, with specified Sheet and thickness, supported with G.I Channel, (excluding the cost of vertical post and painting) etc complete in all respect. (A) G.I Sheet 14 SWG | P.Sft | | | |
| i | CIRCULAR/TRIANGULAR a) 3-4 ft size | P.Sft | 18.00 | | |
| ii | RECTANGULAR SHAPE (a) 12 -48 sft | P.Sft | 40.00 | | |
| 18/27 b | Providing, fabrication and fixing Vertical Post comprising of medium quality G.I Pipe of specified diameter, including the cost of clamping arrangements, top cover, hold fasts, PCC 1:2:4 footing of specified depth and excavation etc complete in all respect, as approved and directed by the engineer incharge. (b) 3 inch diameter (footing 1.5'x1.5'x5') | | | | |
| | | Rft | 170.00 | | |
| 13/42 b | Lettering and printing of signage / direction boards / road delineators of any colour by machine i/c cost of Digital Lettering, amination & pasting etc complete in all respect. b) Diamond Grade Tape | | | | |
| | | P.Sft | 58.00 | | |
| 13/36 ii | Painting Traffic Lane Marking of specified width (1.5mm thick), with Thermoplastic (TP) Paint including Glass Beads, complete in all respect, as approved and directed by Engineer incharge.) ii) 6" wide | | | | |
| | | Rft | 8662.50 | | |
| 10/42-b | Providing and laying Tuff pavers, having 7000 PSI, crushing strength of approved manufacturer, over 2" to 3" sand cushion i/c grouting with sand in joints i/c finishing to require slope . complete in all respect. (50% Grey / 50% Coloured), b) 60-mm thick | | | | |
| | | P.Sft | 30364.99 | | |
| **Total Rs.** | | | | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL & ROOM**

**MAIN SUMMARY**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Description | Amount (Rs.) | Amount (Rs.) |
|---|---|---|---|
| **SCHEDULE ITEMS** | | | |
| 1 | TUBEWELL | | |
| 2 | TUBEWELL ROOM | | |
| | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | |
| **NON SCHEDULE ITEMS** | | | |
| 3 | TUBEWELL | | |
| | **NON SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | |
| | **Grand Total** | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 BI II | Description of items | Unit | Qty | Rate | Total Amount (Rs) |
|---|---|---|---|---|---|---|
| 1 | 23-1-1 d | Boring for tubewell in all types of soil except shingle and rock, from ground level to specific depth, including sinking and withdrawing of casing pipe, complete:-<br>1) Upto 0 to 100' depth<br>d) 6" (150 mm) i/d | | | | |
| | | | Rft of bore | 100.00 | | |
| 2 | 23-1-2 b | Boring for tubewell in all types of soil except shingle and rock, from ground level to specific depth, including sinking and withdrawing of casing pipe, complete:-<br>2) Upto 101' to 200' depth<br>b) 6" (150 mm) i/d | | | | |
| | | | Rft of bore | 100.00 | | |
| 3 | 23-1-3 b | Boring for tubewell in all types of soil except shingle and rock, from ground level to specific depth, including sinking and withdrawing of casing pipe, complete:-<br>3) Upto 201' to 300'<br>b) 6" (150 mm) i/d | | | | |
| | | | Rft of bore | 100.00 | | |
| 3 | 6-5-f | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): Ratio 1: 2: 4 , i/c Lead upto 355 km | | | | |
| | | | P.Cft | 16.00 | | |
| 4 | 23-11-a ii | Providing and installing P.V.C. Bail/End plug, in tubewell bore hole:-4" i/d (150 mm B.S.S. Class `B' | | | | |
| | | | Each | 1.00 | | |
| 5 | 23-10-iii | Providing and installing Fiberglass reinforced polypropelene (FRP) strainer of specifid wall thickness having slot size of 0.9 mm to 1.00 mm in Tubewell borehole i/c the cost of male/female coupling with Nylone Strip,studs complete in all respect as approved and directed by the Engineer Incharge. iv) 4"dia (5mm thickness) | | | | |
| | | | Per Rft | 25.00 | | |
| 6 | 23-12-c | Providing and installing M.S. blind pipe socketed/welded joint, M.S. reducer (where necessary), in tubewell bore hole, including jointing/welding with strainer, etc. complete:- c) 4" i/d, 3/16" (150 mm i/d 5 mm) thick | | | | |
| | | | Per Rft | 275.00 | | |
| 7 | 23/33-a iii | Providing, laying, testing and commissioning of POLYPROPYLENE RANDOM COPOLYMER (PPRC) water supply pipe (Dadex/Popular/Beta or approved equivalent manufacturer, with specified pressure rating PN (PRESSURE NOMINAL) and conforming to DIN 8077-8078 code i/c cost of solvent, specials, making jharries complete in all respect as approved and directed by Engineer Incharge. (Internal/External Diameters mentioned). PN-16 pipe (For Tap) 1") 32 mm | | | | |
| | | | Per Rft | 35.00 | | |
| 8 | 23/16 i | Testing and developing of tubewell of size 6" (150 mm) i/d and above continuously upto 1.5 cs. Discharge | | | | |
| | | | Per Hour | 72.00 | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 BI II | Description of items | Unit | Qty | Rate | Total Amount (Rs) |
|---|---|---|---|---|---|---|
| 9 | 23/17. | Shrouding with graded pea gravel 3/8" to 1/8" (10 to 3 mm), around tubewell in bore hole. | P.Cft | 45.00 | | |
| | | | | | | |
| 10 | 25/10. | Fabrication of heavy steel work, with angle, tees, flat iron round iron and sheet iron for making trusses, girders, tanks, etc., including cutting, drilling, revitting, handling, assembling and fixing, but excluding erection in position. (For Supply & installation of 1/2" i/d thick M.S Cap for 12" housing pipe) | | | | |
| | | | P.K.g | 20.00 | | |
| 11 | 25/11. | Erection and fitting in position iron trusses, staging of water tanks, etc. | | | | |
| | | | P.K.g | 20.00 | | |
| 12 | 23/4. | Providing strong substantially built box of deodar wood 4'x2½'x9" (1200x750x225 mm), with compartments, lock and locking arrangement, for preserving samples of strata from bore hole. | Job for complete bore | 1.00 | | |
| 13 | 23/37-ii. | Providing and fixing, air valve 2½ (65mm) dia of B.S.S. quality and weight (complete with jointing material). Double | | | | |
| | | | Each | 1.00 | | |
| 14 | 23/44-b /ix | Providing and fixing heavy duty Check valve of specified diameter and material for pressure rating PN-16 made of Crane (USA), Hatersly (UK) or Scon (Pakistan) or approved equivalent manufacturer i/c the cost of all accessories flanges,nut/bolt and gaskit where required complete in all respect as approved and directed by the Engineer Incharge. (b) Flange Ended Ductile Iron Valve. (xi) 4" dia | | | | |
| | | | Each | 1.00 | | |
| 15 | 23/63 | Providing and laying sanitary seal with specified ratio of 1:1 cement sand in annular space between bore hole and casing complete in all respect as per approved specifications and as directed by the Engineer incharge | P.Cft | 20.00 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 BI II | Description of items | Unit | Qty | Rate | Total Amount (Rs) |
|---|---|---|---|---|---|---|
| 16 | N.S | Taking of water samples (2 bottles each) at the end of the pumping test. Full chemical and bacteriological analysis, of water samples according to Pakistani standard. | | | | |
| | | | Each | 3.00 | | |
| 17 | RA-06 | For Water Supply Pump<br>Providing, fixing,, testing and Commissioning of 0.1 cusec flow and 300ft head, Submersible bore hole pump with 6 HP, pump motor set, SD Cable, 4" top set, Erection Clamps,Joints complete in all respects at site. (including all applicable taxes). | | | | |
| | | | Each | 1.00 | | |
| 18 | N.S | Carrying out Electrical Resistivity Survey from firms / agencies (approved by the Engineer), including, providing all required materials, tools, instruments and equipments complete with accessories to carry out the tests, with all necessary staff, labour, transport including report of ERS indicating the detail of strata's and assessment of water quality and quantity complete as per specifications, condition of contract and approval of the Engineer. | | | | |
| | | | Job | 1.00 | | |
| | | **NON-SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL ROOM**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 BI II | Item Description | Qty | Unit | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 1 | 3/21 1ii | Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead upto one chain (30 m) and lift upto 5 ft. (1.5 m) 1) By Manual. ii) in ordinary soil. | 255.00 | P.Cft | | |
| 2 | 3/15 ii | Filling, watering and ramming earth under floors: ii) with new earth excavated from outside, lead upto (30m). | 127.50 | P.Cft | | |
| 3 | 6/5 i | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8, i/c Lead upto 355 km | 138.83 | P.Cft | | |
| 4 | 6/5 h | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (h) Ratio 1: 3: 6, i/c Lead upto 355 km | 82.98 | P.Cft | | |
| 5 | 6/6 a2 | Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):- (a) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:- (2) Type B (nominal mix 1: 1½: 3). i/c Lead upto 355 km | 137.17 | P.Cft | | |
| 6 | 7/4 i | Pacca brick work in foundation and plinth in:- i) Cement, sand mortar:- Ratio 1:5 | 546.41 | P.Cum | | |
| 7 | 7/5 i | Pacca brick work in ground floor:- i) cement, sand mortar:- Ratio 1:4 | 421.88 | P.Cum | | |
| 8 | 6/12 bii | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- | 411.51 | P.Kg | | |
| 9 | 6/37a(ii) | Providing and laying damp proof course of 1: 2: 4 (using cement, sand and shingle), including bitumen coating :- (a) with one coat of bitumen and one coat of polythene sheet 500 gauge :- ii) 2" thick (50 mm) | 76.50 | P.Sqm | | |
| 10 | 6/39 a(i)b | Providing and laying vertical damp proof course with cement sand plaster and bitumen coating:- (a) with one coat of bitumen and one coat of polythene sheet. 500 gauge: 3/4" Thick i) Ratio 1: 4 b) ¾" thick (20 mm) | 102.00 | P.Sqm | | |
| 11 | 11/9 b | Cement plaster 1:4 upto 20' (6.00 m) height:- b) ½" (13 mm) thick | 51.23 | P.Sqm | | |
| 12 | 11/9 c | Cement plaster 1:4 upto 20' (6.00 m) height:- c) ¾" (20 mm) thick | 75.49 | P.Sqm | | |
| 13 | 11/12 b | Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, upto 20' height. b) 1:3 | 18.73 | P.Sqm | | |
| 14 | 9/35 ii | Providing and laying roof insulation, comprising of single layer of tiles 9"x4½"x1½" (225x113x40 mm) grouted with cement sand mortar 1:3 laid over 2" (50 mm) thick earth (including mud plaster) over thermopore sheet, over polythene sheet 300 gauge over a layer of bitumen, complete in all respects:- ii) Thermopore sheet ¾ " (20 mm) thick | 14.52 | P.Sqm | | |
| 15 | 9/15. | Khuras on roof 2'x2'x6" (600 x 600 x 150 mm) | 1.00 | Each | | |
| 16 | 19/44 v | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized Polyvinyl Chloride ) Nikasi/ SWV pipe, Dadex / Popular / Beta or approved equivalent manufacturer, plain / Bell Ended / Z - Joints conforming to BS 4514 / BS 5255 - EN 1329 including the cost of specials and Solvents complete in all respects, as per drawings & specifications and / or as approved and directed by the Engineer Incharge. (v) 110 mm | 14.00 | Metre | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL ROOM**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 BI II | Item Description | Qty | Unit | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 17 | 10/22 a (i) | 1½"(40 mm) thick mosaic flooring, consisting of ½ "(13 mm) mosaic topping of one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips, laid over 1"(25 mm) thick floor of 1:2:4 cement concrete, including rubbing and polishing complete with finishing :- (a) using grey cement | 13.38 | P.Sqm | | |
| 18 | 10/34 b -ii | Mosaic dado or skirting with one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips, laid over ½"(13 mm) thick cement plaster 1:3, including rubbing and polishing, complete with finishing. (b) using white cement: ii) ½"(13 mm) thick | 2.23 | P.Sqm | | |
| 19 | 12/5 b-iii | Providing and fixing 1st class solid wood wrought joinery in panelled or panelled and glazed doors and windows of specified thickness with 1" thick solid wood panels with step and 1-1/2"x2-1/2" beadings all around the panels i/c the cost of Tower bolt and handles complete in all respect (Excluding the cost of sliding bolt,lock and chowkats (frame), etc.) as approved and directed by the Engineer Incharge. (iii) 1-1/2" thick (40 mm) | 2.28 | P.Sqm | | |
| 20 | 12/16 b | Providing and fixing M.S. sheet hollow pressed frame of doors, windows, C. windows, etc. (chowkat only) of 20 SWG welded with M.S. flat 6"x 1¼" x 1/8" (150 mmx30mmx3mm) M.S. holdfast 9"x1"x1/8" (225mmx25mmx3mm) welded/screwed 4" (100 mm) long iron hinges, including filling chowkat with cement sand mortar 1:8 and embedding holdfast in cement concrete 1:2:4, complete in all respects | 7.47 | Metre | | |
| 21 | 25/52. | Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge. | 2.32 | P.Sqm | | |
| 22 | 25/53. | Providing and fixing Aluminum Fly screen comprising of Fiber/Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer/powder coated of size1-1/2"x1/2" and 1.6 mm thick with rubber gasket i/c cost of Hard wares as approved and directed by the engineer incharge. complete in all respect. | 1.16 | P.Sqm | | |
| 23 | 25/58. ii | Providing and fixing M.S. grill fabricated with MS Square polished Vertical/horizontal Bars of specified size @ 4" c/c ' passed through punched holes in MS Patti of 1-1/4"x1/8" i/c the cost of 1-1/4"x1/8" MS patti for Frame of windows and painting 3 coat complete in all respect as approved and directed by the Engineer Incharge. (ii) 1/2" Square Bars | 2.32 | P.Sqm | | |
| 24 | 12/64. | Providing and fixing Imported Mortice Lever Handle Lock with back plate (Machine, Cylinders, Lever Handles (Pair) and backplate (Pair)) of approved quality, design & finish, including the cost of all accessories to complete the job as shown on drawing and as per specification, complete in all respect, as approved and directed by the Engineer Incharge. | 1.00 | Each | | |
| 25 | 12/35 c | Providing and fixing door stops of 1½" (40 mm) dia rubber block. | 1.00 | Each | | |
| 26 | 11/23+24 i+ii | Priming coat of chalk under distemper.<br>Distempering using Vinyle Emulsion Paint:- | 69.96 | P.Sqm | | |
| 27 | 11/18 b | Cement pointing struck joints, on walls, upto 20' (6.00 m) hiehgt:- b) ratio 1:3 | 75.49 | P.Sqm | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**TUBEWELL ROOM**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 BI II | Item Description | Qty | Unit | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 28 | 26/43. | Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspensi on concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250)= 540Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect. asapproved by the Engineer Incharge. | 34.71 | P.Sqm | | |
| 29 | 23/52. | Providing and fixing Chain Pulley Block of 5 ton capacity with 5 meter length of chain, as per required specifications complete in all respect and as approved by the Engineer Incharge. | 1.00 | Each | | |
| 30 | 25/10+11 | Fabrication of heavy steel work, with angle, tees, flat iron round iron and sheet iron for making trusses, girders, tanks, etc., including cutting, drilling, revitting, handling, assembling and fixing, but excluding erection in position.<br>Erection and fitting in position iron trusses, staging of water tanks, etc. | 100.00 | Kg | | |
| **b. Total Cost based on MRS, 2nd BI-Annual-2026** | | | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**EXTERNAL SEWERAGE SYSTEM**

**SUMMARY OF COST**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Description | Amount (Rs.) | Amount (Rs.) |
|---|---|---|---|
| 1 | Man Hole Main Line 1 | | |
| 2 | Pipe Lines | | |
| | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | |
| | **Grand Total** | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**EXTERNAL SEWERAGE SYSTEM**

**MAN HOLE MAIN LINE**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 | Item Description | Qty | Unit | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 1 | 3/43 /1 | Earthwork excavation in open cutting for sewers and manholes as shown in drawings including shuttering and timbering, dressing to correct section and dimensions according to templates and levels, and removing surface water, in all types of soil except shingle, gravel and rock:- 50% | | | | |
| | | Man Hole Height 4.3 M (Dia 300mm) | 3,312 | Cft | | |
| 2 | 6/3 b | Cement concrete brick or stone ballast 1½ " to 2" (40 mm to 50 mm) gauge, in foundation and plinth:- Ratio 1: 4: 8, i/c Lead upto 355 km | 331.17 | Cft | | |
| 3 | 6/5-b | Cement concrete plain including placing,compacting, finishing and curing complete (including screening and washing of stone aggregate): 1: 1½: 1½, i/c Lead upto 355 km | 259.05 | Cft | | |
| 4 | 6/5-f | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 2: 4, i/c Lead upto 355 km | 373.12 | Cft | | |
| 5 | 3/5. | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):<br>(f) Ratio 1: 2: 4 | 50.63 | Cft | | |
| 6 | 25/10. | Fabrication of heavy steel / Iron work, with angle, tees, flat iron round iron and sheet iron for making trusses, girders tanks, etc., including cutting, drilling, revitting, handling assembling and fixing, but excluding erection in position. | 225.00 | P.Kg | | |
| 7 | 6/12-bii | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- b) Deformed bars ii) (Grade-60) | 186 | P.Kg | | |
| 8 | 7/7 i +10 | Pacca brick work other than building upto 30ft. (9 m) height. Ratio 1:3 | 837.9 | P.Cft | | |
| 9 | 11/8 c | Cement plaster 1:3 upto 30' (6.00 m) height:-3/4" (20 mm) thick | 1,293.8 | P.Sft | | |
| 10 | 11/18 b | Cement pointing struck joints, on walls, upto 20' (6.00 m) hiehgt:- ratio 1:3 | 939.75 | P.Sft | | |
| 11 | 9/12. | Two coats of bitumen laid hot using 34 lbs. per %Sft, or 1.72 Kg per square metre over roof and blinded with sand at one Cft. per %Sft. (0.003 cu.m per sq.m) | 1,293.98 | P.Sft | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**EXTERNAL SEWERAGE SYSTEM**

**MAN HOLE MAIN LINE**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | MRS 2026 | Item Description | Qty | Unit | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 12 | 21/11. | Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels. | 120.00 | Each | | |
| 13 | 21/14 | Providing and fixing 6" thick R.C.C. manhole cover with tee shaped C.I. frame of 22" I/d (frame weighing 37.324 Kg. or one maund as per Standard Drawing STD/PD No. 6, of 1977, complete in all respect. | 15.00 | Each | | |
| 14 | 21/7 | Extra for making and finishing benching floor work in manhole chamber, with 1/8" (3 mm) thick cement finish. | 497.49 | P.Sft | | |
| | | | | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**EXTERNAL SEWERAGE SYSTEM**

**PIPE LINES**

**MRS, 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr. No. | Item # | Item Description | Qty | Unit | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 1 | 3/43 /1 | Earthwork excavation in open cutting for sewers and manholes as shown in drawings including shuttering and timbering, dressing to correct section and dimensions according to templates and levels, and removing surface water, in all types of soil except shingle, gravel and rock: 50% | | | | |
| | | Man Hole Height 4.3 M (Dia 300mm) | 12,750 | P.Cft | | |
| 2 | 21/21. | Providing, laying, crushed stone in bedding of pipe trenches (3/8" to 1" 10mm to 25mm) complete in all respect. | 2,550.0 | P.Cft | | |
| 3 | 21/03 | Providing and laying R.C.C. pipe sewers, moulded with cement concrete 4000 psi conforming to ASTM Specification C-76-20, specific class. Wall B, including carriage of pipe from factory to site of work lowering in trenches to correct alignment and grade, jointing with rubber ring, cutting pipes where necessary, testing, etc.,complete.<br>c) Class-IV<br>I) 4000 psi | | | | |
| | i | 310 mm (12") i/d | 850.00 | Rft | | |
| | ii | 380 mm (15") i/d | 0.00 | Rft | | |
| 4 | 10/03. | Supplying and filling sand under floor; or plugging in wells. | 7,650.0 | P.Cft | | |
| | | | | | SCHEDULE ITEMS TOTAL AMOUNT (RS) | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**UNDER GROUND WATER TANK AND PUMP ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | MRS 2026 | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | **3. EARTHWORK (EXCAVATION & EMBANKMENT)** | | | | | |
| 3/21 1ii | | Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead upto one chain (30 m) and lift upto 5 ft. (1.5 m) 1) By Manual. ii) in ordinary soil. | P.Cft | 5,750.00 | | |
| 3/15 ii | | Filling, watering and ramming earth under floors:- ii) with new earth excavated from outside, lead upto one chain (30 m). i/c lead upto 5 km | P.Cft | 491.63 | | |
| | **6. CONCRETE** | | | | | |
| 6/5 i | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8, i/c Lead upto 30 km | P.Cft | 250.00 | | |
| 6/9 cvi | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) ( c) Substructure (Foundations, Raft, Strip and Footing Beams). (vi) 3000 PSI i/c Lead upto 355 km | P.Cft | 500.00 | | |
| 6/9 av | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-. (vi) 3000 PSI i/c Lead upto 360 km | P.Cft | 704.83 | | |
| 6/9-b v-i | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a Retaining/ Shear walls laid in situ or precast laid in position, or prestressed members cast ( Formwork on both sides) (vi) 3000 PSI i/c Lead upto 355 km | P.Cft | 795.50 | | |

Engineering Consultancy Services (Pvt.) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**UNDER GROUND WATER TANK AND PUMP ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | MRS 2026 | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 6/12 ii | | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- | P.Kg | 10,501.83 | | |
| 6/32 ii | | Providing and embedding 10" (250mm) wide PVC water stopper in expansion joints of RCC structures (Retaining walls, water tanks, Slabs) complete in all respect. ii) 10" wide 10 mm thick | P.Rft | 78.00 | | |
| | **7. BRICK WORK** | | | | | |
| 7/5 i | | Pacca brick work in ground floor:- i) cement, sand mortar:- Ratio 1:4 | P.Cft | 777.00 | | |
| | **9. ROOFING** | | | | | |
| 9/5 | | Single layer of tiles 9"x4½"x1½" (225x113x40 mm) laid over 4"(100 mm) earth and 1" (25 mm) mud plaster without Bhoosa, grouted with cement sand 1:3 on top of RCC roof slab, provided with 34 lbs.per %Sft. or 1.72 Kg/Sq.m bitumen coating sand blinded. | P.Sft | 374.00 | | |
| 9/15 | | Khuras on roof 2'x2'x6" (600 x 600 x 150 mm) | Each | 1.00 | | |
| 19/44-iv | | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized Polyvinyl Chloride ) Nikasi/ SWV pipe, Dadex / Popular / Beta or approved equivalent manufacturer, plain / Bell Ended / Z - Joints conforming to BS 4514 / BS 5255 - EN 1329 including the cost of specials and Solvents complete in all respects, as per drawings & specifications and / or as approved and directed by the Engineer Incharge. | | | | |
| | | 110 mm Rain Water down pipe. | P.Rft | 14.00 | | |
| | **10. FLOORING** | | | | | |
| 10/3 | | Supplying and filling sand under floor; or plugging in wells. | P.Cft | 125.00 | | |
| 10/22-b-i | | Providing & Laying mosaic flooring consisiting of one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips,laid over 1"(25 mm) thick flooring of 1:2:4 cement concrete including rubbing and polishing complete with finishing :- b) 1½"(40 mm) thick mosaic flooring, consisting of ½ " (13mm) mosaic topping, (i) using grey cement | P.Sft | 600.00 | | |
| 10/34-aii | | Mosaic dado or skirting with one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips, laid over ½"(13 mm) thick cement plaster 1:3, including rubbing and polishing, complete with finishing: (a) using grey cement: ii) ½"(13 mm) thick | P.Sft | 735.00 | | |
| | **11. SURFACE RENDERING** | | | | | |
| 11/12 b | | Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, upto 20' height. b) 1:3 | P.Sft | 300.00 | | |
| | | **Wall plaster** | | | | |
| 11/9 b | | Cement plaster 1:4 upto 20' (6.00 m) height:- b) ½" (13 mm) thick | P.Sft | 980.00 | | |
| 11/9 c | | Cement plaster 1:4 upto 20' (6.00 m) height:- c) ¾" (20 mm) thick | P.Sft | 1,314.00 | | |
| | | **Painting on plastered walls** | | | | |
| 11/23 | | Priming coat of chalk under distemper. | P.Sft | 1,280.00 | | |
| 11/24-a-ii | | Distempering using Vinyle Emulsion Paint: a) new surface ii) two coats | P.Sft | 1,280.00 | | |
| | **13. PAINTING AND VARNISHING** | | | | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**
**UNDER GROUND WATER TANK AND PUMP ROOM**
**BILL OF QUANTITIES**
**CIVIL WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | MRS 2026 | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 13/33 a | | Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: a) new surface: i) 1st coat | P.Sft | 1,314.00 | | |
| | | ii) 2nd coat | P.Sft | 1,314.00 | | |
| | **25. IRON WORK** | | | | | |
| 25/52 | | Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge. | P.Sft | 30.00 | | |
| 25/53 | | Providing and fixing Aluminum Fly screen comprising of Fiber/Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer/powder coated of size1-1/2"x1/2" and 1.6 mm thick with rubber gasket i/c cost of Hard wares as approved and directed by the engineer incharge, complete in all respect. | P.Sft | 30.00 | | |
| 25/58 | | Providing and fixing M.S. grill fabricated with MS Square polished Vertical/horizontal Bars of specified size @ 4" c/c ' passed through punched holes in MS Patti of 1-1/4"x1/8" i/c the cost of 1-1/4"x1/8" MS patti for Frame of windows and painting 3 coat complete in all respect as approved and directed by the Engineer Incharge. (ii) 1/2" Square Bars | P.Sft | 30.00 | | |
| 25/30 | | Making and fixing steel grated doors, complete with locking arrangement, angle iron frame 2"x2"x3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre | P.Sft | 28.00 | | |
| 21/11. | | Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels. | Each | 25.00 | | |
| 26/43 | | Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspensi on concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250)= 540Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect. asapproved by the Engineer Incharge. | P.Sft | 1,535.00 | | |
| | **19. PLUMBING, SANITARY INSTALLATION & GAS FITTINGS** | | | | | |
| 19/40 | | Supply and fitting of cast iron manhole cover with frame, etc. complete. iii) 60 cm (24") dia | Each | | | |
| | **23. TUBEWELL AND WATER SUPPLY** | | | | | |
| 23/51 ii | | Supplying, fixing and testing ductile iron pipe with flange including the cost of specials, (teepu pipe / alpine steel or approved equivalent) manufacturer, complying Class K-12, ISO - 2531 & BS - 4772, & jointing material with all fittings and accessories complete in all respect as approved by the Engineer Incharge. ii) 4" dia (100 mm) | P.Rft | 15.00 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | **I Unit** | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**UNDER GROUND FIRE FIGHTING TANK AND ROOM**

**BILL OF QUANTITIES**

**CIVIL WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | **3. EARTHWORK (EXCAVATION & EMBANKMENT)** | | | | | |
| 3/21 1ii | | Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and ramming lead upto one chain (30 m) and lift upto 5 ft. (1.5 m) 1) By Manual. ii) in ordinary soil. | Cft | 6,083.50 | | |
| 10/3 | | Supplying and filling sand under floor; or plugging in wells. | P.Cft | 529.00 | | |
| | **6. CONCRETE** | | | | | |
| 6/5 i | | Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8, i/c Lead upto 355 km | Cft | 264.50 | | |
| 6/9 av | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) (a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-. (vi) 3000 PSI i/c Lead upto 355 km | Cft | 675.05 | | |
| 6/9-b v-i | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) Retaining/ Shear walls laid in situ or precast laid in position, or prestressed members cast ( Formwork on both sides) (vi) 3000 PSI i/c Lead upto 355 km | Cft | 662.00 | | |
| 6/9 cvi | | Placing, compacting, finishing and curing of concrete using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; including screening, washing of aggregates and mixing of constituents using batching plant, Transportation by transit mixer, pouring with pump in the required proportions to achieve a nominal cylindrical strength in the field as per ACI 214, with the specified consistency. i/c the cost of shuttering, compaction with Viberator, excluding the cost of Admixture, as approved and directed by the Engineer Incharge.) ( c) Substructure (Foundations, Raft, Strip and Footing Beams). (vi) 3000 PSI i/c Lead upto 355 km | Cft | 400.00 | | |

Engineering Consultancy Services Punjab (Pvt.) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**UNDER GROUND FIRE FIGHTING TANK AND ROOM**

**BILL OF QUANTITIES**

**CIVIL WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| 6/12 ii | | Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- | Kg | 9,153.78 | | |
| 6/32 ii | | Providing and embedding 10" (250mm) wide PVC water stopper in expansion joints of RCC structures (Retaining walls, water tanks, Slabs) complete in all respect. ii) 10" wide 10 mm thick | Ft | 76.00 | | |
| | **7. BRICK WORK** | | | | | |
| 7/5 i | | Pacca brick work in ground floor:- i) cement, sand mortar:- Ratio 1:4 | Cft | 798.00 | | |
| | **9. ROOFING** | | | | | |
| 9/35 ii | | Providing and laying roof insulation, comprising of single layer of tiles 9"x4½"x1½" (225x113x40 mm) grouted with cement sand mortar 1:3 laid over 2" (50 mm) thick earth (including mud plaster) over thermopore sheet, over polythene sheet 300 gauge over a layer of bitumen, complete in all respects:- **ii) Thermopore sheet ¾ " (20 mm) thick** | Sft | 400.00 | | |
| 9/15 | | Khuras on roof 2'x2'x6" (600 x 600 x 150 mm) | Each | 1.00 | | |
| 9/20 a | | Cast iron rain water downpipe fixed in position, excluding heads and shoes, but including painting and clamps, etc:- | | | | |
| | | a) 4" dia (100 mm) cast iron down pipe. | Ft | 14.00 | | |
| 9/21 | | Rain water down pipe cast iron head fixed in place, including cost of clamp holdfast and painting. | Each | 2.00 | | |
| 9/22 | | Shoes, bends or offsets for cast iron rain water down pipe, including fixing and painting. | Each | 2.00 | | |
| | **10. FLOORING** | | | | | |
| 10/3 | | Supplying and filling sand under floor; or plugging in wells. | Cft | 100.00 | | |
| 10/22-b-i | | Providing & Laying mosaic flooring consisiting of one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips,laid over 1"(25 mm) thick flooring of 1:2:4 cement concrete including rubbing and polishing complete with finishing :- b) ½"(40 mm) thick mosaic flooring, consisting of ½ " (13mm) mosaic topping, (i) using grey cement | Sft | 648.00 | | |
| 10/35 aii | | Mosaic dado or skirting with one part of cement and marble powder in the ratio of 3:1 and two parts of marble chips, laid over ½"(13 mm) thick cement plaster 1:3, including rubbing and polishing, complete with finishing: (a) using grey cement: ii) ½"(13 mm) thick | Sft | 612.00 | | |
| | **11. SURFACE RENDERING** | | | | | |
| 11/12 b | | Cement plaster 3/8" (10 mm) thick under soffit of R.C.C. roof slabs only, upto 20' height. b) 1:3 | Sft | 324.00 | | |
| | | **Wall plaster** | | | | |
| 11/9 b | | Cement plaster 1:4 upto 20' (6.00 m) height:- b) ½" (13 mm) thick | Sft | 1,008.00 | | |
| 11/9 c | | Cement plaster 1:4 upto 20' (6.00 m) height:- c) ¾" (20 mm) thick | Sft | 1,330.00 | | |
| | | **Painting on plastered walls** | | | | |
| 11/23 | | Priming coat of chalk under distemper. | Sft | 1,332.00 | | |
| 11/24-aii | | Distempering using Vinyle Emulsion Paint:- a) new surface:- ii) two coats | Sft | 1,332.00 | | |

Engineering Consultancy Services (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**UNDER GROUND FIRE FIGHTING TANK AND ROOM**

**BILL OF QUANTITIES**

**CIVIL WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Items No. | | DESCRIPTION | UNIT | Quantity | RATE Rs. | Amount Rs. |
|---|---|---|---|---|---|---|
| | **13. PAINTING AND VARNISHING** | | | | | |
| 13/33 a | | Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: a) new surface: i) 1st coat | Sft | 1,330.00 | | |
| | | ii) 2nd coat | Sft | 1,330.00 | | |
| | **25. IRON WORK** | | | | | |
| 25/52 | | Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge. | Sft | 30.00 | | |
| 25/53 | | Providing and fixing Aluminum Fly screen comprising of Fiber/Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer/powder coated of size1-1/2"x1/2" and 1.6 mm thick with rubber gasket i/c cost of Hard wares as approved and directed by the engineer incharge, complete in all respect. | Sft | 15.00 | | |
| 25/58-ii | | Providing and fixing M.S. grill fabricated with MS Square polished Vertical/horizontal Bars of specified size @ 4" c/c ' passed through punched holes in MS Patti of 1-1/4"x1/8" i/c the cost of 1-1/4"x1/8" MS patti for Frame of windows and painting 3 coat complete in all respect as approved and directed by the Engineer Incharge. (ii) 1/2" Square Bars | Sft | 30.00 | | |
| 25/31 | | Making and fixing steel grated doors, complete with locking arrangement, angle iron frame 2"x2"x3/8" (50x50x10 mm) and ¾" (20 mm) square bars 4" (100 mm) centre to centre | Sft | 28.00 | | |
| 21/11 | | Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels. | Each | 25.00 | | |
| 26/43 | | Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspensi on concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250)= 540Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect. asapproved by the Engineer Incharge. | Sft | 1,403.00 | | |
| | **19. PLUMBING, SANITARY INSTALLATION & GAS FITTINGS** | | | | | |
| 19/37-iii | | Supply and fitting of cast iron manhole cover with frame, etc. complete. iii) 60 cm (24") dia | Each | 4.00 | | |
| | **23. TUBEWELL AND WATER SUPPLY** | | | | | |
| 23/51 ii | | Supplying, fixing and testing ductile iron pipe with flange including the cost of specials, (teepu pipe / alpine steel or approved equivalent) manufacturer, complying Class K-12, ISO - 2531 & BS - 4772, & jointing material with all fittings and accessories complete in all respect as approved by the Engineer Incharge. ii) 4" dia (100 mm) | Ft | 15.00 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | **I Unit** | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES - SUMMARY (ELECTRICAL WORKS)**

**NOTE:**
**All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer Incharge.**

| Sr No. | Sheet / Category | SCHEDULE ITEMS | NON-SCHEDULE ITEMS | Total |
|---|---|---|---|---|
| i | General - Electrical Works (Schedule + Non-Schedule) | | | |
| ii | External Lighting / Street Light System | | | |
| | **GRAND TOTAL** | | | |

All equipment/parts (Active or passive) should comply with EU/USA standards applicable



# PUNJAB INFORMATION TECHNOLOGY BOARD
## ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN
## ELECTRICAL WORKS
## BILL OF QUANTITIES
### MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 1 | | **360 kW MODULAR UPS SYSTEM (CRITICAL COMPUTE & THERMAL LOAD)** | | | | |
| i | NS | **360kw UPS (600kW Chassis) For Critical Compute and Thermal Support: 3PH I/O TRANSFORMER FREE 600KVA INTELLIGENT MODULAR UPS(FOR OVERSEAS EXCEPT NORTH AMERICA AND EUROPE / NO SWITCH)** | No. | 4 | | |
| ii | NS | PM60 POWER MODULE PM60 included in item (i) | No. | 24 | | |
| iii | NS | BACKFEED SUBASSEMBLY (FOR UPS WITHOUT SWITCH) included in item (i) | No. | 4 | | |
| iv | NS | BATTERY SWITCH CABINET (SINGLE SWITCH) included in item (i) | No. | 4 | | |
| v | NS | FUNCTION MODULE BATTERY GROUND FAULT SUBASSEMBLY (WITH BATTERY SIWTCH CABINET) included in item (i) | No. | 44 | | |
| vi | NS | FUNCTION MODULE FOUR PORTS DIGITAL SIGNALS LAMP BOARD included in item (i) | No. | 4 | | |
| vii | NS | CARD IS-UNITY included in item (i) | No. | 4 | | |
| viii | NS | SEISMIC ANCHORS SUBASSEMBLY (NO SWITCH) included in item (i) | No. | 4 | | |
| ix | NS | Battery 12V-230AH or above with 3rd Party Battery Cabinet for 10 min backup at 300KW Load | No. | 320 | | |
| x | NS | Battery Rack WITH ACCESSORIES included in item (i) | No. | 8 | | |
| xi | NS | Start-up OEM included in item (i) | Job | 4 | | |
| 2 | | **120kW UPS SYSTEM (MEET-ME ROOM)** | | | | |
| i | NS | Non Modular UPS 120 kW Three Phase without batteries | No. | 2 | | |
| ii | NS | Battery 12V-150AH Battery for 10-15 min backup at 80% Load | No. | 80 | | |
| iii | NS | External Battery Rack (3rd Party Product) (included in item (i) ) | No. | 2 | | |
| iv | NS | DC Cable with Accessories 50 Meter included in item (i) | No. | 100 | | |
| v | NS | MCCB included in item (i) | No. | 2 | | |
| vi | NS | Start-up OEM included in item (i) | Job | 2 | | |
| 3 | | **UPS SPM Distribution for IT racks 600x1070/1100** | | | | |
| i | NS | Floor standing Rack based Enclosure without transformer, 600kW with OEM's' 1P and 3P hot plug MCB, LCD touch screen, BMS, Modbus (Note: breakers distribution requires as single phase 32A, 16A and three phase 32A-64A (as required) | No. | 4 | | |
| ii | NS | SIC Included included in item (i) | No. | 4 | | |
| iii | NS | Start-up OEM included in item (i) | Job | 4 | | |
| 4 | | **Imported Assembled (CBU ONLY) LOW VOLTAGE TYPE TESTED CERTIFIED SWITCHGEAR DISTRIBUTION BOARDS** | | | | |
| i | NS | Supply of following IEC Type Tested, form 3A &3B*, Free Standing Floor / Wall / Flush Mounted, totally Enclosed, Cubical type, Low Voltage Distribution Boards/Switchgear, including Incoming and Outgoing Circuit Breakers and other components as per SLD with cable terminations, incoming and outgoing cables/Bus Tie Duct from Top/Bottom as per Specifications including all accessories, complete in all respect The whole power supply system shall be Concurrent Maintainable in a way that any repair, maintenance, extension or retrofitting work on one path does not affect continuous operation of the second path to IT equipment and there shall be Zero Single Point of Failure in the system. | | | | |
| ii | NS | LV-MSB-A & B 2000KVA (FORM III) | No. | 4 | | |
| iii | NS | AUTO SYNCH PANEL (FORM III) | No. | 2 | | |
| iv | NS | 3200A ATS A & B (FORM III) | No. | 2 | | |
| v | NS | 3200A ISOLATOR COUPLER PANEL (FORM III) | No. | 1 | | |
| vi | NS | 3200A MDB (FORM III) | No. | 2 | | |
| vii | NS | 45-32A TPNE DB (GENERAL) (FORM II) | No. | 14 | | |
| viii | NS | 45-32A TPNE DB (UPS) (FORM II) | No. | 14 | | |
| ix | NS | LV/LT MTTM COUPLER (A1,B1) (FORM III) | No. | 2 | | |
| ix | NS | 600KVAR PFI PANEL (FORM III) | No. | 2 | | |
| x | NS | Integration, configuration and commissioning charges (included above) | Job | 1 | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ELECTRICAL WORKS**
**BILL OF QUANTITIES**
**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 5 | | **GROUNDING / EARTHING SYSTEM** | | | | |
| i | NS | Supply of following items for complete Earthing system, including Excavation and backfilling, Bentonite chemical, other all required materials and accessories, Earthing test point, Inspection Chamber, Cad weld, boring, Telecom / Grounding Bonding Busbars, labor, tools, transportation etc. as per Specifications including all accessories, complete in all respects | No. | 18 | | |
| ii | NS | Supply and installation of Identification, Tagging and Labelling Works of all electrical components complete in all respect as per BS standards | Job | 2 | | |
| | | | | | | |
| 6 | | **BUILDING EXTERNAL LIGHTNING ARRESTER SYSTEM** | | | | |
| i | NS | Active Lightening /Surge Protection solution | | | | |
| ii | NS | Lightening /Surge Protection solution for Data Centre as per IEC62305, NF C 17-102, UNE 21186:2001 or equivalent ABB or equivalent | Job | 1 | | |
| | | | | | | |
| 7 | | **Power Cables, CABLE TRAY AND LADDER for Cables distribution in complete Facility as per actual will be charge** | | | | |
| i | NS | (locally manufactured) base perforated Cable Tray with cover, 16SWG, Hot Dip Galvanized, appropriate sizes and lengths of MS Rod / Angle Iron Supports, C-channel and anchor Bolts (HILTI/FISHER), including cutting, welding, jointing and necessary required hardware etc. for installation at ceiling, wall, or in floor screeding etc. as per Specifications, complete in all respect | | | | |
| ii | NS | 12" wide x 4" Cable Tray for Power cables | Meter | 1,500 | | |
| iii | NS | 12" wide x 4" Cable Tray for cooling | Meter | 550 | | |
| iv | NS | 24" wide x 4" Cable Tray for Precision Cooling Piping | Meter | 120 | | |
| v | NS | Trench Work if required | Meter | 50 | | |
| | | | | | | |
| 8 | | **ELECTRICAL / POWER CABLES** | | | | |
| i | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (210 m) | Meter | 2,940 | | |
| ii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 10 | | |
| iii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (210 m) | Meter | 2,940 | | |
| iv | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 10 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ELECTRICAL WORKS**
**BILL OF QUANTITIES**
**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| v | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (280 m) | Meter | 3,920 | | |
| vi | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 10 | | |
| vii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (280 m) | Meter | 3,920 | | |
| viii | MRS Ch.24 Item 12(a)(xiv) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 10 | | |
| ix | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (280 m) | Meter | 3,920 | | |
| x | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge. | Meter | 10 | | |
| xi | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (280 m) | Meter | 3,920 | | |
| xii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 10 | | |
| xiii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (280 m) | Meter | 3,920 | | |



Engineering & Consultancy Services (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ELECTRICAL WORKS**
**BILL OF QUANTITIES**
**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| xiv | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge | Meter | 20 | | |
| xv | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (280 m) | Meter | 3,920 | | |
| xvi | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge | Meter | 20 | | |
| xvii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (140 m) | Meter | 1,960 | | |
| xviii | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge | Meter | 10 | | |
| xix | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. (1-Core x 14) (140 m) | Meter | 1,960 | | |
| xx | MRS Ch.24 Item 12(a)(xiv) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Single core (Non-armoured), (xiv) 300 mm sq (61/0.099in) - Composite rate Rs. 13,257.90 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge | Meter | 10 | | |
| xxi | MRS Ch.24 Item 12(b)(xii) +12(a)(ix) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (xii) 150 mm sq (37/0.093in) = Rs. 22,781.80/m power cable, PLUS (a) Single core (Non-armoured), (ix) 95 mm sq (37/0.072in) = Rs. 4,319.80/m earth core. Combined Rs. 27,101.60 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge | Meter | 20 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ELECTRICAL WORKS**
**BILL OF QUANTITIES**
**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| xxii | MRS Ch.24 Item 12(b)(xii) +12(a)(ix) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (xii) 150 mm sq (37/0.093in) = Rs. 22,781.80/m power cable, PLUS (a) Single core (Non-armoured), (ix) 95 mm sq (37/0.072in) = Rs. 4,319.80/m earth core. Combined Rs. 27,101.60 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |
| xxiii | MRS Ch.24 Item 12(b)(xii) +12(a)(ix) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (xii) 150 mm sq (37/0.093in) = Rs. 22,781.80/m power cable, PLUS (a) Single core (Non-armoured), (ix) 95 mm sq (37/0.072in) = Rs. 4,319.80/m earth core. Combined Rs. 27,101.60 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |
| xxiv | MRS Ch.24 Item 12(b)(xii) +12(a)(ix) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (xii) 150 mm sq (37/0.093in) = Rs. 22,781.80/m power cable, PLUS (a) Single core (Non-armoured), (ix) 95 mm sq (37/0.072in) = Rs. 4,319.80/m earth core. Combined Rs. 27,101.60 per Meter. Complete with all termination accessories, complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |
| xxv | MRS Ch.24 Item 12(b)(vii) +12(a)(v) | "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (vii) 35 mm sq (19/0.064in) = Rs. 6,233.25/m power cable, PLUS (a) Single core (Non-armoured), (v) 25 mm sq (19/0.052in) = Rs. 1,256.85/m earth core. Combined Rs. 7,490.10 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |
| xxvi | MRS Ch.24 Item 12(b)(vii) +12(a)(v) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (vii) 35 mm sq (19/0.064in) = Rs. 6,233.25/m power cable, PLUS (a) Single core (Non-armoured), (v) 25 mm sq (19/0.052in) = Rs. 1,256.85/m earth core. Combined Rs. 7,490.10 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |
| xxvii | MRS Ch.24 Item 12(b)(vii) +12(a)(v) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (vii) 35 mm sq (19/0.064in) = Rs. 6,233.25/m power cable, PLUS (a) Single core (Non-armoured), (v) 25 mm sq (19/0.052in) = Rs. 1,256.85/m earth core. Combined Rs. 7,490.10 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |
| xxviii | MRS Ch.24 Item 12(b)(vii) +12(a)(v) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (vii) 35 mm sq (19/0.064in) = Rs. 6,233.25/m power cable, PLUS (a) Single core (Non-armoured), (v) 25 mm sq (19/0.052in) = Rs. 1,256.85/m earth core. Combined Rs. 7,490.10 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Meter | 20 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ELECTRICAL WORKS**
**BILL OF QUANTITIES**
**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| xxix | MRS Ch.24 Item 12(b)(vii) +12(a)(iv) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (vii) 35 mm sq (19/0.064in) = Rs. 6,233.25/m power cable, PLUS (a) Single core (Non-armoured), (iv) 16 mm sq (7/0.064in) = Rs. 925.65/m earth core. Combined Rs. 7,158.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 360 | | |
| xxx | MRS Ch.24 Item 12(b)(vi)+ 12(a)(iv) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (vi) 25 mm sq (19/0.052in) = Rs. 4,573.65/m power cable, PLUS (a) Single core (Non-armoured), (iv) 16 mm sq (7/0.064in) = Rs. 925.65/m earth core. Combined Rs. 5,499.30 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 176 | | |
| xxxi | MRS Ch.24 Item 12(b)(v)+ 12(a)(iii) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (v) 16 mm sq (7/0.064in) = Rs. 3,507.60/m power cable, PLUS (a) Single core (Non-armoured), (iii) 10 mm sq (7/0.052in) = Rs. 608.95/m earth core. Combined Rs. 4,116.55 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 160 | | |
| xxxii | MRS Ch.24 Item 15(a)(iv) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 15): "Supply and erection of PVC insulated, PVC Sheathed flexible copper conductor cables, in prelaid PVC pipe/M.S. conduit/G.I pipe/wooden strip batten/wooden casing and capping/G.I. wire/trenches (rate for cables only)." Selected item: (a) Flexible 3 core, 600/1000 volt non-armoured cable, (iv) 6 mm sq (7/0.044in) - Composite rate Rs. 1,321.75 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 500 | | |
| xxxiii | MRS Ch.24 Item 12(b)(v)+ 12(a)(iii) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected items (combined 2-cable run): (b) Four Core (Non-armoured), (v) 16 mm sq (7/0.064in) = Rs. 3,507.60/m power cable, PLUS (a) Single core (Non-armoured), (iii) 10 mm sq (7/0.052in) = Rs. 608.95/m earth core. Combined Rs. 4,116.55 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 100 | | |
| xxxiv | MRS Ch.24 Item 12(b)(iv) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (b) Four Core (Non-armoured), (iv) 10 mm sq (7/0.052in) - Composite rate Rs. 2,222.40 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 150 | | |
| xxxv | MRS Ch.24 Item 12(b)(i) | MRS SCHEDULE DESCRIPTION (Ch.24, Item 12): "Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (b) Four Core (Non-armoured), (i) 2.5 mm sq (7/0.029in) - Composite rate Rs. 654.90 per Meter. Complete in all respects as approved and directed by the Engineer Incharge | Meter | 150 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**ELECTRICAL WORKS**
**BILL OF QUANTITIES**
**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| | MRS Ch.24 Item 95 (ix) | Suplying,Installation,testing and commissioning of 415-Volt ,5 Pole (TP+N+E) compact Copper Busway (Bus Tie Duct B.T.D) of specified size/rating comprising of 10 mm thick sandwitch copper Bus bars, insulated with non-flammable/flame resistant resin applied at 130 OC by Automatic Electro-static application with Mayler Class-B, housed in Aluminium Housing i/c the cost of hangers, accessories,enclosures IP55 IEC 61439-1, complete in all respect,spaced to a minimum reducing reactance as approved & directed by the Engineer Incharge.<br>(ix) 3200 Amp | Meter | 05 | | |
| 9 | | **GENERAL WIRING** | | | | |
| i | NS | WIRING FOR LIGHTING & POWER SOCKETS as per actual after conducting survey and design | | | | |
| ii | NS | Supply of following items as per Specifications including all accessories, complete in all respect | | | | |
| iii | NS | Circuit wiring from DB-LP to Switchboard including wiring between switch on the same circuit with 2x2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable + CPC 2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable in 25mm diameter EMT conduit, surface / recessed in wall, column, etc., including with all conduit accessories, connectors, ceiling rose, flexible wires, sheet steel boxes, tagging etc. | Job | 1 | | |
| iv | NS | Point wiring for light point from Switch Board to Light Point with 2x2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable + CPC 2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable in 25mm diameter EMT conduit, surface / recessed in wall, column, etc., including with all conduit accessories, connectors, ceiling rose, flexible wires, sheet steel boxes, tagging etc. | Job | 1 | | |
| v | NS | Supply & install new lighting point's c/w light switches and using 2 x 1C/1.5mm sq. PVC cable in PVC pipe for Server room, NOC, MM, Lobby and Power rooms | Job | 1 | | |
| 10 | | **INTERNAL/EXTERNAL LIGHT FIXTURES** | | | | |
| i | | INTERNAL / EXTERNAL LIGHT FIXTURES as per actual after conducting survey and design | | | | |
| ii | NS | Supply, installation and fixing of data center special lights LED (min 500 LUX) antiglare size 2'x 2' / 1'x 4' for Server room, with motions sensors, NOC, SOC, Systems team room, Network team room, MMR, Lobby and Power rooms all critical zones | No. | 120 | | |
| iii | NS | Supply, installation and fixing of special lights LED (min 500 LUX) antiglare size according to proposed design for, NOC, SOC, Lobby. | No. | 15 | | |
| 11 | | **EMERGENCY / EXIT LIGHTING** | | | | |
| i | NS | EMERGENCY / EXIT LIGHTING as per actual after conducting survey and design | | | | |
| ii | NS | Supply of rechargeable NiCad battery-operated (3hrs backup) self test LED emergency lights, rated life 50,000 hours, compliant to BS5266/IEC598-2 or equivalent standard including all accessories, complete in all respect | | | | |
| iii | NS | Supply & installation of Emergency Light c/w battery pack and accessories. | No. | 25 | | |
| iv | NS | Supply & installation of Exit Light c/w battery pack and accessories. | No. | 35 | | |
| | | | | | | |
| 12 | | **2000kVA PAD-MOUNTED DRY-TYPE TRANSFORMER, (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | 2000kVA Pad Mounted Dry Type Transformer Transfopower / PEL with One Year warranty. Wapda Approval, Security, Demand Notice, Metering panel , HT Cable at Customer end. | No. | 4 | | |

# PUNJAB INFORMATION TECHNOLOGY BOARD
## ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN
## ELECTRICAL WORKS
## BILL OF QUANTITIES
## MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)

*NOTE:*
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 13 | | **2000kVA DIESEL ENGINE ELECTRIC GENERATOR, (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | Diesel Engine Driven Electric Generating Set. Model # Supply and install at site.<br>2000kVA Prime Cummins diesel engine or approved equivalent Lorey Somer (Original) alternator or approved equivalenet deep sea UK control module or approved equivalent with AMF<br>- 400 V, 3 Phase+N, 0.8 P.F, 50 Hz, 1500 RPM<br>- Water cooled, Radiator 50 °C Tropically designed<br>- Industrial muffler (Supplied Loose)<br>- Exhaust Flexible (Supplied Loose)<br>- Base Fuel Tank (Sufficient for 8 Hours Capacity)<br>- Engine Sump oil drain tap & Coolant Drain Tap<br>- Self excited Alternator<br>- Emergency Push button<br>- Set mounted lead acid batteries<br>- Earth Leads<br>- Battery Charger<br>- Rubber Pads Sound Level 85dB at 1 Meter<br>- Fabricated from Hot Rolled AISI 1010 Steel,12/14 SWG.<br>- Modular Design for ease of maintenance.<br>- Imported accessories including stainless. steel hinges, die cast hinges, galvanized fasteners (class 8.8), etc.<br>- Acoustic, high density, open cellular, fire proof foam.<br>- Standard cable access window.- Standard control panel viewing | No. | 4 | | |
| ii | NS | External Fuel Tank with 8000lts-16000ltrs Capacity if required | No. | 4 | | |
| iii | NS | Transportation and Installation & Commissioning of Only Diesel Gensets (included in above) | No. | 4 | | |
| | | | | | | |
| 14 | | **ADVANCED SMART BATTERY MANAGEMENT SOLUTION (ABMS), (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | Advance Smart Battery Management Solution:<br><br>ABMS for critical Compute and Thermal laods 24x7 Monitoring including the float charging voltage, discharge voltage, resistance, temperature and so on, to ensure that a fault in each battery is promptly identified.<br><br>a).Support the following alarms for a battery group:<br><br>Bias current, Status of Health abnormal, charge overcurrent, BCB unconnected, BCB tripping, charge voltage inconsistency, discharge voltage inconsistency.<br><br>b).Support the following alarms for a single battery:<br><br>Abnormal internal resistance, single unhealthy battery, single battery over temperature, single battery terminal tripping, single battery abnormal, dormancy voltage inconsistency, battery overvoltage protection | No. | 4 | | |
| 15 | | **MV SUBSTATION SYSTEM, (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | 630 A VCB Protection & Metering Panels (Wapda Approved) | No. | 4 | | |
| ii | NS | 630A VCB Panels(Consumer) (5 +1) (VCB ABB/Siemens/Schneider Eq.) 800W x 1600D x 2200H Each Panel (Room Required 14.7 x 24' for each Set) | Set | 2 | | |
| iii | NS | 11KV Kit+ Hi POD Test etc. | No. | 25 | | |
| iv | NS | 11kV 1C x 150/185mm Cable for Internal Roots (5 x 55 x 4 root) | Meter | 1,100 | | |
| v | NS | Trench Work for 11kV Cables | Meter | 200 | | |
| vi | NS | S.S Logos/Glass Name Plates/ Inauguration Plate etc | Job | | | |

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**MRS, 2nd BI-ANNUAL-2026 (DISTRICT MULTAN)**

***NOTE:***
***All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer.***

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| vi | NS | Iron fence for Genset/fuel tank area 8' H | Sqft | 1,000 | | |
| **16** | | **INTELLIGENT POWER MEASUREMENT SYSTEM (IEMS INTEGRATED TO DCIM), (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | Supply, installation, testing, commissioning, configuration and provision of all necessary hardware, software, accessories, communication equipment, cabling, panels, meters, sensors and licences required for a complete and fully functional Intelligent Energy Monitoring System (IEMS) integrated to DCIM, conforming to IEC 61850 communication protocols and ISO 50001 energy-management principles, providing centralised real-time monitoring, measurement, recording, analysis and reporting of electrical energy generation, consumption and power-quality parameters, suitable for continuous 24-hour operation and expandable for future monitoring points, complete in all respects as approved and directed by the Engineer Incharge. | Job | 1 | | |
| **17** | | **UNDERGROUND RESERVE FUEL STORAGE TANKS (INTERCONNECTED), (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | Supply, fabrication, installation, testing and commissioning of four (04) independent underground diesel reserve storage tanks, 25,000 litres capacity each, fuel-tight MS construction (minimum 4mm thick plate, continuously welded), internally epoxy-coated, complete with manholes, vent/fill/drain connections, leak-proofing treatment and hydrostatic testing, conforming to EN 12285-1 / UL 58, complete in all respects as approved and directed by the Engineer Incharge. | No. | 4 | | |
| ii | NS | Supply, fabrication, installation, testing and commissioning of a cross-interconnection system linking the four (04) underground reserve fuel tanks above, comprising: (a) a FORCED (pumped) cross-transfer line with duty/standby electrically-operated transfer pumps, motorised isolation valves and local control panel, conforming to NFPA 30, enabling controlled fuel transfer between any two tanks on demand or low-level alarm; (b) a NATURAL (gravity) balance line connecting all four tanks at a common low-point invert level, with manual isolation and non-return valves, for passive fuel-level equalisation; (c) tank level transmitters at all four tanks with high/high-high and low/low-low alarms and overfill-prevention interlocks; and (d) all interconnecting pipework, trenching/backfilling, control wiring, testing and commissioning, complete in all respects as approved and directed by the Engineer Incharge. | Job | 1 | | |
| **18** | | **Video Wall, (Non Adjustable item Pursuant to COC clause 70)** | | | | |
| i | NS | NOC - 55" Full HD 1920×1080 LG IPS video wall with 0.88 mm bezel, 500 nits brightness, 178° viewing angle, 24/7 operation, and multi-interface (HDMI/DVI/USB/RS232). | UN | 8 | | |
| ii | NS | Command & Control - 55" Full HD 1920×1080 LG IPS video wall with 0.88 mm bezel, 500 nits brightness, 178° viewing angle, 24/7 operation, and multi-interface (HDMI/DVI/USB/RS232). | UN | 9 | | |
| iii | NS | BR Video Wall Controller – 8/9 screens: Real-time HDMI/DVI output controller with 4K input, seamless switching, customizable layouts, RS232/LAN control, and support for 2×4 / 3×3 video wall configurations. | UN | 2 | | |
| | | | | | | |
| | | **SCHEDULE ITEMS TOTAL COST (A)** | | | | |
| | | **NON-SCHEDULE ITEMS TOTAL COST (B)** | | | | |
| | | **TOTAL COST (C = A + B)** | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**EXTERNAL LIGHTING / STREET LIGHT SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

***NOTE: All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer Incharge.***

| Sr.No. | MRS Ref. No. | Item Description | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 1 | Analysis | DUCT BANK AS PER DWG including 100 mm uPVC Class D pipe | Meter | 20 | | |
| 2 | 3/7/1 A-i | Earthwork excavation in open cutting for storm water channels, drains sullage drains in open areas, roads, streets, lanes, including under pinning of walls and shoring to protect existing works, shuttering and timbering the trenches, dressed to designed level and dimensions, trimming, removal of surface water from trenches, back filling and surplus excavated material disposed of and dressed within 50 ft. (15 m) lead: ( cable laying) | Cu.m | 277.5 | | |
| 3 | 24/11/c/ viii | "Supply and erection of PVC insulated, PVC sheathed copper conductor cables for service connection, in prelaid pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (c) Four core, 600/1000 volt non-armoured cable, (viii) 25 mm (19/0.052in) - Composite rate Rs. 4,805.15 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Rm | 1110 | | |
| 4 | 24/69 | Supplying, installation testing and commissioning of Octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel ,tapered from 225 mm at bottom to 100 mm at top, with 1500 mmx60 mm dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet, with built in junction box with shutter, I/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge. Make Jamal Pipes, IESRA Engineering or equivalent | | | | |
| a | a/ii | "Supplying, installation testing and commissioning of Octagonal shape electric street light pole, made of hot dipped 4.5mm thick (7 SWG) galvanized steel, tapered from 225mm at bottom to 100mm at top, with 1500mm x 60mm x 4mm thick dia. arm for luminaire installation, duly G.I. welded with 470x470x20mm base plate with the help of 4 no. triangular stiffeners 100x350x20mm of GI sheet, with built-in junction box with shutter, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally, as approved and directed by the Engineer Incharge." Selected item: (a) Single Arm, (ii) 10 metre height - Composite rate Rs. 129,868.55 each. Make Jamal Pipes, IESRA Engineering or equivalent, complete in all respects as approved and directed by the Engineer Incharge. | Each | 11 | | |



Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**EXTERNAL LIGHTING / STREET LIGHT SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

***NOTE: All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer Incharge.***

| Sr.No. | MRS Ref. No. | Item Description | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| b | b/iii | "Supplying, installation testing and commissioning of Octagonal shape electric street light pole, made of hot dipped 4.5mm thick (7 SWG) galvanized steel, tapered from 225mm at bottom to 100mm at top, with 1500mm x 60mm x 4mm thick dia. arm for luminaire installation, duly G.I. welded with 470x470x20mm base plate with the help of 4 no. triangular stiffeners 100x350x20mm of GI sheet, with built-in junction box with shutter, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally, as approved and directed by the Engineer Incharge." Selected item: (b) Double Arm, (iii) 12 metre height - Composite rate Rs. 150,007.05 each. Make Jamal Pipes, IESRA Engineering or equivalent, complete in all respects as approved and directed by the Engineer Incharge. | Each | 15 | | |
| 5 | 24/70/a/vii | "Supplying, installation and commissioning of LED Luminaries (street lights) of specified wattage and lumens conforming to IP66 & IK08 or above, Philips/Osram/Thorn or approved equivalent manufacturer, with corrosion-resistant die-casted Aluminum housing, silicon gasket in special groove, F1-rated polycarbonate optic, complete with LED Chip (Philips Lumiled/Cree/Nichia/Osram make or equivalent), programmable LED driver (Harvard/TCI/Lumotech/Philips/VOSSLOH Schwabe/Lightech make or equivalent), minimum 10kV surge protection rating device, i/c the cost of all accessories/components required for proper operation, fully flexible for future upgradation and easy replacement for maintenance purposes, i/c bucket elevator charges, as approved and directed by the Engineer Incharge." Selected item: (a) 140 Lm/Watt, (vii) 150 Watt with 21,000 lumens - Composite rate Rs. 52,595.25 each. Complete in all respects as approved and directed by the Engineer Incharge. | Each | 45 | | |
| 6 | 24/11/c/xi | "Supply and erection of PVC insulated, PVC sheathed copper conductor cables for service connection, in prelaid pipe/G.I. wire/trenches, etc. (rate for cable only)." NOTE: the rate carried in this row (Rs. 406.60/m) matches Selected item (a) Two core, 250/440 volts, (iii) 7/0.74mm (7/0.029in) - it does NOT match a "70mm sq" size, which does not exist under Item 11(a) Two-core 250/440V (that sub-table tops out at 7/1.63mm). This appears to be a mislabelled row carried over from the source estimate - flagged for correction rather than silently repriced. Complete in all respects as approved and directed by the Engineer Incharge. | Rm | 364 | | |



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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**EXTERNAL LIGHTING / STREET LIGHT SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

***NOTE: All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer Incharge.***

| Sr.No. | MRS Ref. No. | Item Description | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 7 | 24/11/a/iii | "Supply and erection of PVC insulated, PVC sheathed copper conductor cables for service connection, in prelaid pipe/G.I. wire/trenches, etc. (rate for cable only)." Selected item: (a) Two core, 250/440 volts, (iii) 7/0.74mm (7/0.029in) Composite rate Rs. 406.60 per Meter. Complete in all respects as approved and directed by the Engineer Incharge. | Rm | 180 | | |
| 8 | 23/14/b/a | Providing, laying, cutting, jointing, testing and disinfecting pipe line in trenches with 2" i/d (50 mm) PVC/ uPVC pipes of B.S.S. with `D' Class working pressure complete in all respects:- | Rm | 700 | | |
| 9 | Analysis | Preparation of foundation for Octagonal Street Light Poles of following height as per drawings provided herein including al material like PVC Pipes, J-Bolt etc.as per drawings, and approval of the Engineer/Consultant/Client. | | | | |
| a | | Single Arm 10 Meter | Each | 11 | | |
| b | | Double Arm 12 Meter | Each | 15 | | |
| 10 | Analysis | Transformer's Pad foundation for 63 KVA transformer (As per MEPCO Approved Drawing) | Nos | 1 | | |
| 11 | Analysis | SLCP Foundation (As per Approved Drawing) | Nos | 1 | | |
| | | **SCHEDULE ITEMS TOTAL COST (A)** | | | | |
| 1 | NS | Supply, installation, testing and commissioning of Pole Base Connection Plates complete comprising of four number (4 Nos.) line up terminal for 95 mm2 cables connection for incoming and outgoing, nut & bolts, earthing strip , end covers and stoppers and covers etc. with Main 6 Amp Single Pole MCB at outgoing. make Legrand or equivalent **(Non Adjustable item Pursuant to COC clause 70)** | | | | |
| a | | Single Arm 10 Meter | Each | 11 | | |
| b | | Double Arm 12 Meter | Each | 15 | | |
| 2 | NS | Supply, Installation, Testing and Commissioning of Pad Mounted Single Phase 63 KVA transformer for street light with energy meter And LT MCCBS complete in all respect (As per MEPCO standards), **(Non Adjustable item Pursuant to COC clause 70)** | Nos | 1 | | |
| 3 | NS | Street Lighting Control Panels (SLCP) made with 14SWG Sheet (Surface mounted Type), Powder coated Paint, i/c the cost of Lock, Indication lights, Thimble, Copper Comb, Wiring, Neutral & Earth Bar, Door Earthing, Digital Voltmeter, Digital Ammeter,Volt Selector Switch, Ammeter selector switch, Current Transformers, 99.9% electrolytic Cu busbar TPN+E at 1000Amp/sq. inch and Controls IP55. Complete in all respect as per drawing approved and directed by the Engineer Incharge. Recommended manufacturers are M/s Siemens, M/s Tariq Electric. or equivalent. | Each | 1 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**EXTERNAL LIGHTING / STREET LIGHT SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

***NOTE: All items listed below shall be deemed to include supply, provision, installation, commissioning, and testing, complete in all respects, as per the site requirements and as approved and directed by the Engineer Incharge.***

| Sr.No. | MRS Ref. No. | Item Description | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| | | Incoming<br>01 x 100 Amps DP 36 KA MCCB<br>01 x 100A TP Magnetic Contactor for 25kvar<br>03 x 6A SP MCB 6 kA for Control<br>01 x 4P Manual Change Over (3 position switches for operation in auto (with photocell) and normal (manual mode-photocell overide)<br>01 x Photo Electric Switch/Sensor with timers and relays. ABB or Panasonic<br>01 x Toggle Switch<br>01 x ON/OFF Push Buttons<br>01 No. ammeters 0-100 Amp, with selector switch (04 position) and CT of 63/5 Amp<br>03 No. indication lights<br>01 No. voltmeter with fuse and 7 position selector switch.<br>03 Ph, N & Earth copper busbars Internal wiring & line-up terminals etc. Brass cable glands/accessories<br>01 No. Panel Light with limit Switch<br>**(Non Adjustable item Pursuant to COC clause 70)** | | | | |
| | | Outgoing<br>06 x 16 Amps DP 15 KA MCCB<br>01 x 16 Amps DP 15 KA MCCB (Spare) | | | | |
| 4 | NS | Supply, Installation, testing and commissioning of Junction Box with terminal blocks and 16 Amp DP circuit breaker, **(Non Adjustable item Pursuant to COC clause 70)** | Each | 2 | | |
| 5 | NS | Supply, Installation, testing and commissioning of Rod type, earthing specifications comprising of all metal works shall be bonded to the proposed earthing network. Earth Electrode 16mm dia, 10' long Copper deposited steel rod (P-116:81), including earth conductor (25mm2) to connect earth rod with equipment and appropriate clamp for clamping of the conductor with rod. The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface. The earth electrode includes excavation, backfilling, etc. Galvanised Earthing clamp of M.S.Flat One welded with earth electrode and loose to be bolted. Galvanised Bolts, Nuts and Spring washers Complete in all respect. Testing and commissioning of the earthing system along with all testing accessories complete in all respect. for Transformers/ SLCP/ Street light Poles. Conforming to IEC 62305, IEC 61643-5-54, UL 467, To achieve Earthing value of less then 5 Ohms as per Drawings/ Data approval by Consultant/ Client. **(Non Adjustable item Pursuant to COC clause 70)** | Each | 2 | | |
| | | **NON-SCHEDULE ITEMS TOTAL COST (B)** | | | | |
| | | **TOTAL COST (C = A + B)** | | | | |



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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES -INTERNAL BUILDING PLUMBING WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No. | Item Descriptions | Unit | Qty | Rate Pkr) | Amount (Pkr) |
|---|---|---|---|---|---|---|
| 1 | 19/7-i | Providing and fitting glazed earthen ware wash hand basin /vanity 56x40 cm (22"x16") including bracket set, waste pipe and waste coupling, etc.<br>v) Under Counter Vanity Basin | Each | 4 | | |
| 2 | 19/8 | Providing and fixing stainless steel sink with drain board, size 120x60 cm (48"x24") including bracket set, waste pipe and waste coupling. | Each | 1 | | |
| 3 | 19/52-iv. | Providing and fixing CP bath Room Set made of Sonex/Master/Faisal comprising of 3-No Tee stop cocks, lever type Basin Mixer, double Bib Cock, open wall shower, Muslim shower,waste coupling and bottle trap etc. complete in all respect as approved and directed by the Engineer incharge<br>(iv) Open Type Wall Shower | Each | 0 | | |
| 4 | 19/4-i | Providing and fitting glazed earthen ware water closet, squatter type (Orisa pattern), combined with foot rest.<br>i) white | Each | 0 | | |
| 5 | 19/11 | Providing and fixing glazed earthen ware flat back urinal. | Each | 0 | | |
| 6 | 19/12-i | Providing and fitting plastic made low down flushing cistern13.63 litre (3 gallons) capacity, including bracket set, copper connection, etc. complete.<br>b) Plastic Made i) white | Each | 0 | | |
| 7 | 19/2-ii | Providing and fixing, double seat and cover only.<br>ii) plastic | Each | 0 | | |
| 8 | 19/13 | Providing and fixing, chromium plated soap dish | Each | 4 | | |
| 9 | 19/15 | Providing and fixing, chromium plated toilet paper holder. | Each | 4 | | |
| 10 | 19/20 | Providing and fixing looking glass 55x40 cm (22"x16") size and 5 mm thick, first quality. | Each | 4 | | |
| 11 | 19/52-v. | Providing and fixing CP bath Room Set made of Sonex/Master/Faisal comprising of 3-No Tee stop cocks, lever type Basin Mixer, double Bib Cock, open wall shower, Muslim shower,waste coupling and bottle trap etc. complete in all respect as approved and directed by the Engineer incharge<br>v) Muslim shower | Each | 4 | | |
| 12 | 19/28 | Providing and fixing chromium plated tee stop cock 15mm (½") | Each | 14 | | |
| 13 | 19/52-iii | Providing and fixing CP bath Room Set made of Sonex/Master/Faisal comprising of 3-No Tee stop cocks, lever type Basin Mixer, double Bib Cock, open wall shower, Muslim shower,waste coupling and bottle trap etc. complete in all respect as approved and directed by the Engineer incharge.<br>(iii) Double Bib Cock | Each | 4 | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**
**BILL OF QUANTITIES -INTERNAL BUILDING PLUMBING WORK**
**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No. | Item Descriptions | Unit | Qty | Rate Pkr) | Amount (Pkr) |
|---|---|---|---|---|---|---|
| 14 | 19/49-a | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized polyvinyl Chloride ) Nikasi/ waste pipe Fittings make of dadex /Popular/Beta/BBJ conforming to code EN-1401 ncluding the cost of Solvents complete in all respect as approved and directed by the Engineer Incharge.<br>(a) P-Trap<br>(i) 4" dia | Each | 8 | | |
| 15 | 19/49-b | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized polyvinyl Chloride ) Nikasi/ waste pipe Fittings make of dadex /Popular/Beta/BBJ conforming to code EN-1401 ncluding the cost of Solvents complete in all respect as approved and directed by the Engineer Incharge.<br>(b) Multi-Trap | | | | |
| | | (i) 4" dia | Each | 2 | | |
| | | (ii) 3" dia | Each | 8 | | |
| 16 | 19/49-d | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized polyvinyl Chloride ) Nikasi/ waste pipe Fittings make of dadex /Popular/Beta/BBJ conforming to code EN-1401 ncluding the cost of Solvents complete in all respect as approved and directed by the Engineer Incharge.<br>(d) Clean Out<br>(i) 4" dia | Each | 2 | | |
| | | (ii) 3" dia | Each | 4 | | |
| 17 | 19/49-c | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized polyvinyl Chloride ) Nikasi/ waste pipe Fittings make of dadex /Popular/Beta/BBJ conforming to code EN-1401 ncluding the cost of Solvents complete in all respect as approved and directed by the Engineer Incharge.<br>(c) Vent Cowel<br>(i) 4" dia | Each | 4 | | |
| 18 | 19/19 | Providing and fixing, chromium plated towel rail:-<br>i) 60 cm (24") long, and 2 cm (¾") dia. | Each | 4 | | |
| 19 | 19/44-iii,iv,v, vi,vii | Providing, fixing, testing and commissioning of µ-PVC (Unplasticized polyvinyl Chloride ) Nikasi/ waste pipe make of dadex /Popular/Beta/BBJ plain /socket ended conforming to code EN-1329 of specified SDR (Standard Dimension Ratio) including the cost of specials and Solvents complete in all respect as approved and directed by the Engineer Incharge. | | | | |
| | | (i) 32mm | Rft | 355 | | |
| | | (iii) 50mm | Rft | 454 | | |
| | | (iv) 82mm | Rft | 393 | | |
| | | (v) 110 mm | Rft | 641 | | |
| | | (vi) 160 mm | Rft | 480 | | |
| | | (vii) 200 mm | Rft | 526 | | |
| | | Providing and fixing CP heavy duty brass Ball valve with CP handle of specified diameter made of Faisal/Sonex / Master best quality or equivalent complete in all respect as approved and directed by the Engineer Incharge. | | | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES -INTERNAL BUILDING PLUMBING WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No. | Item Descriptions | Unit | Qty | Rate Pkr) | Amount (Pkr) |
|---|---|---|---|---|---|---|
| 20 | 23/38 | ii) 3/4" dia | Each | 4 | | |
| | | iii) 1" dia | Each | 28 | | |
| | | iv) 1-1/4" dia | Each | 0 | | |
| | | v) 1-1/2" dia | Each | 2 | | |
| | | vi) 2" dia | Each | 0 | | |
| | | vii) 2-1/2" dia | Each | 0 | | |
| 21 | 23/44 | Providing and fixing heavy duty Check valve of specified diameter and material for pressure rating PN-16 made of Crane (USA), Hatersly (UK) or Scon (Pakistan) i/c the cost of all accessories flanges,nut/bolt and gaskit where required complete in all respect as approved and directed by the Engineer Incharge.<br>a) Brass Threaded Valves | | | | |
| | | iii) 1" dia | Each | 10 | | |
| | | iv) 1-1/4" dia | Each | 0 | | |
| | | v) 1-1/2" dia | Each | 2 | | |
| | | vi) 2" dia | Each | 0 | | |
| 22 | 23/33-a-ii, iii,iv,v,vi,vii | Providing, laying, testing and commissioning of POLYPROPYLENE RANDOM COPOLYMER (PPRC) water supply pipe made of (Dadex /Popular/ Beta / BBJ) with specified pressure rating PN (PRESSURE NOMINAL)and conforming to DIN 8077-8078 code i/c cost of solvent, specials,making jharries complete in all respect as approved and directed by Engineer Incharge.(Internal/External Diameters mentioned). a) PN-16 pipe | | | | |
| | | (ii)(3/4") 25 mm | Rft | 485 | | |
| | | (iii)(1") 32 mm | Rft | 165 | | |
| | | (iv) (1-1/4") 40 mm | Rft | 435 | | |
| | | (v) (1-1/2") 50 mm | Rft | 335 | | |
| | | (vi) )2") 63mm | Rft | 142 | | |
| | | (vii) 75 mm | Rft | 0 | | |
| 23 | 19/13 R | Providing and Fixing of SS304 Roof/scupper Drain, complete in all respect as approved and directed by Engineer Incharge. ii) 4" dia | Each | 25 | | |
| 24 | 23/42 | Providing and fixing heavy duty Gate valve of specified diameter and material for pressure rating PN-16 made of Crane (USA), Hatersly(UK), Scon(Pakistan)or approved equivalent manufacturer, i/c the cost of all accessories flanges, nut/bolt and gaskit where required complete in all respect as approved and directed by the Engineer Incharge.<br>(b) Flange Ended Ductile Iron Valve | | | | |
| | | (ix) 4" dia | Each | 0 | | |
| 25 | 19/51 | Providing and hoisting vertical/horizontal type storage tank of required capacity made of rotationally molded from (HDPE), double plypolyethelene of approved manufacturer i/c cost of making connection for inlet/outlet pipe, float valve i/c all cost of specials & labour complete in all respect as approved and directed by the Engineer Incharge.<br>i)5x50 Gallon<br>ii)1x150 Gallon | Per Gallon | 400 | | |

Engineering Consultancy Services Pvt. Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES -INTERNAL BUILDING PLUMBING WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No. | Item Descriptions | Unit | Qty | Rate Pkr) | Amount (Pkr) |
|---|---|---|---|---|---|---|
| 26 | 19/56 | Supply & Installation of Duel (Electric and Gas Water Heaters)with factory-installed pressure relief valve, adjustable water temperature control thermostate, Copper connections for specific capacity having leaving waterr temprature 140degF & working pressure 15PSI, Ambasador/ Canon or approved manufacturer i/c cost of all accessories to complete the job as per specifications and standards & making connection, complete in all respect as approved and /or directed by Engineer Incharge. | | | | |
| | | (i) 35 Gallons | Each | 0 | | |
| | | (iii) 55 Gallons | Each | 0 | | |
| 27 | 19/55 | Providing/ fixing Electric water heater (Geyser)comprising of tank of 14SWG, GI sheet and external cover of 22 SWG MS sheet, insulated with 4" thick high density glasswool, imported thermostati/ celectricrod, safety valve (Ambassador/Canon) or approved equivalent manufacturer i/c cost of accessories & making connection complete in all respect as approved and directed by Engineer Incharge. | | | | |
| | | (iii) 15 Gal capacity | Each | 3 | | |
| | | (iv) 20 Gal capacity | Each | 0 | | |
| 28 | 24/97 | Providing and fixing specified deep cable tray with straight flange fabricated with perforated G.I. Sheet of specified guage,size and depth of 1"x1"x1/8" and MS patti of 1-1/2"x3/16" size @ 5 ft C/C, hangers i/c duly wall supported/ceiling hung on painted brackets of MS angle iron by Automatic Electro-static application/with epoxy coated insulation with Mayler Class-B, housed in Aluminium Housing i/c the cost of, Providing and fixing specified deep cable tray with straight flange the cost of hardwares as approved and directed by the Engineer Incharge. 16SWG | | | | |
| | | i) 4"x 2" | Rft | 240 | | |
| | | i) 4"x3" | Rft | 350 | | |
| | | ii) 6"x3" | Rft | 225 | | |
| | | iii) 8"x3" | Rft | 200 | | |
| 29 | 21/5 | Constructing gully grating chamber, 12"x12", ( 300x300 mm) complete in all respects:<br>b) concrete Gully trap. | Each | 15 | | |
| 30 | 19/8R | Providing and fixing brass ball float valve:-<br>vi) 5 cm (2") dia | Each | 1 | | |
| | | iii) 2.5 cm (1") dia | Each | 10 | | |
| **a. Total Cost based on 2nd BI MRS 2026** | | | | | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES -INTERNAL BUILDING PLUMBING WORK**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No. | Item Descriptions | Unit | Qty | Rate Pkr) | Amount (Pkr) |
|---|---|---|---|---|---|---|
| 1 | NS | Providing/ fixing/ SS Floor drain Screen/Jali 6x6 complete in all respect as approved and directed by Engineer Incharge. | Each | 10 | | |
| 2 | NS | Supply, installation, testing and commissioning of a single-stage water filter complete with high-quality water filter cartridge, food-grade plastic housing, i/c all necessary accessories, fittings and supporting stand, complete in all respects as approved and directed by the Engineer In-Charge. | Each | 12 | | |
| 3 | NS | Providing and fitting imported Wall Mounted Water Closet PORTA/ AOTCO or approved equivalent manufacturer i/c the cost of CP/rubber connection, thimble, seat cover and rawal bolts complete in all respects as approved and directed by the Engineer Incharge. | Each | 4 | | |
| 4 | NS | Providing and fitting consealed type flushing tank for wall mounted Water Closet, PORTA/ AOTCO or approved equivalent manufacturer i/c the cost of CP/rubber connection, thimble, seat cover and rawal bolts complete in all respects as approved and directed by the Engineer Incharge. | Each | 4 | | |
| 5 | NS | Providing and fitting imported hand wash mixer with sensor (Auto) PORTA/ AOTCO or approved equivalent manufacturer i/c the cost of CP/rubber connection, thimble, seat cover and rawal bolts complete in all respects as approved and directed by the Engineer Incharge. | Each | 5 | | |
| **b. Total Cost based on Non Schedule Items** | | | | | | |
| **Grand Total (a + b) :** | | | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**SUMMARY OF FIRE PROTECTION SYSTEM**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No | DESCRIPTION | SCHEDULE ITEMS | NON SCHEDULE ITEMS | AMOUNT (RS) |
|---|---|---|---|---|
| 1 | FIREFIGHTING SYSTEM | | | |
| 2 | FIRE ALARM SYSTEM | | | |
| | **SUB TOTAL** | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES - FIREFIGHTING SYSTEM**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No | Item Descriptions | Unit | Qty | Rate | Amount |
|---|---|---|---|---|---|---|
| 1 | 23/56 | Gate Valves (OS&Y)<br>Providing and fixing of UL listed /FM approved OS&Y type D.I Gate valve (Flanged End) of specified diameter and working pressure 250 PSI rating, i/c the cost of all accessories flanges, nut/bolt and gasket where required complete in all respect as approved and directed by the Engineer In charge.<br>(iii) 4" dia | Nos | 7 | | |
| 2 | 23/58 | Non Return/ Check Valves<br>Providing and fixing of UL listed /FM approved D.I Check valve (Flanged End, swing type) of specified diameter with working pressure 250 PSI, i/c the cost of all accessories flanges, nut/ bolt and gasket where required complete in all respect as approved and directed by the Engineer In charge<br>(iv) 6" dia | Nos | 6 | | |
| 3 | 23/30 | Providing, laying, cutting, jointing, testing and disinfecting High Density Polyethylene Pipe (HDPE-100) working pressure pipe conforming to standard ISO4427, PS3580, Beta/ Dadex/ Popular/ IIL or approved equivalent manufacturer, including the cost of specials, in trenches, as approved & directed by the engineer incharge, complete in all respects.<br>i) PN-20 | | | | |
| | | 4) 160 mm | RFT | 950 | | |
| 4 | 23/54 | Providing and fixing of fire extinguishers and fire blanket of following type and capacities complete in all respect as approved and directed by the Engineer Incharge. | | | | |
| | | Dry Chemical Powder capacity 6 Kg. | Each | 32 | | |
| | | CO2 Capacity 5 kg. | Each | 32 | | |
| | | HFC Type Capacity 6kg | Each | 0 | | |
| | | K-Type wet chemical capacity 6 Litters. | Each | 2 | | |
| | | Fire Blanket, White Colour, with Black Strip, Hard Flat PVC Case in Red Colour, of 4ft x 6ft size. | Each | 6 | | |
| **a. Total Cost based on MRS 2026** | | | | | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES - FIREFIGHTING SYSTEM**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No | Item Descriptions | Unit | Qty | Rate | Amount |
|---|---|---|---|---|---|---|
| 1 | NS | Providing, fitting, installation & commissioning of Skid Mounted Vertical Turbine Fire Pump set UL Listed / FM Approved consisting of<br>01 No Electric Pump - 500gpm@8bar<br>01 No Diesel Pump - 5000gpm@8bar<br>01 No Jockey Pump - 5gpm@Main pump churn<br>Including Pressure Gauges, Pressure Relief Valve, Flow test Line, fittings, control valves, check valves, flow meter, control panel, instrumentations, piping and joints as per NFPA Requirement, all equipment, valves accessories should be UL Listed / FM Approved complete in all respect as approved by Engineer Incharge. | Each | 1 | | |
| 2 | NS | Providing, Fixing, Welding, Installation, Hanging, Painting, and Testing of Black Steel Pipe , Sch-40 , UL Listed, Pressure Rating 30 bar min, in accordance with ASTM A53, Schedule 40 welded fittings in accordance with ASTM A234, with brand of Jamal Pipe, Bashir Pipe, Hebai Steel Industries or equivalent including labour digging backfilling, bitumen coating paint & Fittings including tees, flanges, elbows, angle iron channel support<br>i) B.S Sch-40 6" dia | RFT | 15 | | |
| | | ii) B.S Sch-40 4" dia | RFT | 60 | | |
| | | iii) B.S Sch-40 3" dia | RFT | 70 | | |
| | | B.S Sch-40 (50mm) 2" Dia | RFT | 172 | | |
| | | B.S Sch-40 (50mm) 1-1/2" Dia | RFT | 30 | | |
| 3 | NS | Supply, Installation, laying, jointing, testing **Class II Fire Hose cabinet** concealed type Single compartment complete with Lock Shield valve 1", hose Reel Swing type in Cabinet 1" x 100 ft, swing type, with imported hose, and imported jet/spray/shut nozzle, pressure gauge and pressure reducing valve, all equipment, valves accessories should be UL Listed / FM Approved complete in all respect as approved by Engineer Incharge. | Each | 2 | | |
| 4 | NS | Supply Installation, Fitting and Testing of Fire hydrant, Pillar Type Double Delivery, Having 4" Flanged and of 2 x 2½" deliveries Controllable outlet with min pressure rating 18 bar with individual controls & British female instantaneous coupling with blank cap and chain, all equipment, valves accessories should be UL Listed / FM Approved complete in all respect as approved by Engineer Incharge. | Each | 7 | | |



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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES - FIREFIGHTING SYSTEM**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No | Item Descriptions | Unit | Qty | Rate | Amount |
|---|---|---|---|---|---|---|
| 5 | NS | Supply Installation, Fitting and Testing of **Hose cabinet**, made of Mild Steel with Glass front, size 24"x24"x10", 01nos of Jet Nozzle, 18" Long, inlet 2 ½" male instantaneous coupling and outlet ¾" orifice. Brass finished, and 01 nos of Fire hose Nylon top, rubber lined. Size: 2.5"x100' with male and female instantaneous couplings. Standing or Wall Hanging/ Concealed, all equipment, valves accessories should be UL Listed / FM Approved complete in all respect as approved by Engineer Incharge. | Each | 7 | | |
| 6 | NS | Supply Installation, Fitting and Testing of Fire Brigade Point/ **Fire Department Connection** complete with 2x2.5" outlet, 6" Dia inlet with matching flange and 6" Dia check valve of Pressure Rating 18 bar, all equipment, valves accessories should be UL Listed / FM Approved complete in all respect as approved by Engineer Incharge. | Each | 1 | | |
| 7 | NS | **Alarm Check Valve**(UAE) 6" DN<br>Provide install, test and commissioning of 6 inch (DN 160) wet type alarm check valve, pressure rating PN-18, having flange coupling and all necessary valves gauges switches water motor alarm gong retard chamber and other necessary appurtenances and shall be FM/UL listed complete in all respects as shown in drawings. i/c of any additional equipment valves as per requirement all equipment, valves accessories should be UL Listed / FM Approved complete in all respect as approved by Engineer Incharge. and approved by Engineer In charge. | Each | 1 | | |
| 8 | NS | **Alarm Check Valve**(UAE) 4" DN<br>Provide install, test and commissioning o4 6 inch (DN 110) wet type alarm check valve, pressure rating PN-18, having flange coupling and all necessary valves gauges switches water motor alarm gong retard chamber and other necessary appurtenances and shall be FM/UL listed complete in all respects as shown in drawings. i/c of any additional equipment valves as per requirement and approved by Engineer In charge. | Each | 1 | | |
| 9 | NS | Providing, fixing, testing, and commissioning of **25 kg Trolley** Mounted Dry Chemical Powder (ABC Type) Fire Extinguisher, stored pressure type, conforming to the relevant applicable standards, complete with seamless steel cylinder, ABC dry chemical powder extinguishing agent, pressure gauge, discharge hose with shut-off nozzle, operating valve, safety pin and seal, wheeled trolley with steel frame, rubber wheels, carrying handle, and all necessary accessories. The item shall include initial filling, mounting (where required), inspection, testing, commissioning, and handing over in complete working condition, as approved by the Engineer In-Charge. | Each | 4 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES - FIREFIGHTING SYSTEM**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr # | MRS No | Item Descriptions | Unit | Qty | Rate | Amount |
|---|---|---|---|---|---|---|
| 10 | NS | Providing, Fixing, Installation, Hanging, Testing and Commissioning of Clean Agent Fire Suppression System (NOVEC 1230) for each area specified, integrated with early warning smoke detection system , in Room and to be connected with built-in fire suppression system inside containment Including the cost of all UL Listed, piping, discharge nozzles, switches, Alarm bell, Flasher, Electric Solenoid Actuator, Cylinders, detectors, control panel, releasing system, wiring, hanging, bracing, Optical Smoke Detector, room integrity pressure test and any other misc. item for the system appurtenances complete in all respects, each system shall be integrated with Central FAS & connected to Main FACP/ DCIM. all equipment should be UL/FM approved as per NFPA standard as approved by Engineer Incharge. | | | | |
| | | MMR A (14'x16'x21') | Job | 1 | | |
| | | MMR B (14'x16'x21') | Job | 1 | | |
| | | COMMAND AND CONTROLL ROOM (58.5'x22.75'x21') | Job | 1 | | |
| | | ELECTRICAL PANNEL ROOM A (38'x34.75'X21') | Job | 1 | | |
| | | ELECTRICAL PANNEL ROOM B (38'x34.75'X21') | Job | 1 | | |
| | | UPS ROOM A (33.5'x16'x21') | Job | 1 | | |
| | | UPS ROOM B (33.5'x16'x21') | Job | 1 | | |
| | | NOC ROOM (21'x11'x21') | Job | 1 | | |
| | | STAGING TDL AREA (12'x11'x21') | Job | 1 | | |
| | | NON CRITICAL UPS ROOM A (17'x11'x21') | Job | 1 | | |
| | | NON CRITICAL UPS ROOM B (17'x11'x21') | Job | 1 | | |
| | | BATTERY ROOM A (40'x14.5'x21') | Job | 1 | | |
| | | BATTERY ROOM B (40'x14.5'x21') | Job | 1 | | |
| | | IT RACK ROOM 02 (40'x20'x21') | Job | 1 | | |
| | | GEN SET SYNC-MTTM A ZONE (30.5'x14'x21') | Job | 1 | | |
| | | GEN SET SYNC-MTTM B ZONE (30.5'x14'x21') | Job | 1 | | |
| | | MV SWITCH GEAR ROOM A (24.75'x14.5'x21') | Job | 1 | | |
| | | MV SWITCH GEAR ROOM B (24.75'x14.5'x21') | Job | 1 | | |
| | | STRONG ROOM (12'x16.75'x12') | Job | 1 | | |
| **b. Total Cost based on Non Schedule Items** | | | | | | |
| **Grand Total (a + b) :** | | | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES - FIRE ALARM SYSTEM**

| Sr # | MRS No | Item Descriptions | Unit | Qty | Rate | Amount |
|---|---|---|---|---|---|---|
| 1 | NS | Providing, fixing, testing and commissioning of complete early warning smoke detection system i.e. VESDA or equivalent, based aspirating smoke detection and fire alarm system, fully addressable and suitable for early warning smoke detection applications, comprising VESDA or equivalent aspirating smoke detectors/air sampling units and standard smoke detectors photoelectric type with high-sensitivity laser-based smoke detection, integral aspirator/fan, multi-level alarm thresholds, LCD/status display and event indication; complete with fire alarm control(capable for integrating with other supression/ detection systems and central control) and indicating panel (FACP) with addressable loop modules, network/communication modules and all necessary system interface modules; high-quality fire-rated air sampling pipework with fittings, bends, tees, end caps, sampling holes/orifices, pipe supports, brackets, identification labels and all associated accessories; sampling point design and installation in accordance with the manufacturer's approved pipe network calculations i/c all necessary power supply units, standby batteries, isolator modules, input/output modules, relay/interface modules, sounder/strobe interfaces, remote display/indicator panels, fault monitoring facilities, alarm relays and interfaces with other building services, including but not limited to HVAC/AHU shutdown, smoke extraction systems, fire/smoke dampers, clean-agent fire suppression system, complete FACP wiring, BMS and other required fire protection interfaces, as applicable. all equipment should be UL/FM and approved as per NFPA standard as approved by Engineer Incharge. | Job | 1 | | |
| **b. Total Cost based on Non Schedule Items** | | | | | | |



| PUNJAB INFORMATION TECHNOLOGY BOARD | | | | | | |
|---|---|---|---|---|---|---|
| ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | | | | | |
| BILL OF QUANTITIES - AIR CONDITIONING WORKS | | | | | | |
| **ITEM NO.** | **MRS Ref.** | **DESCRIPTION** | **UNIT** | **QTY.** | **RATE (Rs.)** | **AMOUNT (Rs.)** |
| **Supply, Installation, Testing & Commissioning of** | | | | | | |
| 1 | NS | Providing, installation, testing, commissioning of **Wall Mounted Units,** to be connected with All DC Inverter T3 reversible heat pump type outdoor condensing units. The Units should be made of Daikin, Toshiba, Carrier, Samsung or equivalent manufactures of USA/Europe/Japan Origion. The indoor unit shall be of capacities as specified in equipment schedule i/c copper pipe(upto 70ft), insulation, wires and any other accessories, the indoor unit shall be complete in all respect.<br>**Note:**<br>i. If the exact same capacity unit Model is not available then, next large capacity unit Model shall be considered/provided.<br>ii. Less capacity unit model shall be rejected and not acceptable.<br>iii. The below requirement is on actual (not Nominal) basis. Temperature adjustments, Level Adjustments between indoor and outdoor units be considered along with piping losses and level difference between indoor and outdoor units.<br>iv. The units should be of T3 Rating, **(Non Adjustable item Pursuant to COC clause 70)** | | | | |
| | i | FCU- 01 + CU 01 (1.0Ton, actual) | Each | 2 | | |
| | ii | FCU- 02 + CU 02 (1.5Ton, actual) | Each | 2 | | |
| | ii | FCU- 03 + CU 03 (2 Ton, actual) | Each | 24 | | |

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| PUNJAB INFORMATION TECHNOLOGY BOARD | | | | | | |
|---|---|---|---|---|---|---|
| ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | | | | | |
| BILL OF QUANTITIES - AIR CONDITIONING WORKS | | | | | | |
| **ITEM NO.** | **MRS Ref.** | **DESCRIPTION** | **UNIT** | **QTY.** | **RATE (Rs.)** | **AMOUNT (Rs.)** |
| 2 | NS | Providing, installation, testing, commissioning, adjusting and balancing of **In-Row, Floor Mounted Type, Intelligent precision air conditioner** with Heater, Fault-Tolerant application, temperature and humidity sensor and Leak Sensor, to be connected with DX-Type Condensing Unit for precision cooling system. The Units should be made of Daikin, Toshiba, Carrier, Huawei, Samsung or equivalent manufactures of USA/Europe/Japan Origion. Outdoor Unit shall be installed on RCC foundations as recommended/required as per the load. Including the cost of valve, fittings, electronic equipment, accessories and any other equipment required for operation of system. Complete in all respects to the entire satisfaction and as approved by the Engineer in Charge. i/c of any additional refrigerant, Class O Insulation, copper pipe (ACR Grade B-280), as per manufacturer recommendation upto 100 feet all fitting, insulation and accessories shall be provided in the same quoted cost., remote sensor, cable all fitting, insulation or accessories shall be provided in the same quoted cost. Complete system should be complied with Tier 4 requirements. Complete in all respects. The equipment should be in accordance with high ambient design condition. and minimum Energy Efficiency Ratio (EER) should be 3.5.<br>**Note:**<br>i. If the exact same capacity unit Model is not available then, next large capacity unit Model shall be considered/provided.<br>ii. Less capacity unit model shall be rejected and not acceptable.<br>iii. The below requirement is on actual (not Nominal) basis. Temperature adjustments, Level Adjustments between indoor and outdoor units be considered along with piping losses and level difference between indoor and outdoor units.<br>iv)Additional specification are detail described in specifications.<br>v)The system should comply with AHRI/ASHRAE/ UTI®/ TIA942/ IEC standards.<br>vi)The units must have the Built-in Factory OEM's Dual Power Supply provision via (OEM built-in power and electrical distribution board 100% workable.<br>vii)The units should be integrated electrical heater, humidifier/de-humidifier/Condensation pump, variable speed fans, active flow control, Colour Touchscreen & Network Card, DC inverter scroll/Digital Scroll/VFD compressor or equivalent technology, easy filter replacement.<br>viii)The Indoor Inrow units must have swappable Modular type cooling fans assemblies replaceable/serviceable in few minutes time onsite.<br>ix)Operating ambient temperature: -20°C ~ +55°C & ambient humidity: ≤ 95% RH with Humidity adjustment range: 20% ~ 80% RH, humidity control accuracy: 5 %RH.<br>x)The units should be configured with 2-3 built-in temperature sensors and 1 built-in temperature & humidity sensor to measure the temperature more accurately and increase system reliability. Alarm signal should be provided when temperature & humidity fluctuations overrun.<br>xi) The cooling capacity derating should not be more than 10% at high ambient temperature.<br>xii) The unit must have auto Refrigerant leakage detection linked to DCIM up to NOC alerts with all health check interconnected.<br>xiii) All equipment shall be designed in accordance with ambient design conditions not less than 46 °C and cooling capacity derating at high ambient temperature shall not exceed 10 percent Certified derating curves shall be submitted in support.<br>ix) Condensing units and the complete system shall be of T3 climatic rating. **(Non Adjustable item Pursuant to COC clause 70)** | | | | |
| | i | PAC-1 +PCU-1 (35KW, actual) Without Humidifier | Each | 6 | | |
| | i | PAC-1 +PCU-1 (35KW, actual) With Humidifier and Dehumidifier | Each | 6 | | |



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| PUNJAB INFORMATION TECHNOLOGY BOARD | | | | | | |
|---|---|---|---|---|---|---|
| ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | | | | | |
| BILL OF QUANTITIES - AIR CONDITIONING WORKS | | | | | | |
| **ITEM NO.** | **MRS Ref.** | **DESCRIPTION** | **UNIT** | **QTY.** | **RATE (Rs.)** | **AMOUNT (Rs.)** |
| 3 | NS | Providing, installation, testing, commissioning, adjusting and balancing of **CRAC TOP/FRONT Floor Mounted Type, Intelligent precision air conditioner** with , Fault-Tolerant application, SIC included with SIC Card Casing and kit, temperature and humidity sensors and Leak Sensor, to be connected with DX-Type Condensing Unit for precision cooling system. The Units should be made of Daikin, Toshiba, Huawei, Carrier, Samsung or equivalent manufactures of USA/Euorpe/Japan Origion. Outdoor Unit shall be installed on RCC foundations as recommended/required as per the load. Including the cost of valve, fittings, electronic equipment, accessories and any other equipment required for operation of system. Complete in all respects to the entire satisfaction and as approved by the Engineer in Charge. i/c of any refrigerant, Class O Insulation, control wire and Copper pipe(ACR Grade B-280), as per manufacturer recommendation upto 100 feet all fitting, insulation or accessories shall be provided in the same quoted cost. Complete system should be complied with Tier 4 requirements. Complete in all respects.The equipment should be in accordance with high ambient design condition. and minimum Energy Efficiency Ratio (EER) should be 3.5.<br>**Note:**<br>i.) If the exact same capacity unit Model is not available then, next large capacity unit Model shall be considered/provided.<br>ii.) Less capacity unit model shall be rejected and not acceptable.<br>iii). The below requirement is on actual (not Nominal) basis. Temperature adjustments, Level Adjustments between indoor and outdoor units be considered along with piping losses and level difference between indoor and outdoor units.<br>iv)Additional specification are detail described in specifications.<br>v)The system should comply with AHRI/ASHRAE/ UTI®/ TIA942/ IEC standards.<br>vi)The units must have the Built-in Factory OEM's Dual Power Supply provision via (OEM built-in power and electrical distribution board 100% workable.<br>vii)The units should be integrated electrical heater, humidifier/de-humidifier/Condensation pump, variable speed fans, active flow control, Color Touchscreen & Network Card, DC inverter scroll/Digital Scroll/VFD compressor or equivalent technology, easy filter replacement.<br>viii)The Indoor Inrow units must have swappable Modular type cooling fans assemblies replaceable/serviceable in few minutes time onsite.<br>ix)Operating ambient temperature: -20°C ~ +55°C & ambient humidity: ≤ 95% RH with Humidity adjustment range: 20% ~ 80% RH, humidity control accuracy: 5 %RH.<br>x)The units should be configured with 2-3 built-in temperature sensors and 1 built-in temperature & humidity sensor to measure the temperature more accurately and increase system reliability. Alarm signal should be provided when temperature & humidity fluctuations overrun.<br>xi) The cooling capacity derating should not be more than 10% at high ambient temperature.<br>xii) The unit must have auto Refrigerant leakage detection linked to DCIM up to NOC alerts with all health check interconnected.<br>xiii)All equipment shall be designed in accordance with ambient design conditions not less than 46 °C and cooling capacity derating at high ambient temperature shall not exceed 10 percent Certified derating curves shall be submitted in support.<br>ix) Condensing units and the complete system shall be of T3 climatic rating. **(Non Adjustable item Pursuant to COC clause 70)** | | | | |
| | i | PAC-2 +PCU-2 (27KW, actual) without heater and Humidifier. | Each | 8 | | |
| | ii | PAC-2 +PCU-2 (27KW, actual) with heater and Humidifier. | Each | 8 | | |
| | iii | PAC-3 +PCU-3 (12KW, actual) without heater and Humidifier. | Each | 4 | | |
| | iv | PAC-3 +PCU-3 (12KW, actual) with heater and Humidifier. | Each | 6 | | |
| 4 | NS | Providing, installation and testing and commissioning of **Rodent replant and Water Leak Detection system** for all 4 Pods of Data Centre and 8No. of Other supporting rooms including UPS Rooms, Battery Rooms,Non-critical UPS Rooms,MMRs i/c of all equipment, accessories, alarm panel, sensors, integration with other system and BMS system, etc complete in every aspect as approved by Engineer Incharge. **(Non Adjustable item Pursuant to COC clause 70)** | Job | 1 | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

| PUNJAB INFORMATION TECHNOLOGY BOARD | | | | | | |
|---|---|---|---|---|---|---|
| ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | | | | | |
| BILL OF QUANTITIES - AIR CONDITIONING WORKS | | | | | | |
| **ITEM NO.** | **MRS Ref.** | **DESCRIPTION** | **UNIT** | **QTY.** | **RATE (Rs.)** | **AMOUNT (Rs.)** |
| 5 | NS | Supply and Installations of **Hot aisle containment** with transparent polycarbonated ceilings and hydraulic door & closer with lights with provision of fire suppression system, containment should also be integrated with fire detection and suppression system, of approved manufacturer complete in all respect as approved by engineer Incharge. **(Non Adjustable item Pursuant to COC clause 70)** | | | | |
| | i | 30' (Double Row) | Job | 1 | | |
| | ii | 30' (Single Row) | Job | 0 | | |
| 6 | NS | Providing, fixing, testing, and commissioning of **Automatic Louver Exhaust Fan** of 9500 CFM capacity, complete with 0.75 HP(min.) heavy-duty motor, mounting frame, protective guard, louvers/shutters, bird/insect screen (where required), electrical wiring from the local isolator to the fan, all fixing accessories, supports, hardware, testing, trial run, and commissioning, complete in all respects, as approved by the Engineer In-Charge. **(Non Adjustable item Pursuant to COC clause 70)** | Each | 4 | | |
| 7 | NS | Providing, installation, testing commissioning of **Refrigerant Copper Piping** to be connected among all In Rack PAC indoors and all DC Inverter Reversible outdoor units heat pump type condensing units. The piping shall be of ASTM –B280 seamless standard, Sealed Nitrogenized ACR Grade specification, with all type of fittings like tee elbow etc. The copper pipe should be placed inside the cable tray. This refrigerant piping shall be consisting of suction and liquid lines, these shall further be covered with 19mm thick closed cell foam insulation (aeroflex/superlon or armaflex). The refrigerant piping shall be made by Muller(USA) or equivalent USA origin, and shall be sized on manufacturer's software's and shall be approved by the Concerns prior to installation, Complete in all respects as per drawings, specifications. Copper testing will be for 24 hours on 600-650 PSI (ASTM –B280 seamless standard, Sealed Nitrogenized ACR Grade). Sizes should be as per software selection. Complete in all respect as approved by Engineer Incharge. **(Non Adjustable item Pursuant to COC clause 70)** | Rft | 2,400 | | |
| 8 | NS | Supply & Installation, Testing, commissioning of ERP and APPULUS certified, 400°C/2 hour fire-rated **exhaust Fan 5,000 CFM @ 1.0 in. w.g.** static pressure, complete with electric motor, fan assembly, casing, impeller, bearings, guards, vibration isolators, mounting/support arrangement and all necessary accessories and fittings, including testing and commissioning, complete in all respects as approved and directed by Engineer Incharge. **(Non Adjustable item Pursuant to COC clause 70)** | Job | 2 | | |
| 9 | NS | Supply & Installation, Testing, commissioning of ERP and APPULUS certified, 400°C/2 hour fire-rated **exhaust Fan 2,500 CFM @ 1.0 in. w.g.** static pressure, complete with electric motor, fan assembly, casing, impeller, bearings, guards, vibration isolators, mounting/support arrangement and all necessary accessories and fittings, including testing and commissioning, complete in all respects as approved and directed by Engineer Incharge. **(Non Adjustable item Pursuant to COC clause 70)** | Job | 2 | | |
| 10 | NS | Providing, installation and testing and commissioning of intelligent **AUTO AIR FLOW CONTROL SYSTEM** for pods, integrated with all precision cooling units in aisle for flow/ temperature control. i/c of all equipment, accessories, panel, sensors, integration with other system and DCIM system, etc complete in every aspect as approved by Engineer Incharge. **(Non Adjustable item Pursuant to COC clause 70)** | No | 1 | | |
| **TOTAL COST BASED ON NON SCHEDULE ITEMS** | | | | | | |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

| PUNJAB INFORMATION TECHNOLOGY BOARD | | | | | | |
|---|---|---|---|---|---|---|
| ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | | | | | |
| BILL OF QUANTITIES - AIR CONDITIONING WORKS | | | | | | |
| **ITEM NO.** | **MRS Ref.** | **DESCRIPTION** | **UNIT** | **QTY.** | **RATE (Rs.)** | **AMOUNT (Rs.)** |
| 1 | 27/9/a-ii (2025-i) | Providing and installation **Return/Exhaust Air grilles** made of specified material having horizontal and vertical adjustable deflecting bars, grilles with minimum of 75%free area complete in all respects as approved and directed by the Engineer Incharge . a) Electrostatic oven Cured Powder Coated/Anodized, Extruded Aluminium (ii) 1.20 mm thick | SFt | 400 | | |
| 2 | 27/1/vi | Supplying, fabrication and installation of **duct** using prime quality hot dipped G.I sheet metal (Z-275) of specified thickness including the cost of hangers , tees, bends , reducers, elbows, turning vanes and splitter etc coupled with jointing sealant , mounting supports @ 8 ft c/c and smoke testing charges complete in all respects as approved and directed by the Engineer Incharge. vi) 18-SWG | SFt | 1200 | | |
| 3 | 27/7/ii | Supply, installation testing and commissioning of cross-linked polyolefin **(XLPE) thermal closed foam cell insulation** of thermal conductivity 0.035 W/mK AT 23C, density 25kg/m3, factory applied aluminium foil facing and self adhesive backing with all accessories to complete the work. the product shall be UL/FM approved and class 0 specifications. ii) 25 mm thick for outdoor ducts | SFt | 1200 | | |
| 4 | 27/20/a | Providing and installing **opposed blade Dampers** (Air-Handler) , of Prime Quality G.I sheet of specified thickness,(The quadrant volume damper shall be muti-leaf type, with a maximum blade width of 8", heavy duty quadrant operators of brass with stand off ountings on thermally insulated ducts to provide clearance between the duct surface and operator, equal to the thickness of the insulation , capable of being locked at desired position conveniently, provided with a baked enamel finish complete in all respects as approved and directed by the Engineer Incharge. a) 16 SWG | | | | |
| | i | Manual Volume Control Dampers (with accuator) | SFt | 50 | | |
| | iii | Motorized Fire & Smoke Dampers (with accuator) | SFt | 75 | | |
| 5 | 27/21/d/ i | Supply & Installation of **duct flexible connector** of specified material and coatings and width as per drawings with all accessories and fittings complete in all respect as approved and directed by Engineer Incharge. (d) Glassfiber with Silicon Coating (i) 9" Wide | SFt | 30 | | |
| TOTAL COST BASED ON SCHEDULE ITEMS | | | | | | |
| TOTAL COST | | | | | | |



**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| | | **Solution including Equipment And Services Details** | | | | |
| 1 | | **CCTV System** | | | | |
| i | 24/139-b | Supply, installation & connecting IP based Camera of specified resolution, lens,motorized,auto-iris and auto-focus function, f=2.8~12 mm,human/vehicle object classification ,D/N function-IR cut filter,Video content analysis based on Deep learning,micro SD card support,WDR with double scan sensor, Min, illumination: 0.007 Ix(01xIR on),IR LED,range upto 50 m, i/c the cost of mounting bracket,accessories,made of AXIS Europe/NOVAS Europe/Avigilon by Motorla USA/Bosch Germany, Pollo Australia or equivalent, as approved as directed by the Engineer Incharge. b) 4 Mega Pixel | | | | |
| | i | Fixed Bullet Type | No | 31 | | |
| | ii | Fixed Dome type | No | 86 | | |
| ii | 24/143 | Supply, installation & connecting outdoor PTZ (Pan-Tilt-Zoom),IP based Camera of specified resolution, lens,motorized varfocal,AL & AF function,specified optical zoom,D/N function-IR cut filter,Video content analysis,micro SD card support, Min, illumination:face recognition, specified IR LED range RANGE i/c the cost of mounting bracket, accessories,made of AXIS Europe / NOVAS Europe / Avigilon by Motorla USA / Bosch Germany, Pollo Australia or equivalent, as approved as directed by the Engineer Incharge. | | | | |
| | iii | 4.0 MPxl, Optical zoom 30x,Digital zoom 16x,,laser distance 200 meter, Main stream H-264+/265+, sub stream H.264/265, Third Stream H.264/265, Max resolution 2560 x 1440 with 30 fps,IP-67. | No | 6 | | |
| 2 | 24/151-b | Supply, Installation and commissioning of Armored Fiber Optic Cable of specified core and mode, Fiber Optic Connection, UL listed , in prelaid /pipe, cable tray , including all accessories, made of Norden / Schneider / Panduit/Pollo Australia or equivalent Complete in all respect as approved and directed by Engineer Incharge. | | | | |
| | b-iii | b) Singlemode OS2, (iii) 12 Core | Meter | 3212 | | |
| 3 | 24/123-II-b-i | Supply, Installation and commissioning of wiring with 4-pair data Cable of specified size, UL/EN listed cable * Conforming to following standards: TIA/EIA 568 / ISO/IEC 11801, in prelaid conduit / cable tray from including all accessories, Manufacturer/OEM Authorization, Make: Schneider / i-connect UK/3M Corning USA/ D-Link/ Pollo Australian or equivalent approved manufacturer, complete in all respect as approved and directed by Engineer Incharge. II 24 AWG, b) STP (Shielded Twisted pair), (i)CAT-7 (Min.1G/ 10G @ 600MHz or higher ) | Meter | 2430 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 4 | 24/154 | Supply, Installation of WiFi access points(APs),conforming IEEE as approved and directed by the Engineer Incharge. | | | | |
| | | **i) Support upto 50 concurrent connections**<br>(a) Data transfer rate Min. 802.11ac: 1200 Mbps<br>(b) Support upto 50 concurrent connections<br>(c) 4X4 MIMO support (3SU,3MU)<br>(d) 2xEthernet 10/100/1000 Base-T (RJ-45)<br>(e) 1x100/1000 BASE -X (SFP) optionally<br>(f) N- Type (Female) for external antennas (Omni,sector rod,etc.)<br>(g) IEEEa/b/g/n/ac wave 2 standards, should work on 2.4 & 5.8 Ghz<br>band Simultaneously ans @ 2.4 Ghz support 500 Mbps.<br>(h) VLAN 802.1Xauthentication ,NAT and DHCP client,LLDP, ACL<br>Ipv4 and lpv 6 support.<br>(i) Power supply: PoE + 48 V /54 V (IEEE 802.3 at -2009) 48 V DC.<br>(j) Operating Temperature from -10 to +45 C. managed by wireless<br>controller. Make: - Aruba / Cisco / Al-Catel. as approved and directed by Engineer Incharge. Support Automatic RF channel selection, and dual stack. Make: - Aruba / Cisco / Al-Catel. | Each | 4 | | |
| | | **SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |
| | | **Note: Racks PDU and Sensors for Racks Must be from Same Vendor** | | | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 1 | | **IT racks 600x1070/1100 For 24 Racks POD1 - EIA/TIA Compliant (Dynamic Load 1200-1500kg), The unit shall have four (4) adjustable levelling feet** | | | | |
| i | NS | Supply, installation, testing, commissioning, programming and integration of complete 42U 600Wx1100D Smart Server Rack of approved manufacturer without PDU, comprising 19-inch enclosed rack cabinet with heavy-duty steel construction, adjustable front and rear mounting rails, lockable front and rear doors, removable side panels, cable management accessories, Toolless Plastic Blank Panels and entry provisions, cooling/ventilation arrangement, castors with leveling feet, grounding/earthing provision and all necessary accessories, made of APC, Dell, Panduit, Eaton or equivalent Complete in all respect as approved and directed by Engineer Incharge. | No. | 24 | | |
| ii | NS | Supply, installation and commissioning of 1U horizontal cable management panel, suitable for standard 19-inch rack/cabinet, manufactured from high-quality, durable flame-retardant plastic/ABS material, black in colour, with enclosed/slotted horizontal cable duct, removable hinged or snap-on cover, provision for front-to-rear cable routing through rear/side openings, smooth and rounded cable fingers/edges to prevent cable damage and maintain minimum cable bend radius, suitable for management of copper and fiber patch cords, complete with required rack mounting hardware, conforming to applicable EIA-310/EIA-310-E rack mounting requirements, complete in all respects as approved by Engineer-In-Charge. | No. | 24 | | |
| iii | NS | Supply, installation, testing and commissioning of 19-inch rack mount fixed shelf, suitable for standard 19-inch server/network racks, with minimum shelf depth of 750 mm, complete with all required mounting hardware and accessories. Make: APC, Vertiv, or approved equivalent, subject to approval of the Engineer In-Charge. | No. | 24 | | |
| 2 | | **IT racks 600x1070/1100 For MMR A And B , Staging Area NOC Room** | | | | |
| i | NS | Supply, installation, testing, commissioning, programming and integration of complete 42U 600Wx1100D Smart Server Rack of approved manufacturer without PDU, comprising 19-inch enclosed rack cabinet with heavy-duty steel construction, adjustable front and rear mounting rails, lockable front and rear doors, removable side panels, cable management accessories, Toolless Plastic Blank Panels and entry provisions, cooling/ventilation arrangement, castors with leveling feet, grounding/earthing provision and all necessary accessories, made of APC, Dell, Panduit, Eaton or equivalent Complete in all respect as approved and directed by Engineer Incharge. | No. | 10 | | |

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PUNJAB INFORMATION TECHNOLOGY BOARD

ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN

NETWORKING SYSTEM

BILL OF QUANTITIES

(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| ii | NS | Supply, installation and commissioning of 1U horizontal cable management panel, suitable for standard 19-inch rack/cabinet, manufactured from high-quality, durable flame-retardant plastic/ABS material, black in colour, with enclosed/slotted horizontal cable duct, removable hinged or snap-on cover, provision for front-to-rear cable routing through rear/side openings, smooth and rounded cable fingers/edges to prevent cable damage and maintain minimum cable bend radius, suitable for management of copper and fiber patch cords, complete with required rack mounting hardware, conforming to applicable EIA-310/EIA-310-E rack mounting requirements, complete in all respects as approved by Engineer-In-Charge. | No. | 10 | | |
| iii | NS | Supply, installation, testing and commissioning of 19-inch rack mount fixed shelf, suitable for standard 19-inch server/network racks, with minimum shelf depth of 750 mm, complete with all required mounting hardware and accessories. Make: APC, Vertiv, or approved equivalent, subject to approval of the Engineer In-Charge. | No. | 10 | | |
| | | | | | | |
| 3 | | **UPS, Power and Metered PDU for IT racks 600x1070/1100** | | | | |
| i | NS | Supply, Installation, testing commissioning and integration of 06KW 0U Switched & Outlet-Metered Intelligent PDU, 06kW continuous load capacity, 30A Max Input (24A continuous) via standard industrial IEC 60309 connector or regional equivalent, Integrated, low-profile UL 489 rated magnetic-hydraulic circuit breakers dividing the PDU into isolated branch circuits, 0U Vertical mount configuration, 24 Outlets Total in a high-density, mixed arrangement (e.g. IEC C13 + IEC C19), Comprehensive native network integration via HTTPS (Web Interface), SNMP v2c/v3, SSH/Telnet CLI, Modbus TCP/IP, and JSON-RPC / REST API, Daisy-chaining Capabilities to link iPDUs, IntegratedRJ45 auxiliary ports for Communication, Open architecture compatible with third-party DCIM, made of APC / Raritan / Eaton or equivalent Complete in all respect as approved and directed by Engineer Incharge. | Each | 38 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| ii | NS | Supply, Installation, testing commissioning and integration of 15KW 0U Switched & Outlet-Metered Intelligent PDU, 15kW continuous load capacity (typically rated up to 17.3kVA or 22kVA to preserve overhead safety margins), 63A Max Input (48A continuous) via standard industrial IEC 60309 connector or regional equivalent, Integrated, low-profile UL 489 rated magnetic-hydraulic circuit breakers dividing the PDU into isolated branch circuits, 0U Vertical mount configuration, 40 outlets per unit, High-density arrangement mixing IEC 60320 C13 (rated up to 10A) and IEC 60320 C19 (rated up to 16A) locking or high-retention receptacles, Comprehensive native network integration via HTTPS (Web Interface), SNMP v2c/v3, SSH/Telnet CLI, Modbus TCP/IP, and JSON-RPC, Daisy-chaining Capabilities to link iPDUs, IntegratedRJ45 auxiliary ports for Communication, Open architecture compatible with third-party DCIM, made of APC, Raritan, Eaton or equivalent Complete in all respect as approved and directed by Engineer Incharge. | Each | 30 | | |
| 4 | NS | **Supply, installation, testing, commissioning, programming and integration of complete DCIM / Environment Management System for ITDCF PODs, including all required hardware, software, licenses and accessories. System shall support monitoring and management of HVAC, power, UPS, data racks, access control, CCTV and other facility components, with 10–15% spare capacity for future expansion. Make: Approved Manufacturer, complete in all respects and as approved by the Engineer In Charge.** | No. | 1 | | |
| 5 | | **CCTV System** | | | | |
| i | NS | Supply, installation, testing, commissioning, configration and integration of complete enterprise IP Video Storage System: The system shall be an enterprise-grade 4U rack-mountable IP video storage appliance supporting a minimum of 320 IP camera channels, 800 Mbps recording bandwidth, and 24 hot-swappable SATA HDD bays. It shall support RAID 0/1/5/6/10/50/60, hot-spare, automatic RAID rebuild, HDD health monitoring, and scalable storage capacity. The system shall support continuous, scheduled and event-based recording with individual recording settings per camera, along with ANR or equivalent network-loss recovery and N+M or equivalent failover capability. It shall provide redundant power supplies, minimum 4×1GbE network interfaces with 10GbE support, ONVIF and other open protocols, H.264/H.265, iSCSI/IP-SAN, PTZ and intelligent event recording. The system shall provide web-based management, remote monitoring, video search/playback, backup/export, system health monitoring and be suitable for 24×7 surveillance operation, made of Dahua / Hikvision / Hanwha Vision or equivalent Complete in all respect as approved and directed by Engineer Incharge. | UN | 2 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| ii | NS | Supply, installation, testing, commissioning, and integration of complete enterprise Surveillance/Datacenter HDD: The offered hard disk drive shall have a minimum 28 TB native capacity, 3.5-inch form factor, 7200 RPM rotational speed, SATA 6 Gb/s interface, and CMR (Conventional Magnetic Recording) technology. The drive shall be designed for 24×7 continuous operation and multi-drive RAID environments, with a minimum 550 TB/year workload rating, enterprise-grade reliability, and support for RAID applications. The drive shall provide a minimum 256 MB cache and support hot-plug/hot-swap operation when installed in the storage appliance. It shall have an enterprise-class workload/endurance rating, vibration tolerance suitable for multi-drive enclosures, and a minimum 5-year manufacturer warranty, made of WD purple / Seagate skyhawk or equivalent Complete in all respect as approved and directed by Engineer Incharge. | UN | 16 | | |
| iii | NS | Supply, installation, testing and termination of data cabling using Cat-6 UTP cable in PVC conduits/channel, including supply and installation of PVC conduit/channel of suitable size, bends, junctions, couplers, saddles, supports and all necessary accessories. Complete data cabling works including cable pulling, dressing, identification, termination on patch panels and data outlets, testing and certification, complete in all respects as approved and directed by the Engineer In-Charge | JOB | 1 | | |
| iv | NS | Supply, installation, testing, commissioning and integration of 48-Port Managed PoE Switch with 48 × 10/100/1000 Mbps RJ-45 PoE ports and minimum 4 × 1/10 Gbps SFP/SFP+ uplink ports, supporting IEEE 802.3af/at/bt with PoE power budget and PoE++ support. Switch shall support VLAN, STP/RSTP, LACP, IGMP Snooping, QoS, ACL, 802.1X, SNMP and Web/CLI management. 19-inch rack-mountable, 1U, suitable for network/CCTV applications. Make: Cisco, Huawei, TP-Link, Netgear, or approved equivalent, complete in all respects as approved and directed by the Engineer In-Charge. | UN | 2 | | |
| 6 | | **Access Control System (DCF Building)++ Rest Areas** | | | | |
| i | NS | Supply, installation, testing and commissioning of Face Recognition + Fingerprint based Time Attendance and Access Control Terminal, with RFID card/PIN support, display, TCP/IP network connectivity, built-in attendance memory, access control relay, door/exit button interfaces and centralized management software, complete with power supply, mounting accessories, configuration and commissioning, complete in all respects as approved and directed by the Engineer in-charge. | UN | 24 | | |
| ii | NS | Supply, installation, testing and commissioning of heavy-duty metal push-to-exit button for access-controlled doors, with NO/NC contacts, suitable for 12/24V DC access control systems, complete with mounting accessories and wiring, complete in all respects as approved and directed by the Engineer in-charge. | UN | 24 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| iii | NS | Supply, installation, testing and commissioning of electromagnetic/electric bolt door lock suitable for access control applications, complete with mounting accessories, door interface and required power connection, compatible with the proposed access control system, complete in all respects as approved and directed by the Engineer in-charge. | UN | 24 | | |
| iv | NS | Supply, installation, configuration and commissioning of network-based time attendance software for centralized employee management, attendance monitoring, shift/roster management, late/early reporting, overtime calculation and attendance report generation, compatible with the proposed biometric terminals, complete in all respects as approved and directed by the Engineer in-charge. | UN | 1 | | |
| v | NS | Supply, installation, testing and commissioning of 16-Port Gigabit Unmanaged Network Switch with 16 × 10/100/1000 Mbps RJ45 ports, auto-negotiation, Auto-MDI/MDIX, IEEE 802.3/802.3u/802.3ab compliance, non-blocking switching, MAC address self-learning, LED link/activity indicators and plug-and-play operation, complete with power supply, mounting accessories and commissioning, complete in all respects as approved and directed by the Engineer in-charge. | UN | 2 | | |
| vi | NS | Supply, installation, testing and termination of Cat-6 UTP data cable and 3/29, 2-core power cable in PVC conduit/channel, including conduits, bends, junctions, couplers, saddles, supports and all necessary accessories. Complete cable pulling, dressing, identification, termination, testing and certification, complete in all respects as approved and directed by the Engineer In-Charge. | JOB | 1 | | |
| 7 | | **Access Control System (Powerhouse Building)** | | | | |
| i | NS | Supply, installation, testing and commissioning of Face Recognition + Fingerprint based Time Attendance and Access Control Terminal, with RFID card/PIN support, display, TCP/IP network connectivity, built-in attendance memory, access control relay, door/exit button interfaces and centralized management software, complete with power supply, mounting accessories, configuration and commissioning, complete in all respects as approved and directed by the Engineer in-charge. | UN | 34 | | |
| ii | NS | Supply, installation, testing and commissioning of heavy-duty metal push-to-exit button for access-controlled doors, with NO/NC contacts, suitable for 12/24V DC access control systems, complete with mounting accessories and wiring, complete in all respects as approved and directed by the Engineer in-charge. | UN | 34 | | |
| iii | NS | Supply, installation, testing and commissioning of electromagnetic/electric bolt door lock suitable for access control applications, complete with mounting accessories, door interface and required power connection, compatible with the proposed access control system, complete in all respects as approved and directed by the Engineer in-charge. | UN | 34 | | |

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**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| iv | NS | Supply, installation, configuration, testing and commissioning of 48-port fully managed Gigabit Ethernet Switch, rack-mountable in standard 19-inch rack, with 48 × 10/100/1000 Mbps RJ-45 ports and minimum 4 × 1Gbps SFP uplink ports, non-PoE. The switch shall provide minimum 100 Gbps switching capacity, support VLAN, STP/RSTP/MSTP, LACP, QoS, IGMP Snooping, ACL, 802.1X, DHCP Snooping and port security, with management through Web GUI, CLI, SSH and SNMP v2c/v3. Jumbo frames of minimum 9 KB, port mirroring and Syslog shall be supported. Complete with rack mounting accessories, power cable and all accessories required for installation and commissioning | UN | 2 | | |
| v | NS | Supply, installation, testing and termination of Cat-6 UTP data cable and 3/29, 2-core power cable in Separate PVC conduit/channel, including conduits, bends, junctions, couplers, saddles, supports and all necessary accessories. Complete cable pulling, dressing, identification, termination, testing and certification, complete in all respects as approved and directed by the Engineer In-Charge. | JOB | 1 | | |
| | | | | | | |
| 8 | NS | Providing and fixing PVC/ABS cable tray with straight flange, having a 12-inch width × 4-inch depth, fabricated from high-quality, heavy-duty, UV-stabilized, flame-retardant and corrosion-resistant PVC/ABS material, complete with matching removable PVC/ABS cover, including all necessary coupler plates (1-1/4" × 8"), jointing accessories, bends, tees, reducers, supports and hardware, supported on painted MS angle iron brackets of 1-1/2" × 1-1/2" × 3/16" and MS patti of 1-1/2" × 3/16" size at 3 ft C/C, hangers including all necessary hardware, anchors and fasteners, complete in all respects as approved and directed by the Engineer Incharge. | Meter | 330 | | |
| 9 | NS | Supply, installation, testing, commissioning, programming and integration of environmental and security monitoring system including temperature sensor, humidity sensor and rack/door opening sensor, with real-time monitoring, configurable alarm thresholds, door-open alarm, local indication and communication/interface for integration with the DCIM System, including all required sensors, monitoring controller, cabling, software, accessories and hardware,made of APC, Vertiv, AKCP, CISCO or equivalent complete in all respect as approved and directed by Engineer Incharge. | Each | 34 | | |

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**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

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**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 10 | NS | Supply, installation, testing, commissioning, configration and integration of complete intelligent Category 7 Patch Panel & Master Controller: 1U rack-mountable intelligent patching system comprising 24-port Cat 7/Class F S/FTP modular patch panel, 600 MHz/10 Gbps support, 360° shielding with earthing, rear cable management, port-level physical connection sensing, LED/trace indicators, hot-swappable AIM upgrade capability, and 1U master controller supporting up to 48 ports with LCD touchscreen, dual Gigabit management uplinks, SNMP v2c/v3, HTTPS, REST API, IPv4/IPv6, DCIM integration, redundant A+B AC/DC or PoE power, hot-standby capability, and non-volatile event logging, made of CommScope / Belden / RiT Tech or equivalent Complete in all respect as approved and directed by Engineer Incharge. | Each | 57 | | |
| 11 | NS | Supply, installation, testing, commissioning and integration of complete of Modular 1U Intelligent Automated Infrastructure Management (AIM) Fiber Patching SystemEnclosure with Front to Rear Mapping, Must feature a 100% passive optical backplane layout ensuring complete electrical power failure to the chassis or management hardware does not interrupt, drop, or degrade active data traffic flowing through the fiber paths, Local UI & Display like Front-facing integrated LCD or LED touchscreen display providing localized real-time port telemetry, visual setup menus, and active event alerts, Telemetry & Network Interfaces which is capable of generating real-time SNMP traps or REST API alerts for unauthorized cable disconnects or configuration mismatches, utilizing a dedicated RJ45 Ethernet management port. Fiber Media Class is Singlemode OS2, Multimode OM3. Optical Front Density: 24x LC Duplex internal adapters per media card, providing a total of 48 individual front-facing patching ports. Optical Rear Interfaces of 4x MPO (12-Fiber) trunk ports per media card. Internal Optical Wiring: 100% factory-terminated, performance certified internal fanout ribbon routing. System Polarity: Type A (Straight-Through mapping, Pin-1 to Pin-1 configuration complying with TIA-568.3-D protocols), made of CommScope / Belden / RiT Tech or equivalent Complete in all respect as approved and directed by Engineer Incharge. | Each | 35 | | |

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**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**NETWORKING SYSTEM**

**BILL OF QUANTITIES**

**(MRS), 2nd BI-ANNUAL-2026 (01.07.2026 to 31.12.2026) DISTRICT MULTAN**

| Sr.No. | Ref. No. | Description of Items | Unit | Qty | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|---|---|
| 12 | NS | Supply, installation, configuration, testing and commissioning of 48-port fully managed Gigabit Ethernet Switch, rack-mountable in standard 19-inch rack, with 48 × 10/100/1000 Mbps RJ-45 ports and minimum 4 × 1Gbps SFP uplink ports, non-PoE. The switch shall provide minimum 100 Gbps switching capacity, support VLAN, STP/RSTP/MSTP, LACP, QoS, IGMP Snooping, ACL, 802.1X, DHCP Snooping and port security, with management through Web GUI, CLI, SSH and SNMP v2c/v3. Jumbo frames of minimum 9 KB, port mirroring and Syslog shall be supported. Complete with rack mounting accessories, power cable and all accessories required for installation and commissioning | No. | 8 | | |
| 13 | NS | Supply, installation, testing, commissioning, programming and integration of environmental and security monitoring system including temperature sensor, humidity sensor and rack/door opening sensor, with real-time monitoring, configurable alarm thresholds, door-open alarm, local indication and communication/interface for integration with the DCIM System, including all required sensors, monitoring controller, cabling, software, accessories and hardware,made of APC, Vertiv, AKCP, CISCO or equivalent complete in all respect as approved and directed by Engineer Incharge. | Each | 34 | | |
| 14 | NS | Supply, installation, testing and commissioning of complete Office LAN Network including Cat-6 UTP LAN cabling, PVC conduit/cable channel with all necessary accessories, Cat-6 I/O faceplates and keystone modules, dedicated Cat-6 cabling for Wi-Fi Access Points, termination at network rack and outlets, labeling, cable dressing, testing and commissioning, including all required labor, tools and installation accessories, complete in all respects as per drawing. | JOB | 1 | | |
| | | **NON-SCHEDULE ITEMS TOTAL AMOUNT (RS)** | | | | |

**PUNJAB INFORMATION TECHNOLOGY BOARD**

**ESTABLISHMENT OF DISASTER REVOVERY (DR) DATA CENTER AT PITB MULTAN**

**BILL OF QUANTITIES**

**O & M Cost during SLA**

| Sr. No. | Description | Unit | Rate Rs. | Amount (Rs.) |
|---|---|---|---|---|
| 1 | Manpower including relievers | Job | | |
| 2 | Critical Spare Parts required during O&M | Job | | |
| 3 | Special Maintenance Tools, Diagnostic equipment and Testing Instruments | Job | | |
| 4 | Training, close out, records, transition / hand-over etc. | Job | | |
| | **Total O & M SLA Price (Rs.)** | | | - |

# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTRE AT PITB MULTAN

# VOLUME 3 (A)

# SPECIAL PROVISIONS



Contents


1 GENERAL ..... 1
2 DESCRIPTION OF PROJECT, WORKS INVOLVED AND SITE ..... 1
3 CODES, STANDARDS AND CERTIFICATES ..... 2
4 MANUFACTURER'S RECOMMENDATIONS ..... 4
5 UNITS OF MEASUREMENTS ..... 5
6 EXISTING CONDITION AT SITE ..... 5
7 PROTECTION AND PRECAUTIONS ..... 5
8 SEQUENCE OF CONSTRUCTION ..... 6
9 LINES AND LEVELS ..... 6
10 PLANT, EQUIPMENT AND TOOLS ..... 6
11 EXISTING SERVICES ..... 7
12 CONSTRUCTION AREA AND ACCESS ..... 8
13 CONSTRUCTION & CHECKING AT SITE ..... 8
14 STORAGE & HANDLING FACILITIES ..... 9
15 PRODUCT DATA ..... 10
16 PRODUCT QUALITY AND HANDLING ..... 10
17 INSPECTION & TESTS REPORTS ..... 11
18 FIELD LABORATORY AND TESTING ..... 12
19 SURVEYING INSTRUMENTS ..... 14
20 APPROVAL OF MATERIALS AND PLANT ..... 15
21 BAR BENDING SCHEDULE ..... 18
22 DRAWINGS ..... 19
23 PROTECTION OF THE WORKS ..... 23
24 RESTORATION AND CLEANING ..... 24
25 SITE OFFICE AND TEMPORARY FACILITIES TO BE PROVIDED BY THE CONTRACTOR ..... 25
26 CONSTRUCTION SCHEDULE ..... 29
27 SUBMISSION REQUIREMENTS ..... 30
28 RESUBMISSION REQUIREMENTS ..... 31
29 WEEKLY PROGRESS REPORT AND PHTOGRAPHS ..... 31
30 CONTRACTOR TO NOTIFY DELAYS ..... 33
31 PHOTOGRAPHS ..... 34
32 SIGN BOARD ..... 35
33 COORDINATION OF WORK AT SITE ..... 36
34 SITE FACILITIES TO BE PROVIDED BY THE CONTRACTOR ..... 37


Engineering Consultancy Services Punjab (Pvt) Ltd.

35 CONSTRUCTION PROCEDURES ..... 39
36 NOTIFICATION TO ENGINEER ..... 40
37 NIGHT WORK ..... 40
38 WEATHER ..... 41
39 CO-ORDINATION WITH OTHER CONTRACTORS ..... 41
40 INTERFACE MANAGEMENT AND SYSTEM INTEGRATION ..... 42
41 SITE SECURITY, ACCESS CONTROL AND CONFIDENTIALITY ..... 43
42 PROTECTION OF SENSITIVE EQUIPMENT AND CONTROLLED WORKING ENVIRONMENT ..... 44
43 ACCIDENT PREVENTION, SAFETY MEASURES AND PROTECTIVE EQUIPMENT 44
44 SETTING OUT OF WORK AND SURVEY ..... 47
45 SPECIFICATION EPILOGUES ..... 50
46 WASTAGE ..... 52
47 ENVIRONMENTAL PROTECTION ..... 53
48 QUARRY OPERATIONS ..... 54
49 SOIL EROSION AND SEDIMENTATION CONTROL ..... 55
50 CONSERVATION OF FAUNA AND FLORA ..... 55
51 FUEL AND CHEMICAL STORAGE ..... 56
52 WATER QUALITY ..... 57
53 AIR QUALITY ..... 59
54 NOISE ..... 60
55 SAMPLING ..... 62
56 PRESERVATION OF ARCHAEOLOGICAL, CULTURAL, RELIGIOUS ASSETS ..... 62
57 ENVIRONMENT ENHANCEMENT AND SITE RESPOTRATION ..... 63
58 SITE OFFICES AND TEMPORARY FACILITIES FOR THE EMPLOYER / THE ENGINEER / THE ENGINEER'S REPRESENTATIVE / CONSULTANTS ..... 65
59 COORDINATION WITH MEPCO AND PROVISION OF PERMANENT / DEDICATED ELECTRICITY CONNECTION ..... 68
60 PERMITS, APPROVALS AND STATUTORY REQUIREMENTS ..... 69
61 EMERGENCY PREPAREDNESS AND RESPONSE ..... 70
62 TESTING, COMMISSIONING AND INTEGRATED SYSTEMS TESTING ..... 70
63 OPERATION AND MAINTENANCE MANUALS, TRAINING AND HANDOVER ..... 72
64 WARRANTIES, GUARANTEES AND AFTER-SALES SUPPORT ..... 73
65 WARRANTIES EXCEEDING ONE YEAR OF DEFECTS LIABILITY PERIOD ..... 74
66 INVENTORY OF SPARES, SPECIAL TOOLS AND CONSUMABLES ..... 74
67 PAYMENT FOR WORK REQUIRED BY SPECIAL PROVISIONS ..... 75



Engineering Consultancy Services Punjab (Pvt) Ltd.

68 MANDATORY ONE-YEAR OPERATIONS, MAINTENANCE, WARRANTY MANAGEMENT & SERVICE LEVEL AGREEMENT (O&M/SLA) ..... 75

69 RELATIONSHIP OF O&M SERVICES WITH DEFECTS LIABILITY PERIOD..... 77

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# SPECIAL PROVISIONS

## 1 GENERAL

1.1 Specifications – These Special Provisions shall form an integral part of Bid Documents and the Contract Documents.

1.2 The Contractor shall notify all sub-contractors of the provisions of these Special Provisions. The Contractor shall ensure that all Subcontractors, suppliers and other parties engaged by him are fully informed of and comply with all applicable provisions of the Contract, including these Special Provisions. The Contractor shall remain fully responsible for the acts, omissions and performance of his Subcontractors and suppliers.

## 2 DESCRIPTION OF PROJECT, WORKS INVOLVED AND SITE

Punjab Information Technology Board (PITB) hereinafter called "the Employer" wishes to receive bids for the **'Establishment of Disaster Recovery Data Center at PITB Multan'**, comprising the Works described in the Drawings, Bill of Quantities (BOQ) and Technical Specifications forming part of these Bidding Documents.

The Works include, but are not limited to, civil and structural works, electrical works, HVAC works, firefighting systems, plumbing and sewerage works, IT/networking infrastructure and all associated installation, testing, commissioning and related works including One-Year mandatory O&M/SLA Services as specified in the Contract Documents.

The Employer intends to establish a Fault-Tolerant Data Centre Facility [SYSTEMS + SYSTEMS redundant] in accordance with the Drawings, Specifications and other Contract Documents, designed to provide continuous operation in the event of **any single fault** occurring in any part of the critical distribution path or in any single item of critical equipment or component. Such single fault shall not cause interruption, loss of redundancy or unacceptable degradation of the Data Centre's critical operations.

The Contractor shall construct, supply, install, test and commission the Works in accordance with the Drawings, Specifications and other Contract Documents, so as to achieve the required specified Rated IV level of fault tolerance and resiliency. The Contractor shall not alter, deviate from or substitute the Employer's specified design, systems, equipment or configuration except with the prior approval of the Engineer in accordance with the Contract.

The critical infrastructure shall, as specified in the Contract Documents, incorporate dual active/redundant paths and systems-level redundancy, including 2N, N+N or equivalent configurations, as applicable to the critical power, cooling and telecommunications systems. The Contractor shall ensure that all such systems, equipment, components and distribution

paths are installed, interconnected, tested and commissioned in accordance with the approved Drawings and Specifications.

The Works shall incorporate the required physical and functional segregation/compartmentalization of critical electrical, mechanical, telecommunications and associated architectural zones and distribution paths, together with the specified DCIM monitoring and control systems, to provide the required system resiliency, operational monitoring, security and maintainability.

The Contractor shall be responsible for ensuring the vetting and Rated IV certification of both the Data Center (DC) design and the completed DC facility by EPI, or such other internationally recognized equivalent certification as may be expressly accepted by the Employer.

## 3 CODES, STANDARDS AND CERTIFICATES

### A. Applicable Standards

Except where otherwise specified in the Contract Documents, all materials, equipment, workmanship, fabrication, installation, inspection, testing and commissioning shall comply with the latest applicable editions of the codes and standards referred to in these Specifications. The principal abbreviations used for standards and codes are as follows:

| Abbreviation: | Full Form: |
|---|---|
| ASCE | American Society of Civil Engineers |
| ASA | American Standard Association |
| ACI | American Concrete Institute (USA) |
| AISI | American Iron and Steel Institute (USA) |
| AISC | American Institute of Steel Construction (USA) |
| ANSI | American National Standard Institute (USA) |

| | |
|---|---|
| AASHTO | American Association of State Highway & Transportation Officials |
| AWS | American Welding Society (USA) |
| BS | British Standards (UK) |
| CP | Codes of Practice (UK) |
| ICAO | International Civil Aviation Organization |
| PS | Pakistan Standards (Pak) |
| BSICP | British Standard Institute Code of Practice |
| PCA | Portland Cement Association |
| PSI | Pakistan Standard Institute |
| SSPC | Steel Structures Painting Council (USA) |
| UBC | Uniform Building Code (USA) |
| USBR | United States Bureau of Reclamation (USA) |

If the Contractor, at any time and for any reason, proposes to deviate from a specified code or standard or proposes to use a material or equipment not covered by the specified standards, he shall submit to the Engineer full details of the proposed deviation, state the exact nature of the changes, the reason for such deviation/change, the applicable alternative standard and complete technical specifications and supporting evidence for review and approval.

Where specific codes or standards are identified elsewhere in the Contract Documents, the requirements of such specified codes or standards shall apply to the relevant Works.

No such deviation or alternative shall be adopted without the prior written approval of the Engineer.

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### B. Standards other than those Specified

Where requirements for materials, equipment, testing or other requirements are specified by reference to a standard originating in a particular country, equivalent standards of other countries may be accepted, provided that the Contractor demonstrates, to the satisfaction of the Engineer, that the proposed alternative standard provides requirements and performance at least equivalent to those of the specified standard.

The Contractor may propose to the Engineer an equivalent standard other than that specified, in which case he shall submit the proposed standard, together with complete technical particulars, relevant test certificates and all other information required and shall submit written proof that his proposed standard is equivalent in all significant respects to the standard specified. All such submissions shall be made in the English language.

Acceptance of an alternative standard shall not relieve the Contractor of any obligation under the Contract.

### C. Codes and Standards at Site

The Contractor shall supply and maintain at his Site Office, in readily accessible form: -

a) Copies of all latest editions of all codes and standards referred to in these Specifications and in the Contract Documents or equivalent codes and standards as approved by the Engineer;

b) Manufacturers' catalogues, technical literature and published recommendations applicable to products and materials incorporated into the Works; and

c) Manufacturers' and suppliers' technical documentation demonstrating that materials and products requiring compliance with a particular code or standard conform to the specified requirements as stated in the Bidding Documents.

## 4 MANUFACTURER'S RECOMMENDATIONS

Installation, testing, commissioning, operation and maintenance of all manufactured equipment, systems and products shall be carried out in accordance with the latest written recommendations, instructions and requirements of the respective manufacturer, unless otherwise specified in the Contract Documents or approved in writing by the Engineer.

Where the requirements of the manufacturer conflict with the Contract Documents, the Contractor shall immediately refer the matter to the Engineer for determination before proceeding with the affected work.

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## 5 UNITS OF MEASUREMENTS

The units of measurement specified in the Bill of Quantities/Schedule of Prices forming part of Volume-II of the Bidding Documents shall govern throughout the Contract for measurement, pricing and payment of the Works.

## 6 EXISTING CONDITION AT SITE

Drawings and information relating to existing Site conditions have been provided for reference and information purposes. Neither the Employer nor the Engineer warrants the adequacy or correctness of these. The Bidder shall satisfy himself, prior to submission of his Bid, regarding the Site conditions, access, existing facilities, utilities and other circumstances that may affect the execution of the Works.

Bidders are encouraged to visit and inspect the Site to assess the existing site conditions and obtain all information necessary for the preparation of their Bids.

The provisions of this Clause shall be read in conjunction with the applicable provisions of the Conditions of Contract relating to Site conditions and unforeseeable physical conditions.

## 7 PROTECTION AND PRECAUTIONS

The Contractor and his Sub-contractors shall provide all necessary protection to existing structures facilities, utilities, roads, services and other property that may be affected by the execution of the Works.

The Contractor shall be responsible for making good, at his own cost, any damage caused to existing structures, facilities, roads or services as a result of his or his Subcontractors' acts, omissions, negligence or failure to take adequate precautions.

The Contractor shall keep roads and access routes used for the execution of the Works free from unnecessary obstruction, debris and materials and shall maintain safe and reasonable access and traffic movement at all times.

The Contractor shall provide and maintain all necessary safety and precautionary measures, including warning signs, warning lights, barricades, fencing and other protective measures, as necessary to prevent accidents, injury or damage to persons and property.

Any damage attributable to the Contractor shall promptly be repaired and the affected facility restored to its original condition, at no additional cost to the Employer.

The Contractor shall coordinate and cooperate with the Employer, Engineer, other contractors, suppliers and other parties engaged in or associated with the Project as necessary for the proper and timely completion of the Works.

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## 8 SEQUENCE OF CONSTRUCTION

Prior to commencement of the Works, the Contractor shall submit to the Engineer for review and approval a detailed proposed sequence and methodology of construction, consistent with the approved programme and the requirements of the Contract.

The Works shall be executed in accordance with the approved sequence, subject to such modifications as may be required by the Engineer in consultation with the Employer.

Approval of the Contractor's sequence, programme or methodology shall not relieve the Contractor of his responsibility for the proper execution of the Works, the means and methods of construction, safety, coordination or achievement of the Time for Completion.

## 9 LINES AND LEVELS

Survey control points, benchmarks and reference information shall be established or provided by the Engineer as specified in the Contract Documents.

The Contractor shall be responsible to verify the accuracy and suitability of such control points and benchmarks before commencing the relevant Works and shall be responsible for all setting-out, surveying and measurement necessary for the proper execution of the Works to the required locations, lines, levels, dimensions and grades, specified or shown on the drawings, subject to such modifications as the Engineer may require as work progresses.

The Contractor shall promptly notify the Engineer of any discrepancy or error identified in the survey control information before proceeding with the affected work.

The Contractor shall be responsible for maintaining and protecting all survey control points and benchmarks established for the execution of the Works and for rectifying, at his own cost, any setting-out errors attributable to him.

## 10 PLANT, EQUIPMENT AND TOOLS

The Contractor shall provide, mobilize, operate and maintain, at his own cost, all modern and suitable plant, equipment, tools, temporary facilities and other resources necessary for the proper and timely execution, testing and commissioning of the Works.

The plant, equipment and tools shall be adequate in type, capacity, quantity and condition for the nature, magnitude and complexity of the Contract and shall comply with the requirements of the General Conditions of Contract, Conditions of Particular Application and Technical Specifications.

The Contractor shall provide and maintain all specialist equipment necessary for inspection, testing, commissioning and integrated systems testing of the Works, including equipment required for electrical, HVAC, firefighting, plumbing and IT/networking systems, as applicable.

Equipment proposed and accepted during the bidding process shall be made available for the execution of the Works in accordance with the approved construction programme. Any proposed substitution of major or specialist equipment shall be subject to the prior written approval of the Engineer and shall not adversely affect the quality, performance or timely completion of the Works.

The Engineer may inspect and verify the availability, suitability and condition of the Contractor's plant, equipment and tools at any time during execution of the Works.

## 11 EXISTING SERVICES

The Contractor shall exercise due care and take all reasonable measures to search for, identify, locate, verify and protect existing services and utilities, including but not limited to electrical wiring and cables, communication cables, ducts, pipelines, water supply, sewerage, drainage, gas lines and other utility infrastructure, located within or immediately adjoining the Site and which may be affected by the Works. The Contractor shall carry out such investigation, trial pits, detection, surveying and other verification as may reasonably be necessary to determine the location and nature of existing services. The Contractor shall take full responsibly for safety of existing service lines, utilities and utility structures uncovered or encountered during excavation and construction operations.

The Contractor shall be responsible for protecting existing services and utility structures that are identified, shown on the Contract Documents, made known to him, or reasonably discoverable through the exercise of due care. Such services shall be adequately supported, protected and maintained throughout the execution of the Works.

The Contractor shall promptly notify the Engineer and the relevant utility authority of any existing service encountered which is not identified in the Contract Documents or information provided by the Employer and which may be affected by the Works. No work that may endanger such service shall proceed until appropriate protective measures have been agreed with the Engineer.

In the event of damage to any existing service or utility attributable to the Contractor's acts, omissions, negligence or failure to exercise due care, the Contractor shall immediately take all necessary safety measures, provide temporary arrangements where required, notify the Engineer and the relevant authority, and carry out the necessary repair and reinstatement at his own cost.

Existing utilities which are to remain in service for or after the works are to be determined by the Contractor. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during these operations, they shall be safeguarded

protected from damage, and supported. The Contractor shall preserve, maintain and keep in perfect working conditions, any existing facilities required to be preserved by the Employer/the Engineer.

## 12 CONSTRUCTION AREA AND ACCESS

The Employer shall make available to the Contractor, to the extent reasonably practicable, such space within or in the vicinity of the Site as may be available for temporary storage of plant, equipment and materials and for the Contractor's temporary site office and related facilities during execution of the Works.

Where adequate space is not available within the Site or Project boundary for storage of plant, equipment, materials or temporary facilities required by the Contractor, the Contractor shall make his own arrangements for such additional space at his own cost and responsibility.

All temporary offices, storage areas, workshops, access arrangements and other temporary facilities established by the Contractor shall be located, maintained and operated so as not to interfere with permanent Works, existing services, access routes, safety requirements or the operational functions of the Employer or other parties working at the Site.

The Contractor shall be solely responsible for the security, handling, storage and protection of all plant, equipment and materials brought to or stored at the Site. The Contractor shall protect all materials, equipment and components against theft, corrosion, contamination, mechanical damage, weathering, deterioration and other damage during transportation, storage, installation and erection.

All storage and protection arrangements shall comply with the manufacturers' recommendations, the Contract Documents and the Engineer's requirements.

## 13 CONSTRUCTION & CHECKING AT SITE

The Contractor shall submit to the Engineer, sufficiently in advance of the commencement of the relevant Works, his proposed methods, procedures and arrangements for execution of the temporary and permanent Works, including method statements, where required by the Contract Documents or the Engineer.

Submission of any method statement, proposal or arrangement by the Contractor, and its review, acceptance or approval by the Engineer, shall not relieve the Contractor of any responsibility or obligation under the Contract, including responsibility for the adequacy, safety and proper execution of the Works.

The Contractor shall provide sufficient qualified, competent and experienced supervisory staff and representatives at the Site to properly supervise and control the Works. The Contractor

shall provide the Engineer and his Representative with all reasonable facilities, access, assistance and information necessary to inspect, examine, measure, test and verify the execution and quality of the Works.

The Engineer and his Representative shall have the right to inspect and examine any part of the Works at any time. The Engineer may, at his discretion, waive inspection of particular items; however, such waiver shall not relieve the Contractor of any responsibility or obligation under the Contract. Particular attention shall be given to the quality and conformity of materials, setting out and dimensions, foundations, levels, alignment, installation, fitting, adjustment, testing and commissioning of manufactured equipment, systems and finished Works.

If the Engineer determines that the Contractor's rate of progress is insufficient to achieve completion within the Time for Completion, the Engineer may require the Contractor to take appropriate measures to expedite the Works, including increasing manpower, plant and equipment, extending working hours or introducing additional shifts, subject to the provisions of the Conditions of Contract.

Where such measures are required due to the Contractor's failure to maintain the required progress or due to causes attributable to the Contractor, they shall be implemented at the Contractor's own cost and shall not entitle the Contractor to additional payment.

Where night work or work outside normal working hours is undertaken, the Contractor shall provide adequate lighting, supervision, manpower, safety arrangements and other facilities necessary for the safe and satisfactory execution of the Works to the satisfaction of the Engineer or his Representative.

## 14 STORAGE & HANDLING FACILITIES

The Contractor shall provide and maintain, at his own cost, all necessary facilities for the proper storage, handling, protection and preservation of plant, equipment, materials and components required for the Works, including temporary storage areas, workshops, covered storage and the Contractor's temporary site office, as applicable.

Storage and handling facilities shall be suitable for the nature of the materials and equipment and shall comply with the Contract Documents, manufacturers' recommendations and the Engineer's requirements.

The Contractor shall ensure that storage and handling arrangements do not obstruct the Works, existing services, access routes or the operations of the Employer, Engineer or other contractors.

## 15 PRODUCT DATA

Manufacturer's standard schematic drawings and other standard documentation shall be appropriately modified, marked or supplemented to clearly identify only the information applicable to the Project.

Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other descriptive literature submitted for approval shall clearly identify the proposed materials, products, equipment, models and systems.

The Contractor shall clearly indicate, as applicable, the relevant dimensions, capacities, performance characteristics, ratings, operating requirements, required clearances, connection details and other information necessary for the Engineer to verify compliance with the Contract Documents.

Product data shall be submitted in sufficient detail and sufficiently in advance of procurement and installation to enable the Engineer to review the proposed products and equipment before they are incorporated into the Works.

Approval or review of product data by the Engineer shall not relieve the Contractor of responsibility for compliance with the requirements of the Contract Documents or for the proper performance of the Works.

## 16 PRODUCT QUALITY AND HANDLING

All materials, products, equipment and systems incorporated into the Works shall be new, of good quality, fit for their intended purpose, and shall comply with the requirements of the Contract Documents, applicable standards and the approved Technical Specifications.

Manufacturers, suppliers and specialist installers of major or specialized products and systems shall have demonstrated experience and established capability in manufacturing, supplying, installing, commissioning and/or servicing the relevant products or systems.

Where considered necessary, the Engineer may require the Contractor to submit:

- a list of similar installations, including the project name, location, scope of supply/work and date of completion;
- complete product literature, catalogues, technical specifications, performance data and other relevant technical information;
- details of similar installations and service records within Pakistan, where applicable;
- details of the manufacturer's or supplier's authorized service/support organization in Pakistan, including the location and contact details of the service office from which the installed equipment or system can be maintained and supported; and

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- evidence of the availability of trained and competent personnel for installation, testing, commissioning and servicing of the relevant products or systems.

All fabrication, installation, testing and commissioning of specialized or manufactured equipment and systems shall be carried out by suitably trained, competent and experienced personnel who are familiar with the products concerned and with the manufacturer's recommended methods and procedures.

The Contractor shall use all necessary means and precautions to protect materials, products, equipment and completed Works before, during and after installation. The Contractor shall also protect the Works and materials installed by other trades and shall coordinate his activities accordingly.

Any material, equipment, product or completed work damaged due to the Contractor's or his Subcontractors' acts, omissions, negligence, improper handling, storage, installation or inadequate protection shall be repaired, replaced or reinstated by the Contractor to the satisfaction of the Engineer, at no additional cost to the Employer.

The Contractor shall ensure that all materials and equipment are properly handled, transported, stored, preserved and installed in accordance with the Contract Documents and the manufacturers' recommendations. No damaged, defective, deteriorated or otherwise non-conforming material or equipment shall be incorporated into the Works.

## 17 INSPECTION & TESTS REPORTS

All materials, equipment and systems furnished under the Contract, and all Works performed in connection therewith, shall be subject to inspection, examination and testing by the Engineer or the Engineer's Representative at the Site, at the place of manufacture or fabrication, or at any other location specified in the Contract Documents.

The Contractor shall provide all necessary facilities, access, labour, equipment, instruments and assistance required by the Engineer or his Representative for carrying out such inspections, examinations and tests.

Inspection, examination, testing, witnessing or acceptance of any material, equipment or Work, or the Engineer's decision not to inspect or test any particular item, shall not relieve the Contractor of any responsibility or obligation under the Contract, including responsibility for the quality, conformity, performance and proper functioning of the Works.

The Contractor shall furnish the Engineer, sufficiently in advance of incorporation or installation of the relevant materials or equipment, with certified copies of manufacturers' test certificates, laboratory test reports, factory test reports and other quality-control documentation required by the Contract Documents.

Such test reports and certificates shall clearly identify the material, equipment or product tested and shall demonstrate compliance with the applicable requirements of the Contract Documents, approved Technical Specifications and relevant codes and standards.

Where required by the Contract Documents or the Engineer, the Contractor shall arrange and conduct factory acceptance tests (FAT), site acceptance tests (SAT), performance tests, commissioning tests and integrated systems testing for the relevant equipment and systems. The Engineer shall be given reasonable prior notice to witness such tests where witnessing is required.

All testing shall be carried out using properly calibrated instruments and equipment. Calibration certificates and test records shall be submitted to the Engineer upon request.

Materials, equipment or Works that fail to comply with the specified requirements shall be rejected or rectified/replaced by the Contractor, as directed by the Engineer, at no additional cost to the Employer.

The Contractor shall maintain complete records of all inspections and tests carried out during execution of the Works and shall submit the test reports, certificates and records to the Engineer as part of the quality-control and commissioning documentation.

## 18 FIELD LABORATORY AND TESTING

### 18.1 General

The Contractor shall establish, equip, operate and maintain a properly equipped Field Laboratory at the Site for carrying out all routine quality-control and material testing required under the Contract.

The Contractor shall submit a Site Testing and Quality Control Programme to the Engineer for review and approval. All quality-control testing shall be carried out by competent and suitably qualified personnel employed by the Contractor and in accordance with the approved programme, the Technical Specifications and applicable codes and standards.

The Contractor shall carry out all required preliminary and routine quality-control tests before submitting a request for inspection, approval or testing to the Engineer or his Representative. The results of such tests shall be made available to the Engineer as part of the Contractor's quality-control records.

Where specified in the Contract Documents, or where considered necessary by the Engineer for verification of compliance, tests may be carried out at an independent or commercial testing laboratory approved by the Engineer. The Contractor shall make all necessary arrangements for such testing and shall bear the cost where such testing forms part of the Contractor's

contractual quality-control obligations or is required due to non-conformance attributable to the Contractor.

The Contractor shall provide competent laboratory personnel, including a qualified Materials/Material Engineer and Laboratory Technician, as necessary for the proper operation of the Field Laboratory and execution of the required tests.

The Field Laboratory, its equipment and facilities shall be made available to the Engineer for inspection, witnessing and verification of tests during the Contract Period. The Contractor's laboratory personnel shall provide reasonable assistance to the Engineer in connection with such activities but shall remain under the Contractor's management and responsibility.

The Contractor shall maintain complete and up-to-date records of all quality-control tests, including test dates, locations, materials/samples tested, test methods, results, acceptance criteria and relevant test certificates. Such records shall be submitted to the Engineer upon request.

All testing shall be carried out in accordance with the applicable requirements of the Contract Documents, relevant codes and standards and approved testing procedures.

### 18.2 Field Laboratory Equipment Requirements

The Contractor shall provide and maintain all equipment, instruments, apparatus, furniture, fittings and other facilities necessary for carrying out the tests specified in the Contract Documents.

All laboratory equipment shall be new, unused, suitable for the intended tests and properly calibrated. Calibration certificates shall be maintained and submitted to the Engineer upon request.

The Contractor shall provide, at his own cost, any additional testing equipment, instruments, materials or facilities reasonably required by the Engineer for carrying out tests specified in the Contract Documents.

If any laboratory equipment, furniture, fitting, fixture or other facility becomes damaged, defective or unserviceable during the Contract Period, the Contractor shall promptly repair or replace it with suitable equipment or facilities.

The Field Laboratory shall be maintained in clean, safe and proper working condition throughout the Contract Period.



### 18.3 Testing Laboratory Certificates

Where testing by an independent or commercial laboratory is specified or required, the laboratory shall be acceptable to the Engineer and suitably accredited or otherwise competent for the type of testing to be undertaken.

Test certificates and reports shall clearly identify the material, product or equipment tested, applicable test standard, sample identification, date of testing, test results and applicable acceptance criteria.

The Engineer may require original or certified copies of laboratory test reports and certificates to verify compliance with the requirements of the Contract Documents.

### 18.4 Method of Payment

The cost of establishing, operating, staffing, equipping, maintaining and running the Field Laboratory, including laboratory equipment, consumables, routine quality-control testing, calibration, transportation of samples and related facilities, shall be deemed to be included in the Contractor's Contract Price and no separate payment shall be made for these activities.

The cost of any additional or repeat testing necessitated by the failure of materials, workmanship, equipment or Works to comply with the Contract Documents, or by the Contractor's failure to follow the specified testing procedures, shall be borne entirely by the Contractor.

Where samples or Works are found to be non-compliant, the Contractor shall bear all costs associated with re-sampling, re-testing, investigation, removal, replacement, rectification and subsequent testing required to demonstrate compliance.

Where the Engineer requires an additional test solely for verification of compliance and the test result confirms that the relevant material, equipment or Work complies with the Contract Documents, the cost of such additional test shall be dealt with in accordance with the applicable provisions of the Conditions of Contract.

If the Contractor fails to provide the required laboratory, equipment, personnel or testing facilities within the time specified by the Engineer, the Engineer may arrange the required testing through an appropriate laboratory or service provider. The reasonable cost incurred by the Employer in arranging such testing, together with the applicable overheads, shall be recovered from amounts due to the Contractor.

Failure by the Contractor to provide the Field Laboratory or required testing facilities shall not relieve him of any obligation to demonstrate compliance of the Works with the Contract Documents.




## 19 SURVEYING INSTRUMENTS

### 19.1 General

The Contractor shall provide, maintain and keep available at the Site, throughout the Contract Period, the minimum surveying equipment specified below, together with qualified Surveyors and Survey Helpers. All surveying instruments and equipment shall be suitable for the Works,

maintained in good working condition, and kept properly calibrated where applicable throughout the Contract Period.

The Contractor shall provide any additional surveying instruments, equipment, tools and accessories necessary for the proper execution, checking and setting out of the Works, irrespective of whether specifically listed herein.

The surveying equipment shall be made available to the Engineer or Engineer's Representative for inspection or verification when requested. Any equipment damaged, lost, defective or otherwise rendered unserviceable shall be promptly repaired or replaced by the Contractor at his own cost.

### 19.2 Surveying Equipment Required

As a minimum, the Contractor shall provide and maintain the following surveying equipment at the Site:

a) Total Station complete with accessories and staff 01 No.

b) Automatic Level with tripod & staff 01 No.

The Contractor shall also provide all other miscellaneous surveying tools, equipment, instruments, accessories and materials required for setting out, levelling, measurement, alignment, checking and control of the Works.

## 20 APPROVAL OF MATERIALS AND PLANT

### 20.1 Quality of Materials

All materials, fixtures, fittings, supplies, equipment and Plant furnished under the Contract shall be new and unused, of standard first-grade quality, suitable for their intended purpose, and conform to the requirements of the Contract, Specifications, applicable Codes and Standards, and approved samples, where applicable.

No inferior, defective or substandard materials, equipment, Plant or articles shall be incorporated into the Works. All fabrication, installation, assembly and construction shall be carried out in a proper, workmanlike and professional manner in accordance with the Contract.

The Contractor shall ensure that all manufacturers and suppliers are provided with the relevant requirements of the Contract and Specifications necessary to ensure compliance of the materials, equipment and Plant supplied for incorporation into the Works.

### 20.2 Submission of Samples and Data

20.2.1 The Contractor shall, in accordance with the approved Schedule of Submittals and with reasonable promptness, submit for the Engineer's review and approval all samples, product

data, technical literature and other information specifically required by the Specifications or requested by the Engineer.

The Engineer's review and approval shall be limited to verifying general conformity with the design requirements and the Contract Documents. Such review or approval shall not relieve the Contractor of any obligation or responsibility under the Contract.

20.2.2 Samples and related technical data shall be submitted sufficiently in advance to allow reasonable time for review and approval and shall not be submitted in a manner that delays procurement, fabrication or execution of the Works.

20.2.3 Each sample shall be properly identified and labelled with, as applicable, name and description of the material/product, manufacturer's name and country of origin, name of the project, the Contractor's name, the date of submission, and relevant Specification/BOQ item reference.

20.2.4 Manufacturer's installation, operation, maintenance and other relevant instructions shall be submitted with the sample or product data, where applicable. The Contractor shall bear all costs of preparation, transportation and delivery of samples to the Engineer's office, Site, testing laboratory or other location designated by the Engineer.

20.2.5 Samples shall be of sufficient size and quantity to permit proper evaluation. Where variation in colour, texture, dimensions, finish or other characteristics is reasonably expected, the Contractor shall submit representative samples showing the permissible range of such variation. Materials or products falling outside the approved range shall not be incorporated into the Works without the Engineer's approval.

20.2.6 Where coordinated selection of colours, finishes, materials or related products is required, the Contractor shall submit all related samples together to the Engineer to facilitate coordinated review and approval

20.2.7 Where both Shop Drawings and samples or product data are required for the same item, the Engineer may require both to be submitted before granting approval for procurement, fabrication or installation.

20.2.8 Where specifically required by the Contract Documents or directed by the Engineer, the Contractor shall prepare and erect representative mock-ups of finished work or installations. Approved mock-ups shall be properly protected and preserved by the Contractor until completion of the relevant Works or until otherwise directed by the Engineer.

20.2.9 Review or approval of any Shop Drawing, sample, product data, mock-up or other submittal by the Engineer shall not:

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a) relieve the Contractor of his responsibility for compliance with the Contract;
b) constitute acceptance of defective or non-conforming work;
c) relieve the Contractor of responsibility for dimensions, quantities, performance, installation, coordination or fitness for purpose; or
d) constitute authorization for any increase in the Contract Price or extension of Time for Completion unless expressly approved in accordance with the Contract.

### 20.3 Inspection

All materials, equipment and Plant furnished, and all work performed under the Contract, shall be subject to inspection and examination by the Engineer at all reasonable times and at all stages of manufacture, fabrication, delivery, installation and completion, whether at the Site or off-Site.

The Contractor shall provide, without additional cost to the Employer, all reasonable facilities, access, labour, equipment, instruments, samples, records and other assistance necessary for inspection and testing as required by the Engineer under the Contract.

Inspection, examination, testing or acceptance by the Engineer shall not relieve the Contractor of any responsibility or obligation under the Contract. Materials, equipment, Plant or work found to be defective or non-conforming shall be rejected, removed, replaced or rectified by the Contractor in accordance with the Contract.

### 20.4 Approved Sample at Site

The Contractor shall maintain at the Site, throughout the relevant period of construction, representative approved samples of materials and products where required by the Engineer or the Specifications.

Such approved samples shall be properly identified, protected from damage or deterioration, and made available to the Engineer for comparison and verification whenever requested.

The approved samples shall serve as a reference for assessing the quality, appearance, finish and other relevant characteristics of the corresponding materials incorporated into the Works.

### 20.5 Quality Assurance and Quality Control

The Contractor shall establish, implement and maintain an effective Quality Assurance and Quality Control (QA/QC) system throughout the Contract Period to ensure that all Works, materials, Plant, equipment, workmanship, testing and commissioning comply with the Contract, Drawings, Technical Specifications, approved Shop Drawings and Method Statements, applicable Codes and Standards, and the Engineer's instructions.

The Contractor shall, within fourteen (14) days of the Engineer's Notice to Commence the Works, submit a project-specific QA/QC Plan for the Engineer's review, including the proposed QA/QC organization, Inspection and Test Plans (ITPs), inspection and testing procedures, Hold/Witness Points, material control and traceability, calibration arrangements, non-conformance and corrective-action procedures, and quality documentation requirements.

The Contractor shall provide suitably qualified and experienced QA/QC personnel and shall ensure effective quality control by all Subcontractors, suppliers, manufacturers and specialist installers. The Contractor shall carry out all inspections, sampling and testing required under the Contract and maintain complete and up-to-date quality records and test certificates.

Any defective, damaged or non-conforming materials, equipment or Works shall be promptly identified, removed, replaced or rectified by the Contractor at his own cost.

Any inspection, testing, review, approval or acceptance by the Engineer shall not relieve the Contractor of his responsibility for the quality, conformity, accuracy, completeness and performance of the Works.

All costs associated with QA/QC, including personnel, inspections, routine testing, sampling, calibration, documentation and quality records, shall be deemed to be included in the Contract Price.

## 21 BAR BENDING SCHEDULE

The Contractor shall prepare the Bar Bending Schedule (BBS) for all reinforcement shown in the structural drawings and submit it in triplicate to the Engineer for review and approval sufficiently in advance of fabrication and placement of reinforcement.

The Bar Bending Schedule shall be prepared in accordance with the approved structural drawings, Specifications and applicable Codes and Standards, and shall include bar mark, diameter, shape, dimensions, cutting length, quantity, spacing and other information necessary for proper fabrication and placement of reinforcement.

The Contractor shall not fabricate or place reinforcement based on an unapproved Bar Bending Schedule where such approval is required under the Contract.

The Engineer's review or approval of the Bar Bending Schedule shall not relieve the Contractor of responsibility for its accuracy, completeness, correct interpretation of the structural drawings, quantities, dimensions, cutting lengths, bending details or proper placement of reinforcement in the Works.

## 22 DRAWINGS

### 22.1 Bid Drawings

The Drawings issued with the Bidding Documents (hereinafter referred to as the **"Bid Drawings"**) indicate the scope, design intent, general arrangement and Employer's requirements for execution of the Works.

The Bid Drawings shall be read in conjunction with the Specifications, BOQ, Conditions of Contract and other Bidding Documents. Where detailed drawings are required for fabrication, installation, coordination, setting out or construction, the Contractor shall prepare and submit the necessary Shop Drawings, Working Drawings, Coordination Drawings and other documents in accordance with this Section.

The Contractor shall verify all relevant dimensions, levels, site conditions and interfaces before commencing the Works and shall promptly notify the Engineer of any discrepancy, omission, ambiguity or inconsistency identified in the Bid Drawings or other Contract Documents.

### 22.2 Drawings to be Furnished by the Contractor

The Contractor shall prepare and submit to the Engineer, for review and approval, all drawings and details required under the Contract, sufficiently in advance of the Works to which they relate.

Such drawings shall be prepared by suitably qualified and competent personnel and shall comply with the Contract Documents, applicable Codes and Standards, and the Engineer's requirements.

The Contractor shall coordinate all drawings and details relating to Civil/Structural, Electrical, HVAC, Firefighting, Plumbing/Sewerage, ICT/Networking and other specialist works to ensure proper integration and avoid clashes or interference between the various components of the Works.

#### 22.2.1 Reinforcement Drawings

Reinforcement placement drawings and Bar Bending Schedules (BBS) for all reinforced concrete works shall be prepared by the Contractor and submitted in triplicate to the Engineer for review and approval, sufficiently in advance of the Works in which they are intended to be used.

The reinforcement drawings and BBS shall be prepared in accordance with the approved Structural Drawings, Specifications and applicable Codes and Standards.

The Engineer's review or approval shall not relieve the Contractor of responsibility for the accuracy, completeness and proper interpretation of the reinforcement drawings and BBS.

### 22.2.2 Shop Drawings

(a) The Contractor shall submit to the Engineer, for review and approval, three (3) copies of all Shop Drawings, Working Drawings, fabrication drawings, installation drawings, setting-out drawings and other drawings required for procurement, fabrication, installation and construction of the Works.

The drawings shall be prepared based on the Contract Drawings and shall incorporate all relevant dimensions, data, details, design requirements, materials, Codes and Standards and site conditions.

Unless otherwise specified, such drawings shall be submitted at least **fourteen (14) days** before the date on which they are required for use. The Contractor shall allow sufficient time for review, correction and resubmission.

Where the Engineer identifies non-compliance with the Contract requirements, the Contractor shall promptly revise and resubmit the drawings at his own cost.

No fabrication, installation or construction of the relevant portion of the Works shall commence until the required drawings have been reviewed and approved by the Engineer.

The Works shall be executed in accordance with the approved drawings. Where the Contractor proposes any modification to an approved drawing, he shall promptly notify the Engineer and submit revised drawings for review and approval before implementing the modification.

Where the Engineer determines that additional drawings or details are necessary for proper execution of the Works, the Contractor shall prepare and submit such drawings to the Engineer without additional cost to the Employer.

The Contractor shall, at his own cost, rectify any errors, omissions, ambiguities, discrepancies or inadequacies in drawings prepared by him.

The Engineer's review or approval of any drawing shall not relieve the Contractor of any responsibility or obligation under the Contract.

(b) All Shop Drawings shall be clearly identified and shall indicate, as applicable, the relevant part of the Works, drawing title and number, Contractor's and/or supplier's name, date of preparation and revision history

The drawings shall be complete and shall include all dimensions, materials, finishes, equipment details, installation requirements, interfaces, clearances, fixing details and other information necessary for proper fabrication, installation and execution of the Works.

(c) Where the Works of different trades or disciplines interface with or affect each other, the Contractor shall prepare coordinated or composite Shop Drawings showing all affected Works.

Particular attention shall be given to coordination of structural elements with Electrical, HVAC, Firefighting, Plumbing/Sewerage and ICT/Networking systems, including equipment rooms, shafts, risers, ceiling spaces, penetrations, openings, sleeves, supports and access/maintenance clearances.

If the Contractor proceeds with any work without proper coordination and thereby causes interference, obstruction, rework or damage to the Works of another trade or Contractor, he shall make all necessary corrections at his own cost and without entitlement to additional payment or extension of time, to the extent attributable to his failure to coordinate.

(d) Resubmitted Shop Drawings shall incorporate all comments and required corrections identified by the Engineer. The Contractor shall ensure that no unrelated changes are introduced without clearly identifying and submitting them for review.

(e) The Contractor shall not commence fabrication or place orders for materials or Plant where such fabrication or procurement is dependent upon approved Shop Drawings, unless the relevant Shop Drawings have been reviewed and approved by the Engineer.

The Contractor shall submit Shop Drawings sufficiently in advance to allow reasonable time for review, correction, resubmission and approval. Failure to make timely submissions shall not, where attributable to the Contractor, constitute grounds for an extension of time for completion of the Works.

(f) The Contractor shall verify all relevant Site measurements and conditions whenever required for preparation of Shop Drawings by the Contractor, specialist contractors or Subcontractors. The Contractor shall promptly provide such verified information to the concerned parties to enable them to prepare their own shop drawings and furnish a copy of all such information to the Engineer where relevant. The Contractor shall remain responsible for the accuracy of all Site measurements and information provided by him to the concerned parties.

### 22.2.3 Coordination Drawings

The Contractor shall prepare and submit coordinated drawings where required to demonstrate the proper integration of the various disciplines and systems forming part of the Works.

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Such drawings shall, as applicable, coordinate structural elements, architectural finishes, Electrical systems, HVAC systems, Firefighting systems, Plumbing/Sewerage systems, ICT/Networking systems, equipment, supports, sleeves, openings, penetrations, access requirements and maintenance clearances.

No work involving interfaces between different trades shall proceed where the relevant coordination drawings are required under the Contract until such drawings have been reviewed and approved by the Engineer.

Approval of coordination drawings shall not relieve the Contractor of his responsibility for coordination, constructability, accuracy or proper execution of the Works.

### 22.2.4 As-Built Drawings

The Contractor shall maintain at the Site, throughout the execution of the Works, a separate and continuously updated set of drawings showing accurately and clearly all changes, deviations and modifications from the approved drawings and the actual Works constructed or installed.

The As-Built information shall accurately record the final physical location, dimensions, levels, configuration and routing of the Works, including, where applicable, concealed services, underground utilities, ducts, pipes, cables, conduits, equipment, access points, valves, chambers, manholes, sleeves, penetrations and other relevant installations.

The Contractor shall ensure, throughout the execution of the Works, that its Subcontractors and specialist contractors maintain corresponding marked-up records for their respective portions of the Works and shall incorporate such information into the final As-Built Drawings. Such drawings/records shall show the exact physical location and configuration of the works as actually installed.

Within fourteen (14) days of issuance of the Taking-Over Certificate for the whole of the Works, or such other period specified by the Engineer, the Contractor shall submit two (2) complete sets of updated marked-up drawings to the Engineer for review. Such marked-up drawings after review and approval by the Engineer shall be returned to the Contractor and the Contractor shall incorporate any required corrections and prepare the final As-Built Drawings.

The Contractor shall furnish to the Engineer **six (6) complete sets and one (1) reproducible copy** of the final As-Built Drawings within twenty-eight (28) days of receiving the Engineer's comments on the marked-up drawings.

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Unless otherwise specified, the final As-Built Drawings shall be prepared in the same format and suitable scale as the approved construction drawings and shall be clearly identified as **"AS-BUILT DRAWINGS."**

The Contractor shall also provide electronic copies of the final As-Built Drawings in the editable/native format and PDF format, where required by the Contract.

Preparation, updating, correction and submission of all Shop Drawings, Coordination Drawings, Working Drawings and As-Built Drawings shall be deemed included in the Contract Price.

### 22.2.5 Contractor's Engineering Responsibility

The Contractor shall be responsible for preparing and submitting all Shop Drawings, Working Drawings, Coordination Drawings, fabrication and installation drawings, design calculations and other engineering documents required for the proper execution, coordination, installation, testing and commissioning of the Works, in accordance with the Contract, Drawings, Technical Specifications, applicable Codes and Standards and manufacturers' recommendations.

The Contractor shall verify all dimensions, levels, site conditions, interfaces and design information relevant to his Works and shall promptly notify the Engineer of any discrepancy, omission or inconsistency identified.

The Contractor shall be responsible for the accuracy, completeness, adequacy, coordination and constructability of all drawings, calculations and engineering documents prepared or submitted by him, including those prepared by his Subcontractors, suppliers or specialist manufacturers.

The Engineer's review, comments, approval or acceptance of any such drawings, calculations or documents shall not relieve the Contractor of his contractual responsibilities or liability for errors, omissions, non-compliance or inadequate coordination.

Nothing in this Clause shall transfer to the Contractor any design responsibility expressly retained by the Employer under the Contract. Any design or engineering service expressly assigned to the Contractor under the Contract shall be deemed included in the Contract Price.

## 23 PROTECTION OF THE WORKS

The Contractor shall, whenever necessary, adequately cover, protect and preserve the Works, materials, equipment and Plant from weather, water, dust, contamination, deterioration, damage and other adverse conditions, and from damage that may be caused by his own workmen, Subcontractors, suppliers or subsequent construction operations.

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The Contractor shall provide and maintain, at his own cost, all necessary dust sheets, protective coverings, barriers, guard rails, barricades, temporary enclosures and other protective measures required for the safe and proper protection of the Works and surrounding property.

Particular care shall be taken to protect completed or partially completed Works, finishes, equipment, services and installations from damage during subsequent construction activities and from the activities of other trades.

Any damage to the Works, materials, equipment or Plant caused by the Contractor, his Subcontractors, suppliers or personnel, or resulting from failure to provide adequate protection, shall be promptly repaired, replaced or otherwise rectified by the Contractor at his own cost and to the satisfaction of the Engineer.

All temporary protective measures shall be properly maintained throughout the period for which they are required and shall be removed by the Contractor upon completion of the relevant Works or when directed by the Engineer. The Contractor shall leave the Site clean and free from all such temporary protective materials and debris.

## 24 RESTORATION AND CLEANING

Upon completion of the Works, the Contractor shall restore all areas, facilities, surfaces and other items affected by the execution of the Works to their original or specified condition, or as otherwise required by the Contract, to the satisfaction of the Engineer.

The Contractor shall maintain the Site and the Works in a clean, orderly and safe condition throughout the construction period. He shall regularly remove and properly dispose of all rubbish, debris, waste materials, surplus materials, packaging and other construction waste arising from the execution of the Works. Such materials shall not be allowed to accumulate on the Site or interfere with the Works, access, safety or operations.

Upon completion of the Works and before Taking-Over, the Contractor shall:

a) remove all temporary construction facilities, temporary structures, offices, sheds, storage areas, foundations, stockpiles, surplus and waste materials, debris and other temporary works not required to remain under the Contract;

b) restore and reinstate all areas, surfaces, roads, pavements, drainage facilities, landscaping and other property affected by the Contractor's operations, to the condition required by the Contract and to the satisfaction of the Engineer;

c) clean all buildings, rooms, equipment areas, floors, walls, ceilings, doors, windows, fittings, fixtures, paved areas and other completed Works;

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d) remove all labels, protective coverings, stains, dust, construction marks, adhesive residues and other construction-related contamination from completed Works, taking care not to damage any surface, finish, equipment or installation;

e) clean and leave all technical and equipment areas, including electrical, HVAC, firefighting, plumbing and ICT/networking areas, free from dust, debris, moisture and other contaminants that may adversely affect the operation of the installed systems; and

f) leave the Works and Site in a clean, safe, functional and satisfactory condition, ready for immediate use and occupation.

The Contractor shall use only cleaning materials, chemicals, methods and equipment that are suitable for the surfaces, finishes, equipment and installations being cleaned and shall comply with the manufacturers' recommendations. No cleaning agent or method that may damage or adversely affect any surface, finish, equipment or installation shall be used.

The Contractor shall take all reasonable measures throughout the construction period to keep the Site and Works free from vermin, insects, rodents and other pests and shall leave the completed Works and Site free from such infestation.

Where pest-control treatment is required, the Contractor shall, before application, submit to the Engineer for review and approval details of the proposed product, manufacturer, method of application, areas to be treated and extent and frequency of application. Pest-control products shall be applied strictly in accordance with the manufacturer's instructions and applicable safety requirements.

All costs associated with restoration, cleaning, removal of waste, disposal of surplus materials, pest control and reinstatement required under this Clause shall be deemed included in the Contract Price.

## 25 SITE OFFICE AND TEMPORARY FACILITIES TO BE PROVIDED BY THE CONTRACTOR

### 25.1 Contractor's Office and Facilities

The Contractor shall establish, equip, maintain and operate a suitable Site Office and all temporary facilities and services necessary for the proper execution, completion and commissioning of the Works, remedying of defects and performance of the Contractor's obligations under the Contract.

The Contractor shall arrange, provide and maintain, as applicable, all necessary temporary facilities and services, including but not limited to:

a) Contractor's Site Office and facilities for his management, engineering and support staff;

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b) offices and necessary facilities for the Engineer's Representative and the Engineer's Site staff, where required under the Contract;
c) labour accommodation/camps, where required;
d) work yards, workshops and storage areas;
e) temporary water supply and sanitation facilities;
f) temporary electricity supply and distribution;
g) temporary lighting;
h) temporary access and internal roads, where required;
i) waste-water and waste-disposal facilities;
j) first-aid/medical facilities and emergency arrangements;
k) fire protection and firefighting facilities;
l) security arrangements and protection of temporary facilities, materials and equipment; and
m) all other temporary facilities, services and utilities necessary for execution of the Works.

The Contractor shall be responsible for obtaining, installing, operating, maintaining and removing the temporary facilities and services and for payment of all associated costs, charges and consumption.

The Contractor shall establish and maintain an adequately staffed architectural and engineering facility at the Site, with suitably qualified technical and support personnel and appropriate equipment necessary for preparation, coordination and submission of Shop Drawings, Working Drawings, Coordination Drawings, As-Built Drawings and other technical documents required under the Contract.

All temporary facilities shall comply with applicable laws, regulations, safety requirements and the Engineer's instructions.

### 25.2 Temporary Roads

The Contractor shall construct, maintain and, where necessary, modify suitable temporary access roads, haul roads and internal roads required for execution of the Works, including access from the Site to the nearest suitable public road, where required. The location and arrangement of temporary roads and access routes shall be coordinated with and shall be subject to the Engineer's approval.

The Contractor shall maintain such roads in safe and serviceable condition throughout their use and shall take appropriate measures to control dust, mud and other nuisances, including regular watering, grading, compaction and cleaning as necessary.

The Contractor shall ensure that temporary access arrangements do not obstruct or adversely affect existing roads, adjoining properties, public access, utilities or the execution of the Works.

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## 25.3 Temporary Services

### 25.3.1 Temporary Water Supply

The Contractor shall provide an adequate and continuous supply of potable and construction water required for the execution of the Works, including water required by his personnel, Subcontractors and other trades under his responsibility.

The Contractor shall arrange and pay all costs associated with the installation, connection, operation, maintenance, consumption and removal of temporary water-supply facilities, including temporary tanks, pumps, piping and associated equipment.

Water used for construction purposes shall be of suitable quality for its intended use and shall comply with the requirements of the Contract and relevant Specifications.

Upon completion of the Works, or when no longer required, the Contractor shall remove temporary water-supply facilities at his own cost and shall reinstate affected areas.

### 25.3.2 Temporary Electricity and Power Supply

The Contractor shall arrange and provide adequate temporary electrical power for all construction activities, Plant, equipment, workshops, Site Offices, labour facilities, lighting and other temporary facilities required for execution of the Works.

The Contractor shall bear all costs associated with the installation, connection, operation, maintenance, protection and removal of the temporary electrical supply and shall pay all electricity consumption charges.

The Contractor shall provide and maintain, through-out the duration of Contract, adequate standby generating capacity at the Site to ensure continuity of essential construction activities and temporary facilities. The generating capacity shall be sufficient for the Contractor's anticipated temporary power requirements.

Any generator or temporary power system shall be properly installed, earthed, protected and operated in accordance with applicable electrical safety requirements. Where the temporary generating capacity becomes inadequate or fails, the Contractor shall promptly provide additional or replacement generating equipment at his own cost.

The Contractor shall provide, install and maintain adequate temporary lighting system throughout the Site, to the satisfaction of the Engineer, including work areas, access routes, stairways, storage areas, offices and other locations where required for safe construction, security and emergency access.

The permanent electrical power and lighting systems may be used for construction purposes only after they have been placed into safe operating condition and with the prior written

approval of the Engineer. Such use shall not interfere with testing, commissioning or operation of the permanent systems and shall be subject to all applicable safety requirements.

The Contractor shall bear the cost of any temporary connections, protection, operation, maintenance, repair or reinstatement arising from his use of the permanent electrical power and lighting systems.

The Contractor shall not energize, operate, modify or otherwise interfere with any permanent electrical installation without the Engineer's prior written authorization and compliance with the applicable safety and commissioning procedures.

Upon completion of the Works, or when temporary facilities are no longer required, the Contractor shall disconnect and remove all temporary electrical installations, generators, cables, distribution boards and associated equipment and shall reinstate affected areas at his own cost.

### 25.3.3 Waste Disposal and Environmental Protection

The Contractor shall make all necessary arrangements for the safe collection, handling, storage, transportation and disposal of construction waste, wastewater, sewage, surplus soil, chemicals, fuels, oils, grease, bituminous materials and other waste generated by the Works.

All waste and effluent shall be disposed of only at locations and through methods permitted by the relevant authorities and approved by the Engineer where such approval is required.

The Contractor shall take all necessary precautions to prevent pollution of the Site, groundwater, drainage systems, adjoining property and the surrounding environment.

Any waste or material deposited in an unauthorized location shall be removed by the Contractor and the affected area restored to its previous or required condition at the Contractor's cost.

Where the Contractor causes contamination of soil or other areas through spills, leakage, improper storage or disposal of hazardous or polluting materials, he shall promptly contain, remove and properly dispose of the contaminated material and reinstate the affected area in accordance with applicable requirements, all at his own cost.

### 25.3.4 Fire Protection and Firefighting

The Contractor shall provide and maintain adequate fire prevention and firefighting facilities throughout the Site and temporary facilities, appropriate to the nature and extent of the Works.

Fire extinguishers, fire-water arrangements, fire buckets, fire points and other suitable firefighting equipment shall be provided at readily accessible locations, including near

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temporary buildings, storage areas, workshops, fuel-storage areas and other locations presenting a fire risk.

Flammable liquids, fuels, gases and other combustible materials shall be stored, handled and dispensed only in suitable and approved containers and designated storage areas, away from sources of ignition and areas of active construction, in accordance with applicable safety requirements.

Hot works, including welding, gas cutting, brazing and other operations involving flame, sparks or significant heat, shall be carried out under an appropriate permit-to-work or hot-work control system and only after the required approval/authorization has been obtained from the Engineer or the Contractor's designated responsible person, as applicable. Suitable fire extinguishers and other firefighting equipment shall be immediately available at all locations where hot work is being performed. The Contractor shall provide appropriate fire watch and other precautions where required.

The Contractor shall comply with all applicable requirements and instructions of the Civil Defense Department, Rescue services, local authorities and other competent authorities relating to fire prevention, emergency preparedness and firefighting.

The Contractor shall, upon completion of the Works or when any temporary facility is no longer required, dismantle and remove such facility, clear the affected area and reinstate the Site to the condition required by the Contract.

All costs associated with the provision, operation, maintenance and removal of temporary facilities and services shall be deemed included in the Contract Price.

## 26 CONSTRUCTION SCHEDULE

The Contractor shall prepare, maintain and update the Programme and Construction Schedule in accordance with the requirements of the General Conditions of Contract and shall submit the same to the Engineer for review and approval.

The Programme shall be supported by sufficient data and information necessary for proper monitoring and control of the Works, including, but not limited to:

a) details of construction plant, equipment and machinery to be employed;
b) procurement, mobilization and planned arrival of plant, equipment and materials at Site;
c) installation, testing and commissioning of plant and equipment, where applicable;
d) proposed methods and sequence of construction operations;
e) deployment and anticipated requirements of labour and supervisory personnel;
f) temporary Works and facilities required for execution of the Works; and

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g) the planned commencement and completion dates and sequence of major activities and Works.

Where the Engineer requires any reasonable alteration or addition to the Programme or Construction Schedule for the proper execution and coordination of the Works, the Contractor shall revise and resubmit the Programme accordingly. Where such revision is required due to the Contractor's delay, inadequate resources, failure to maintain the approved Programme, or other default attributable to the Contractor, the Contractor shall implement such revision without any additional cost to the Employer and without prejudice to the Employer's other rights and remedies under the Contract.

Whenever the actual progress of the Works deviates materially from the approved Programme, or whenever otherwise required under the Contract, the Contractor shall promptly update the Programme and submit the revised Programme to the Engineer for review and approval, together with details of the measures proposed to recover any delay and achieve the Time for Completion.

Review or approval of the Programme by the Engineer shall not relieve the Contractor of any of his obligations, responsibilities or liabilities under the Contract, including his obligation to complete the Works within the Time for Completion, subject to any Extension of Time granted in accordance with the Contract.

## 27 SUBMISSION REQUIREMENTS

The Contractor shall prepare and submit a schedule of all Shop Drawings, Product Data, Samples and other required submittals sufficiently in advance, and in any event at least sixty (60) days before the date on which the reviewed submittal will be required for use in the Works, unless otherwise specified or agreed by the Engineer.

The Contractor shall submit Shop Drawings in accordance with the relevant provisions of the Contract and the number of copies specified therein. For Product Data, the Contractor shall submit the number of copies required for distribution, together with four (4) additional copies for retention by the Engineer, unless otherwise specified.

The Contractor shall submit three (3) samples of each material, product, fixture, fitting or other item requiring approval, unless otherwise specified in the Contract or directed by the Engineer.

Each submission shall be accompanied by a transmittal letter, in duplicate, clearly identifying the submission and containing, as a minimum, the following information:

i. Date of submission;
ii. Project title and Contract number;
iii. Contractor's name and address;

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

iv. Identification and number of each Shop Drawing, Product Data and the Sample submitted;

v. A clear statement identifying/notifying any deviation, variation or departure from the Contract Documents; and

vi. Any other pertinent information/data necessary for proper review and identification of the submission.

Submission, review or approval by the Engineer shall not relieve the Contractor of his responsibility for compliance with the Contract Documents, including the accuracy, adequacy, coordination and suitability of the submitted information.

## 28 RESUBMISSION REQUIREMENTS

**Shop Drawings:**

The Contractor shall revise and resubmit Shop Drawings in accordance with the requirements applicable to the initial submission and within the time specified by the Engineer. All comments, corrections and required changes identified by the Engineer shall be incorporated in the resubmitted drawings.

All revisions made in response to the Engineer's comments shall be clearly identified on the resubmitted drawings, including by revision clouds, markings or other suitable means, together with the applicable revision number and date. Where the Engineer has made or directed any changes to the drawings, such changes shall be clearly incorporated and identified in the resubmission.

**Product Data and Samples:**

The Contractor shall revise and resubmit Product Data and Samples as required by the Engineer and in accordance with the requirements applicable to the initial submission. New or revised data and samples shall be submitted where necessary to demonstrate compliance with the Contract Documents or to address the Engineer's comments.

Resubmission, review or approval of any revised Shop Drawing, Product Data or Sample shall not relieve the Contractor of his responsibility for compliance with the Contract Documents or for the accuracy, adequacy, coordination and suitability of the submitted information.

## 29 WEEKLY PROGRESS REPORT AND PHTOGRAPHS

**29.1** During the continuance of the Contract, the Contractor shall submit a Weekly Progress Report to the Engineer, in the form and number of copies/electronic format approved by the Engineer. The report shall be submitted on a day and within a period specified by the Engineer and shall indicate the actual progress achieved up to the reporting date against the approved Programme and Construction Schedule.

The Weekly Progress Report shall, as applicable, include the status and progress of all major activities, including:

a) mobilization and deployment of resources;
b) construction and installation activities;
c) procurement and delivery of materials and equipment;
d) manufacture and fabrication of equipment and components;
e) surveys, setting-out and related activities;
f) Shop Drawings, technical submittals and approvals;
g) inspections, tests, testing and commissioning;
h) manpower, construction plant and equipment deployed at Site;
i) actual and planned progress, including critical and delayed activities;
j) constraints, hindrances and issues affecting progress;
k) measures proposed or taken to mitigate delays and maintain the approved Programme; and
l) any other information reasonably required by the Engineer for monitoring and administration of the Contract.

The report shall include suitable progress charts, tables and other supporting information necessary to demonstrate the actual status of the Works versus the planned progress.

**29.2** The Employer and the Engineer may coordinate the activities and programmes of the Contractor with those of other contractors, suppliers or agencies working at or in connection with the Site and may require reasonable adjustments to the sequence and timing of activities to achieve proper coordination and the timely completion of the Project.

Any such coordination or adjustment shall be carried out in accordance with the Contract and shall not relieve the Contractor of his obligations under the Contract. Where any such adjustment affects the Time for Completion or gives rise to any entitlement under the Contract, the Contractor's rights shall be determined in accordance with the relevant provisions of the Conditions of Contract.

**29.3** Commencing after the first week of construction and continuing weekly until completion of the Works, the Contractor shall take and submit to the Engineer's Representative a sufficient number of clear, dated and properly identified photographs showing the progress of the Works.

The photographs shall, as applicable, cover:

a) overall progress of the Works;
b) progress of major structures and work areas;



c) significant construction and installation activities;
d) concealed or subsequently inaccessible Works before covering;
e) delivery and installation of major Plant and equipment;
f) testing, commissioning and other significant activities; and
g) any other work or condition considered relevant by the Engineer.

Photographs shall be suitably labelled with the date, location, activity/work description and relevant reference, and shall be submitted in the format and manner specified by the Engineer.

The Contractor shall maintain a complete photographic record of the Works throughout the Contract period and shall provide additional photographs whenever reasonably required by the Engineer for progress monitoring, documentation, inspection or record purposes.

## 30 CONTRACTOR TO NOTIFY DELAYS

The Contractor shall promptly notify the Engineer in writing of any actual or anticipated delay, hindrance, disruption or other circumstance that may adversely affect the progress or Time for Completion of the Works. The notification shall identify the affected activities, the cause and likely duration of the delay, its effect on the approved Programme, and the measures proposed by the Contractor to avoid, mitigate or recover the delay.

Where the delay is attributable to the Contractor, the Contractor shall, at his own cost and without prejudice to the Employer's rights under the Contract, take all reasonable measures necessary to maintain or recover the approved Programme.

The Contractor shall submit progress reports covering the various sections of the Works and shall provide details of:

a) actual progress against the approved Programme;
b) construction plant, equipment and machinery in use or held in readiness at Site;
c) materials and equipment procured, delivered or outstanding;
d) manpower and supervisory staff deployed;
e) Shop Drawings, submissions, inspections, tests and approvals;
f) procurement, manufacture and delivery of major Plant and equipment;
g) matters, constraints or difficulties that have arisen or are likely to affect progress; and
h) measures being taken or proposed to maintain or recover the Programme.

Each progress report shall include a concise summary indicating the current position of the Works against the approved Contract Programme.

Progress reports shall be prepared in the format approved by the Engineer and submitted promptly so that, upon receipt, the information contained therein is not more than twenty-one (21) days out of date. The Engineer may require additional information or more frequent

reporting where the progress of the Works or any particular activity is considered unsatisfactory.

Where the Employer or Engineer considers the progress of any section of the Works to be unsatisfactory, or where any other matter relating to the Contract requires discussion, the Employer or Engineer may convene a progress review or coordination meeting. The Contractor shall ensure attendance of his authorized representative(s), having sufficient authority and knowledge to discuss and take necessary decisions regarding the progress and execution of the Works.

The Contractor's Site Office shall prepare and submit six (6) copies of the Weekly Progress Report to the Employer and the Engineer's Site Office, together with an electronic copy where required by the Engineer. The report shall summarize the activities undertaken during the reporting period and shall specifically identify any difficulties experienced, or reasonably anticipated, in maintaining the approved Programme, together with the proposed corrective and recovery measures.

The Contractor's Site Office shall prepare and submit two (2) copies of a Daily Activity Report to the Engineer's Site Office, or such electronic submission as may be directed by the Engineer. The report shall summarize the principal activities undertaken or planned for the day and shall identify significant activities, including tests, inspections, alignment and setting-out checks, major deliveries, equipment installation, commissioning and other activities specified by the Engineer.

The Contractor shall be responsible for expediting the procurement, manufacture, transportation and delivery to Site of all materials, Plant and equipment to be provided by him or his Subcontractors, in accordance with the approved Programme. The Contractor shall take all necessary measures to ensure timely availability of such materials, Plant and equipment and shall promptly notify the Engineer of any actual or anticipated procurement or delivery delay.

Submission of progress reports or notification of delay shall not, by itself, relieve the Contractor of his obligations under the Contract or constitute acceptance by the Employer or Engineer of any delay or entitlement to an Extension of Time or additional payment. Any entitlement of the Contractor shall be determined in accordance with the relevant provisions of the Contract.

## 31 PHOTOGRAPHS

As soon as work commences on Site, and thereafter at such intervals as directed by the Engineer, the Contractor shall provide not less than twelve (12) photographs per reporting

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period, or such greater number as may reasonably be required by the Engineer, from locations and viewpoints selected by the Engineer to adequately record the progress of the Works.

The photographs shall be clear, properly exposed, dated and suitably identified. Each photographic print shall be not less than 297 mm × 210 mm (A4 size) and shall bear a printed caption indicating, as a minimum, the serial number, date, location and description of the work/activity shown.

The Contractor shall also provide an electronic (soft) copy of all photographs in a commonly used, high-resolution digital format. The electronic photographs shall retain the corresponding serial numbers and identification details and shall be organized chronologically and/or by work area as directed by the Engineer.

The Contractor shall maintain a complete, properly indexed photographic record of the Works at the Site Office throughout the Contract period. The original digital files shall be preserved in an accessible and secure electronic storage medium and shall not be altered or deleted.

Upon completion of the Contract, the Contractor shall hand over to the Employer the complete photographic record, including all required hard-copy photographs and electronic files, in the format and storage medium specified by the Engineer.

The cost of taking, printing, organizing, storing and handing over all photographs and photographic records shall be deemed to be included in the Contract Price.

## 32 SIGN BOARD

The Contractor shall provide, erect and maintain at the Site two (2) Sign Boards at locations approved by the Engineer and at such prominent positions as directed by the Engineer. The dimensions, layout and appearance of the Sign Boards shall be subject to the Engineer's approval.

The Sign Boards shall be fabricated from suitable durable metal sheet/material, securely mounted on steel posts and adequately anchored, braced and supported to withstand normal Site and weather conditions.

Each Sign Board shall clearly display, in both English and Urdu, the following information:

a) Name of the Works/Project;
b) Name of the Employer;
c) Name of the Engineer; and
d) Name of the Contractor.




The wording, lettering, layout and any project identification details shall be as approved by the Engineer.

The Contractor shall keep the Sign Boards clean, legible, properly maintained and securely fixed throughout the execution of the Works and shall promptly repair or replace any damaged, defaced or deteriorated Sign Board.

Upon completion of the Works, the Contractor shall remove the Sign Boards and their supports and make good any resulting damage to the Site, unless otherwise directed by the Engineer.

The cost of providing, fabricating, erecting, maintaining, repairing, replacing and removing the Sign Boards shall be deemed to be included in the Contract Price.

## 33 COORDINATION OF WORK AT SITE

The Contractor shall take full cognizance that other contractors, subcontractors, utility agencies, service providers or other persons may be working concurrently at or in the vicinity of the Site during execution of the Works.

The Contractor shall properly plan, coordinate and execute the Works under his responsibility so as to facilitate the activities of other contractors and agencies and shall provide reasonable access and working facilities necessary for the execution, inspection and supervision of their respective works, insofar as such access and facilities are within the Contractor's control and consistent with the Contract.

The Contractor shall coordinate his activities, work areas, access arrangements, temporary works, storage, deliveries, construction plant and services with other contractors and agencies working at the Site. He shall take all reasonable measures to avoid interference, obstruction, disruption, damage or unsafe conditions, particularly where different contractors are required to work simultaneously or in adjacent areas.

The Contractor shall maintain safe and suitable access to sections of the Works required by other contractors or agencies for the extension, installation, inspection, testing or completion of their works. No work, storage of materials, construction plant or temporary facility shall be arranged in a manner that unreasonably obstructs such access.

The Contractor shall attend coordination meetings and comply with reasonable directions of the Engineer regarding the sequence, timing, interfaces and coordination of the Works, including the order in which particular activities are to be carried out, to facilitate proper and timely completion of the Project.

The Contractor shall promptly notify the Engineer of any actual or anticipated conflict, interference, access restriction or other coordination issue that may affect the progress, safety or quality of the Works and shall cooperate in implementing reasonable measures to resolve the matter.

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### 34.4 Work yards and Storage Areas

The Contractor shall provide, operate and maintain suitable work yards, workshops, sheds, stores, storage areas and other temporary facilities required for the proper storage, handling, protection and maintenance of materials, Plant, equipment and other items brought to or used at the Site.

Such facilities shall include, where necessary, fencing, gates, foundations, hard standings, drainage, weather protection and other temporary structures and works required for their safe and effective use.

The Contractor shall be responsible for the security and protection of his labour camps, staff residences, site offices, work yards, workshops, stores, materials, Plant and equipment.

### 34.5 Water Supply, Sewerage System and Electricity

The Contractor shall, at his own cost, make all necessary arrangements for the provision, operation and maintenance of adequate temporary electricity, potable and construction water supply, sanitation, sewerage and wastewater disposal facilities required for the Site, labour camps, staff accommodation, site offices, workshops and other temporary facilities.

The Contractor shall obtain and maintain any temporary utility connections, permits or approvals required for such facilities and shall pay all applicable connection, installation, consumption, operation, maintenance and other charges associated therewith.

All temporary electrical installations shall be properly designed, installed, protected, earthed and maintained in accordance with applicable standards and safety requirements.

### 34.6 Medical Care and First Aid

The Contractor shall provide adequate medical and first-aid facilities for his employees and personnel in accordance with applicable health and safety requirements.

Adequately equipped and properly staffed first-aid stations or dispensaries shall be provided at the Site and, where applicable, at labour camps and other strategic locations. Such facilities shall be capable of providing first-aid treatment during all periods when work is being undertaken and shall be available, where necessary, for persons present at the Site, including personnel of the Employer and Engineer.

The nature, number and location of the medical and first-aid facilities and the personnel provided by the Contractor shall comply with applicable Government health, safety and labour requirements and shall be subject to the Engineer's review.

The Contractor shall also make suitable arrangements for emergency medical treatment and transportation of injured or seriously ill persons to an appropriate medical facility.

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The Contractor shall be responsible for any damage, loss, obstruction or disruption to the works, property, equipment or activities of other contractors or agencies to the extent caused by his acts, omissions, negligence or failure to properly coordinate the Works.

The Contractor shall not be entitled to any additional payment for the normal coordination, cooperation, access arrangements, sequencing and facilities required under this Sub-Clause, and all associated costs shall be deemed to be included in the Contract Price.

However, the Contractor may be entitled to an Extension of Time or other relief expressly provided under the Contract where any delay or disruption is attributable to causes for which the Contractor is not responsible.

## 34 SITE FACILITIES TO BE PROVIDED BY THE CONTRACTOR

### 34.1 General

Without prejudice to the generality of the various provisions of the Contract, the Contractor shall, at his own cost, provide, operate, maintain and subsequently remove all temporary facilities and services necessary for the proper, safe and efficient execution and completion of the Works, including the following:

### 34.2 Labour Camps and Staff Residences

The Contractor shall, where required, provide, operate and maintain suitable labour camps and staff accommodation for his employees and personnel engaged on the Works.

The Contractor shall ensure that all such facilities comply with applicable laws, regulations and requirements relating to labour, health, safety, sanitation, welfare, accommodation and environmental protection in force in Pakistan and Punjab. The accommodation shall be adequately ventilated, sanitary, properly maintained and provided with suitable water supply, sanitation, lighting, fire protection and other necessary welfare facilities.

The Contractor shall be responsible for the security, operation, maintenance and cleanliness of such camps and residences.

### 34.3 Administrative and Field Offices

The Contractor shall provide, operate and maintain suitable administrative and field offices necessary for his management, engineering, supervisory and support staff.

The Contractor shall provide all necessary furniture, office equipment, communication facilities, appliances, utilities, cleaning and janitorial services, security and other facilities required for the efficient operation of such offices.

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### 34.7 Other Facilities

The Contractor shall, at his own cost, provide such additional facilities and services as may reasonably be required for his staff and labour for the proper execution of the Works, including, where applicable:

a) transportation to and from the Site;
b) catering and food arrangements;
c) telephone, internet and other communication facilities;
d) recreational and welfare facilities; and
e) other facilities necessary for the safe, orderly and efficient operation of the Site.

### 34.8 Compliance and Removal of Temporary Facilities

All temporary facilities shall be located, constructed and operated in accordance with the Engineer's directions and all applicable statutory, environmental, health, safety and security requirements.

Upon completion of the Works, or when otherwise directed by the Engineer, the Contractor shall dismantle and remove his temporary facilities, clear the areas occupied by them and reinstate the affected areas to the satisfaction of the Engineer.

All costs associated with providing, operating, maintaining, securing, removing and reinstating such facilities shall be deemed to be included in the Contract Price.

## 35 CONSTRUCTION PROCEDURES

The Contractor shall submit to the Engineer, for review, the proposed construction procedures, methods and sequence of execution of the Works in accordance with the requirements of the Conditions of Contract and the approved Programme.

The Contractor shall provide adequate and competent labour, supervision, construction Plant, equipment, materials and other resources necessary to execute the Works in accordance with the Contract and to achieve the Time for Completion.

If the Engineer determines that the progress of the Works is insufficient to achieve completion within the Time for Completion, particularly where such insufficient progress is attributable to the Contractor's failure to deploy adequate resources or otherwise to comply with the approved Programme, the Engineer may require the Contractor to take appropriate measures to expedite progress, including increasing manpower, deploying additional Plant and equipment, extending working hours, or working additional shifts.

The Contractor shall comply with such reasonable requirements at his own cost where the need for such measures arises from delay, inadequate resources, or other circumstances

attributable to the Contractor. Such measures shall not relieve the Contractor of any other obligations or liabilities under the Contract.

Review or approval by the Engineer of any construction procedure, method or sequence shall not relieve the Contractor of his responsibility for the proper execution, safety, quality, coordination and timely completion of the Works.

## 36 NOTIFICATION TO ENGINEER

The Contractor shall notify the Engineer in writing, on a daily basis and sufficiently in advance, of the nature, location and planned timing of the Works proposed to be carried out on the following day, to enable the Engineer or his Representative to make any necessary inspection, measurement, testing or other verification.

The notification shall identify, as applicable, the relevant work area, activity, BOQ item, drawing reference and any Works that are to be covered, concealed, tested or otherwise rendered inaccessible for subsequent inspection.

The Engineer may require the Contractor to provide longer advance notice for particular operations, including major concrete pours, testing and commissioning, installation of major Plant and equipment, works requiring specialist inspection, or any other activity for which adequate preparation or coordination is necessary.

The Contractor shall not proceed with any activity requiring prior inspection, measurement, testing or approval until the required notice has been given and the Engineer has been afforded a reasonable opportunity to carry out the necessary inspection or verification.

Failure by the Engineer to attend or inspect following proper notification shall not relieve the Contractor of his responsibility for compliance with the Contract or the accuracy and quality of the Works.

## 37 NIGHT WORK

Where the Contractor carries out any work during night-time, he shall provide and maintain, from sunset to sunrise, adequate artificial lighting at and around all work areas, access routes, construction Plant, equipment and other locations necessary for the safe and efficient execution, inspection and supervision of the Works.

The lighting shall be of sufficient intensity and suitably positioned to provide clear visibility for construction operations, inspection, measurement, testing and supervision, and shall not cause glare, obstruction or unsafe conditions.

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The Contractor shall provide all necessary lighting equipment, power supply, generators, cables, supports, guards and other accessories and shall operate and maintain them in safe and serviceable condition throughout the period of night work.

The Engineer may require additional or improved lighting where, in his opinion, the illumination provided is inadequate for proper observation, inspection or safe execution of the Works. The Contractor shall promptly comply with such requirements.

The Contractor shall ensure that all night work and associated lighting arrangements comply with the applicable health, safety, environmental and electrical safety requirements. Adequate lighting shall also be provided at access and egress routes, stairs, excavations, working platforms and other areas where required for safe movement.

All costs associated with night working, including provision, operation, fuel, maintenance and removal of temporary lighting and associated facilities, shall be deemed to be included in the Contract Price.

## 38 WEATHER

The Contractor shall take all necessary precautions and provide adequate measures to protect the Works, materials, Plant and equipment from adverse weather conditions.

No work or construction operation shall be undertaken, or permitted to continue, where, in the opinion of the Engineer, the prevailing or anticipated weather conditions are such that the proper execution, quality, safety or protection of the Works cannot reasonably be ensured.

The Contractor shall suspend or modify the affected operations when directed by the Engineer and shall take all necessary measures to protect the Works and Site during such conditions.

Any suspension or interruption of the Works due to weather conditions shall be dealt with in accordance with the relevant provisions of the Contract.

## 39 CO-ORDINATION WITH OTHER CONTRACTORS

The Contractor shall maintain professional and cooperative relations with all other contractors, subcontractors, suppliers, utility agencies and other parties employed or engaged by the Employer at or in connection with the Site.

The Contractor shall fully cooperate and coordinate his activities with those of other contractors and agencies to the extent reasonably necessary for the proper and timely execution and completion of the Project in accordance with the approved Programme and the requirements of the Contract.



The Contractor shall coordinate work sequences, access, work areas, deliveries, temporary facilities, interfaces and other activities with other contractors so as to avoid unnecessary interference, obstruction, delay or disruption to the Works or to the works of others.

Where access to the Works or work areas of other contractors is through or across areas under the Contractor's control, the Contractor shall coordinate with such contractors and provide reasonable access, subject to appropriate safety, security and site-control requirements.

Any disagreement, conflict or coordination issue arising between the Contractor and any other contractor which cannot be resolved through mutual coordination shall be promptly referred to the Engineer for appropriate direction or decision in accordance with the Contract. The Contractor shall comply with the Engineer's direction pending determination of the matter in accordance with the applicable provisions of the Contract.

The Contractor shall promptly notify the Engineer of any actual or anticipated interference, access restriction, delay or other coordination matter arising from the activities of other contractors that may affect the progress or performance of the Works. The Contractor shall proceed with the work in accordance with direction issued by the Engineer.

## 40 INTERFACE MANAGEMENT AND SYSTEM INTEGRATION

The Contractor shall be responsible for effective coordination and management of all interfaces among the Civil/Structural, Electrical, HVAC, Firefighting, Plumbing/Sewerage, ICT/Networking and other systems forming part of the Works, including interfaces with existing services and facilities.

The Contractor shall prepare and maintain coordinated drawings, layouts, details and interface information necessary to ensure proper integration of all systems, including equipment locations, foundations, supports, sleeves, openings, penetrations, cable trays, ducts, pipes, access and maintenance clearances, power supplies, control and monitoring interfaces and other relevant connections.

The Contractor shall coordinate the activities of all Subcontractors, suppliers, manufacturers and specialist installers and shall ensure that their respective Works are compatible, properly sequenced and fully integrated. Any clash, omission, incompatibility or rework arising from inadequate coordination attributable to the Contractor shall be rectified by the Contractor at his own cost and without entitlement to additional payment or Extension of Time.

The Contractor shall demonstrate, through the required testing and commissioning procedures, that the individual systems and their interfaces operate together in accordance with the Contract requirements. The Engineer's review or approval of coordination drawings

or interface arrangements shall not relieve the Contractor of his responsibility for proper coordination, integration and performance of the Works.

## 41 SITE SECURITY, ACCESS CONTROL AND CONFIDENTIALITY

The Contractor shall provide and maintain adequate security and access-control arrangements at the Site throughout the Contract Period to protect the Works, materials, equipment, personnel, documents and facilities, and to prevent unauthorized access.

Access to the Site and to restricted areas containing sensitive equipment, ICT/Networking systems, electrical installations, control systems and other critical facilities shall be limited to authorized personnel. The Contractor shall maintain appropriate identification, visitor-control and access records and shall comply with any additional security and access-control requirements specified by the Employer or Engineer.

The Contractor shall ensure that his Subcontractors, suppliers, consultants, workers and other personnel comply with the Site security and access-control requirements. The Engineer or Employer may require the removal from the Site of any person who fails to comply with such requirements, subject to the Contract.

The Contractor shall maintain the confidentiality and security of all drawings, specifications, technical information, ICT/network information, data, photographs, records and other information relating to the Employer, the Project or the Site obtained in connection with the Contract. Such information shall not be disclosed, copied, photographed, transmitted or used for any purpose other than execution of the Contract without the prior written approval of the Employer, except where disclosure is required by applicable law.

The Contractor shall take appropriate measures to prevent unauthorized photography, recording, removal or dissemination of information or materials from restricted areas, where so directed by the Employer or Engineer.

The Contractor shall immediately notify the Engineer of any security breach, unauthorized access, loss of confidential information, theft, damage or other security incident affecting the Site or the Works and shall take immediate measures to contain and rectify the incident.

Upon completion of the Works, the Contractor shall return or securely dispose of confidential documents, information and access media as directed by the Employer, subject to the record-retention requirements of the Contract.

All costs associated with Site security, access control, security personnel, identification systems, records and related measures required under this Clause shall be deemed to be included in the Contract Price.

## 42 PROTECTION OF SENSITIVE EQUIPMENT AND CONTROLLED WORKING ENVIRONMENT

The Contractor shall take all necessary measures to protect sensitive, precision and electronic equipment, including Electrical, HVAC, Firefighting, ICT/Networking, UPS, batteries, control, monitoring and other critical systems, from dust, moisture, water ingress, construction debris, vibration, heat, contamination, physical damage and other adverse conditions during storage, installation, testing and commissioning.

Areas designated for installation, testing or commissioning of sensitive equipment shall be maintained in a clean, dry and controlled condition appropriate to the requirements of the equipment and the manufacturers' recommendations. The Contractor shall provide suitable temporary enclosures, barriers, coverings, dust-control measures, drainage, ventilation, environmental controls and other protective measures as necessary.

No activities likely to generate excessive dust, moisture, fumes, vibration or other contaminants, including cutting, grinding, drilling, welding or similar works, shall be carried out in or adjacent to areas containing installed sensitive equipment without adequate protective measures and the Engineer's approval where required.

All sensitive equipment shall be properly stored, handled, protected and installed in accordance with the Contract and manufacturers' recommendations. Any damage, contamination or deterioration attributable to the Contractor, his Subcontractors, suppliers or personnel shall be promptly rectified or the affected equipment replaced at the Contractor's own cost.

The Contractor shall ensure that the required environmental and site conditions are maintained until completion of the relevant installation, testing and commissioning activities. The Engineer's inspection or approval shall not relieve the Contractor of his responsibility for the protection, condition and performance of the equipment.

All costs associated with the protection and maintenance of the controlled working environment under this Clause shall be deemed to be included in the Contract Price.

## 43 ACCIDENT PREVENTION, SAFETY MEASURES AND PROTECTIVE EQUIPMENT

The Contractor shall comply with, and shall ensure compliance by all his Subcontractors, suppliers and personnel with, the highest applicable standards of occupational health and safety and accident prevention, including applicable international standards and all applicable laws, rules, regulations, codes, ordinances and statutory requirements in force in Pakistan and Punjab.

The Contractor shall be responsible for establishing, implementing and maintaining an effective Site Health and Safety Management System appropriate to the nature and risks of the Works. The Contractor shall provide competent safety personnel, necessary safety equipment, training, supervision and emergency arrangements throughout the execution of the Works.

The Contractor shall provide, erect and maintain at his own cost all necessary barriers, fencing, barricades, guardrails, warning signs, warning lights, protective screens, covers, access controls and other safety measures required for the protection of persons, property, existing services and the Works at and adjacent to the Site.

All excavations, openings, shafts, edges, elevated work areas and other hazardous locations shall be adequately barricaded, guarded, covered or otherwise protected. Safe access and egress shall be provided and maintained at all times.

All falsework, formwork, scaffolding, working platforms, ladders, temporary stairs, handrails, guardrails and other temporary structures shall be properly designed, constructed, braced, secured, inspected and maintained in a safe condition. They shall be used only for their intended purpose and shall not be overloaded.

Where work is carried out at height or overhead, the Contractor shall provide suitable fall-protection systems, safety nets, platforms, guardrails, toe boards, protective screens and other appropriate measures. Warning signs and barricades shall be provided at ground level and other affected areas to clearly identify the hazards associated with overhead work

The Contractor shall provide, maintain and enforce the use of appropriate Personal Protective Equipment (PPE) by all personnel at the Site, including, as applicable, safety helmets, safety footwear, high-visibility clothing, gloves, eye and face protection, hearing protection, respiratory protection, fall-arrest equipment and other PPE appropriate to the work and associated hazards.

All electrical work shall be carried out by competent and authorized personnel using suitable tools, equipment and protective devices. Temporary and permanent electrical installations used during construction shall be properly installed, protected, earthed and maintained in accordance with applicable electrical safety requirements.

The Contractor shall implement appropriate safety controls for lifting operations, cranes, hoists, material handling, hot works, welding and cutting, work in confined spaces, excavation, working at height, electrical work, testing and commissioning, and other hazardous activities. Where appropriate, such activities shall be undertaken under a permit-to-work system and in accordance with approved method statements and risk assessments.

The Contractor shall maintain the Site in a clean, orderly and safe condition. Construction debris, waste materials, surplus materials and other obstructions shall be removed regularly and shall not be permitted to accumulate in work areas, access routes, emergency exits or other locations where they may create a hazard.

Where netting or protective screening is required, the Contractor shall provide and maintain suitable netting or equivalent protection at all levels and around working areas where there is a risk of falling persons, materials, tools or debris. Such protection shall be securely fixed and maintained throughout the period of risk.

All safety and warning signs shall be clearly visible and, where appropriate, shall be provided in both English and Urdu. Signs shall be maintained clean, legible, properly illuminated where required, and replaced immediately if damaged or deteriorated.

The Contractor shall provide suitable fire prevention and firefighting equipment, first-aid facilities, emergency communication arrangements, emergency access and evacuation procedures, and shall maintain appropriate emergency response arrangements throughout the execution of the Works.

The Contractor shall immediately report to the Engineer any accident, injury, dangerous occurrence, fire, major property damage or other significant safety incident occurring at or in connection with the Site and shall maintain records of accidents, incidents and corrective actions as required under the Contract and applicable law.

The Contractor shall ensure that all safety measures are maintained continuously and shall promptly rectify any unsafe condition identified by the Contractor, the Engineer or any competent authority. The Engineer may require suspension of an unsafe activity until the identified safety deficiency has been satisfactorily rectified.

The Contractor shall be responsible for the safety of his employees, Subcontractors, suppliers and all persons under his control at the Site and shall take all reasonable measures to protect the Employer, Engineer, visitors and members of the public from hazards arising from the Works.

All costs associated with safety measures, protective equipment, safety personnel, training, signage, barriers, lighting, protective systems, inspections, emergency arrangements and other requirements under this Sub-Clause shall be deemed to be included in the Contract Price.



## 44 SETTING OUT OF WORK AND SURVEY

### 44.1 Reference Points, Lines

The Contractor shall establish and maintain the benchmarks, Temporary Bench Marks (TBMs), reference points, reference lines and other survey control points at the Site in accordance with the Drawings, Specifications and the instructions of the Engineer.

The Contractor shall set out and execute the Works from the established survey control points and shall provide all necessary surveying instruments, equipment, materials and qualified personnel required for establishing, checking and maintaining such survey control.

Before commencement of excavation, the Contractor shall establish all necessary setting-out points, lines, grades and slope stakes and shall re-establish or relocate them as required during the progress of the Works using the approved survey control network.

### 44.2 Verification and Survey Responsibilities

The Engineer may carry out checks of the lines, levels, grades, coordinates and other survey information established by the Contractor to verify conformity of the Works with the Drawings and Specifications. Such checking or verification by the Engineer shall not relieve the Contractor of his responsibility for the accuracy and correctness of the setting out and for executing the Works in accordance with the Contract.

Based on the basic survey control provided or established for the Project, the Contractor shall establish such additional primary and secondary control points as may be necessary for execution of the Works and shall preserve and maintain them until otherwise authorized by the Engineer.

The Contractor shall be responsible for protecting and maintaining all survey markers, monuments, benchmarks, property corners and other control points within his area of operations. If any such marker, monument or control point is disturbed or destroyed due to the Contractor's operations, the Contractor shall, at his own cost, arrange for its accurate re-establishment or replacement to the satisfaction of the Engineer. Where a monument cannot be restored at its original position, a suitable witness point shall be established and properly referenced. The Contractor shall maintain adequate records of all survey control points, including coordinates, elevations, references and other relevant information, in the format required by the Engineer.



The Contractor shall provide experienced and suitably qualified construction surveyors and survey assistants having relevant experience in construction surveying for works of similar nature.

The Contractor shall establish and maintain all lines, levels, grades, coordinates and other survey controls necessary for execution of the Works and shall carry out all measurements and calculations required to construct the Works within the tolerances specified in the Contract.

**Quantity Surveys:**

The Contractor shall carry out all surveys, measurements and computations necessary to determine the quantities of Works executed during each progress payment period and shall provide all survey information reasonably required by the Engineer for verification of interim and final quantities of the works executed.

The Engineer shall determine the final quantities of the Works in accordance with the Contract, based on the original ground levels and other survey information established by the Contractor and agreed or verified by the Engineer.

The Contractor shall notify the Engineer at least twenty-four (24) hours in advance of any survey intended for the purpose of determining quantities for payment. Unless otherwise agreed or waived by the Engineer, such quantity surveys shall be carried out in the presence of an authorized representative of the Engineer.

**Survey Accuracy and Tolerances:**

The accuracy of survey work shall satisfy the following minimum requirements, unless tighter tolerances are specified in the Drawings, Specifications or applicable standards:

(a) Structural seyying-out points: within **3 mm** (0.01 foot) accuracy from point to point, except where tighter tolerances are specified;

(b) Cross-section points: within **30 mm (.010 foot) horizontally and 3 mm (0.01 foot) vertically**, unless otherwise specified; and

(c) Levelling lines for establishing Temporary Bench Marks (TBMs): Permissible closing error for a levelling line meant for establishing Temporary Bench Mark (TBMs) shall not exceed 0.045 x $\sqrt{}$ M foot, where M is in miles, and/or permissible closing error shall not exceed 14 mm × $\sqrt{}$K, where K is the length of the levelling line in kilometers. The closing error shall be properly adjusted in accordance with recognized surveying practice.

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The Contractor shall ensure that the accuracy achieved is appropriate to the type and purpose of the survey and shall adopt tighter tolerances where required for structural, architectural, MEP, equipment installation or other precision works.

**Survey Materials, Equipment and Instruments:**

The Contractor shall provide all materials, equipment, instruments and labour necessary for the survey and setting-out of the Works, including, but not limited to, total stations, levels, measuring equipment, prisms, staffs, stakes, spikes, steel pins, templates, platforms, markers and other necessary accessories. Except for items incorporated into or permanently left in the Works, such materials and equipment shall remain the property of the Contractor.

All surveying instruments shall be suitable for the intended purpose, maintained in good working condition and properly calibrated where applicable. Instruments shall be checked periodically and whenever their accuracy is in doubt. Any defective, damaged or inaccurate instrument shall be promptly repaired, recalibrated or replaced to the satisfaction of the Engineer.

**Survey Records:**

The Contractor shall maintain complete and accurate survey records in accordance with recognized professional surveying practice. Original field observations, field notes, calculations, coordinates, levels, setting-out data, quantity surveys, calibration records and other relevant survey information shall be properly recorded and maintained in field books and/or secure electronic records in a format approved by the Engineer.

Records shall be legible, identifiable, dated and traceable to the relevant survey activity and location. Corrections to field records shall be made in a manner that preserves the original entry and clearly identifies the correction. The Contractor shall not substitute original field observations with unauthorised copied or reconstructed records.

The Contractor shall make all survey records and computations available to the Engineer for inspection and verification and shall provide copies or electronic records when required.

**Cost of Surveying:**

The cost of all surveying, setting out, establishment and maintenance of survey control points, survey instruments and equipment, survey records, quantity surveys, surveyors, survey assistants, materials and other resources required under this Clause shall be deemed to be included in the rates and prices of the relevant items in the Bill of Quantities, and no separate measurement or payment shall be made therefor.

### 44.3 SURVEY INSTRUMENTS

The Contractor shall maintain at the Site, throughout the execution of the Works, adequate and appropriate surveying instruments in good working condition and properly calibrated where applicable, sufficient to enable the Contractor to carry out all required surveys and to enable the Engineer's Representative to check the lines, levels, coordinates and grades of the Works at all reasonable times.

As a minimum, the Contractor shall provide and maintain at Site:

a) One (1) Total Station, complete with tripod, prism, accessories and necessary data-recording facilities; and

b) One (1) Automatic/Digital Level, complete with tripod, staff and necessary accessories.

The Engineer may require additional surveying instruments or equipment where necessary for the proper setting out, checking, measurement or verification of the Works.

## 45 SPECIFICATION EPILOGUES

(To remain in force during the entire completion/Contract period).

**Compliance with Specifications:**

The Works comprising the Contract shall be executed, completed, tested, commissioned and, where applicable, guaranteed strictly in accordance with the requirements of the Contract Documents, including the Drawings, Technical Specifications, BOQ, applicable Standards and Codes, and the instructions of the Engineer issued in accordance with the Contract.

The Contractor shall provide all materials, Plant, equipment, workmanship, services, testing, commissioning and other requirements necessary for the proper and complete execution of the Works, whether specifically stated or reasonably necessary for achieving the specified performance and intended function of the Works.

**Applicable Standards Where Specifications Are Silent:**

In the event that a particular material, product, equipment, construction activity, method, fabrication, installation, testing or commissioning requirement is not specifically covered by the Contract Documents, the applicable recognized standard, code or specification relevant to the particular work shall apply, and the contractor shall be obliged to strictly follow the instructions issued by the Engineer, in this regard:

Unless otherwise specified in the Contract Documents, the following standards and codes, as applicable to the nature of the Works, may be referred to:

AASHTO - American Association of State Highway and Transportation Officials.

ASTM - American Society for Testing & Materials

ASME - American Society of Mechanical Engineers

AISC - American Institute of Steel Construction

ASA American Standards Association

AWS - American Welding Society

AWWA - American Water Works Association;

AWWA - American Water Works Association

BS/BS EN - applicable British Standards/British-European Standards

BCP - applicable provisions of the Building Code of Pakistan

MRS - Government of Punjab Market Rate System, 2nd Bi-Annual 2026, Multan, for applicable schedule items. and for non-schedule works the standard specifications/ as per the direction of the Engineer shall be followed.

PSI - Pakistan Standards Institute; and

other internationally or nationally recognized standards specifically referenced in the Contract Documents or approved by the Engineer.

For **Non-Schedule Items**, the requirements shall be governed by the respective BOQ description, Technical Specifications, Drawings and applicable Standards and Codes forming part of the Contract Documents.

**Hierarchy and Selection of Standards:**

Where more than one standard or code is applicable, the Contractor shall comply with the standard expressly specified in the Contract Documents. Where no particular standard is specified, the Engineer shall determine the applicable recognized standard having regard to the nature and intended performance of the relevant work, material, equipment or system.

The application of any standard shall not result in a reduction in the quality, performance, durability, safety or functional requirements specified in the Contract.

**Proposed Alternative Standards, Materials or Equipment:**

If the Contractor proposes to use any alternative standard, code, specification, material, product, Plant or equipment not expressly specified or not covered by the applicable Contract Documents, he shall submit a written proposal to the Engineer at least thirty (30) days before describing exact nature of change/substitution/ replacement, the reason for proposing such change/substitution/ replacement, the proposed use, procurement or incorporation into the Works, or such longer period as may be necessary for proper review.

The submission shall clearly state:

a) the proposed alternative or deviation;
b) the relevant specified requirement;
c) the reasons and justification for the proposed alternative;
d) complete technical specifications, catalogues, data sheets and illustrated details;
e) evidence demonstrating compliance and equivalence, where applicable;
f) details of performance, quality, durability, compatibility and warranty; and
g) details of any effect on the Contract Price, Time for Completion or other contractual requirements.

No alternative material, equipment, standard, specification or method shall be used or incorporated into the Works without the **prior written approval of the Engineer**.

**Effect of Approval:**

Approval of any alternative standard, material, equipment or method shall not relieve the Contractor of his responsibility for the performance, quality, safety, compatibility, durability or compliance of the Works with the Contract.

Any approval involving a change to the scope, quality, functionality, Contract Price or Time for Completion shall be dealt with in accordance with the applicable provisions of the Contract. No adjustment to the Contract Price or Time for Completion shall arise solely from the Contractor's proposal or request unless expressly approved or otherwise determined in accordance with the Contract.

**Manufacturer's Standards and Recommendations:**

Where specialized Plant, equipment or proprietary systems are incorporated into the Works, the Contractor shall comply with the applicable manufacturer's installation, testing, commissioning, operation and maintenance requirements, provided that such requirements do not conflict with the Contract Documents or applicable statutory requirements.

Where a conflict exists, the Contractor shall promptly notify the Engineer and shall not proceed on the basis of the conflicting requirement without obtaining the Engineer's written direction.

## 46 WASTAGE

No separate measurement or payment shall be made for any wastage, loss, off-cuts, excess consumption, spillage, breakage or surplus of materials, supplies, fixtures, Plant or other items provided by the Contractor, whether arising during transportation, handling, storage, fabrication, cutting, installation or execution of the Works.



Payment shall be made only for the net quantities of completed and accepted Works measured in accordance with the applicable method of measurement and the provisions of the Contract.

The Contractor shall make adequate allowance for all normal and unavoidable wastage, cutting, laps, overlaps, off-cuts, spillage, breakage and other losses, including, where applicable, cut ends and laps of reinforcement steel, cement spillage and other construction materials, when determining his unit rates and prices for the Works.

## 47 ENVIRONMENTAL PROTECTION

The Contractor shall conduct all construction activities in a manner that minimizes adverse environmental impacts and shall comply with all applicable environmental laws, regulations, permits, approvals and requirements of the relevant authorities.

The Contractor shall exercise due care to protect the natural landscape and shall plan and execute his operations so as to avoid unnecessary destruction, scarring, disturbance or defacing of the natural surroundings in and around the Site.

Except where clearing is necessary for the Permanent Works, approved access and construction roads, authorized Temporary Works, excavation or other activities expressly permitted under the Contract, all existing trees, vegetation and other natural features shall be preserved and protected from damage caused by the Contractor's operations, Plant, equipment, materials and personnel.

The Contractor shall take appropriate measures to prevent pollution, contamination and nuisance arising from the Works, including uncontrolled discharge of wastewater, sewage, fuels, oils, chemicals, construction debris, solid waste and other harmful substances. Construction waste and surplus materials shall be collected, stored, transported and disposed of at approved locations and in accordance with applicable requirements.

The Contractor shall take reasonable measures to control dust, mud, smoke, noise, vibration and other disturbances arising from construction activities and shall ensure that such activities do not unnecessarily adversely affect adjacent property, public areas, roads, existing services or the surrounding environment.

Fuels, oils, chemicals, hazardous materials and other substances capable of causing environmental contamination shall be stored, handled and used in suitable designated areas and in a manner that prevents leakage, spillage or contamination of soil, drainage systems, surface water or groundwater.

The Contractor shall immediately contain, clean up and properly dispose of any spill, leakage or contamination resulting from his operations and shall reinstate the affected area to the satisfaction of the Engineer and the relevant authority, where applicable.

On completion of the Works, the Contractor shall remove all construction debris, surplus materials, temporary facilities and other waste from the Site and shall smooth, grade, clean and reinstate all areas disturbed by his operations to a condition acceptable to the Engineer and consistent, where applicable, with the original or approved finished condition of the Site, at his own cost.

The Contractor shall be responsible for ensuring that his Subcontractors, suppliers and personnel comply with the requirements of this Clause. All costs associated with environmental protection, pollution prevention, waste management, protection of vegetation and reinstatement required under this Clause shall be deemed to be included in the Contract Price.

## 48 QUARRY OPERATIONS

The Contractor shall obtain and procure all aggregates, stone, sand, gravel and other quarry materials required for the Works only from duly licensed and Government-approved quarries and sources.

All quarrying, extraction, processing, crushing, screening, transportation and related operations shall be carried out in accordance with all applicable laws, rules, regulations, environmental requirements, permits and conditions imposed by the relevant Government authorities.

The Contractor shall be responsible for obtaining and maintaining all licences, permits and approvals required for the operation or use of quarries and shall ensure that the materials obtained comply with the quality, grading, durability and other requirements specified in the Contract.

The Engineer may require the Contractor to submit evidence of the approval/licensing of the quarry or source and the results of relevant material tests before the materials are incorporated into the Works.

Any quarry or source found to be unauthorized, non-compliant or unsuitable shall not be used and the Contractor shall arrange an alternative approved source at his own cost.

All costs associated with obtaining, operating or using approved quarry sources, including permits, royalties, extraction, processing, testing, loading, transportation and other related costs, shall be deemed to be included in the relevant rates and prices in the Bill of Quantities.

## 49 SOIL EROSION AND SEDIMENTATION CONTROL

The Contractor shall plan and execute the Works in such a manner as to minimize and control soil erosion and to prevent sedimentation, silting and pollution of natural watercourses, drains, ponds, tanks, reservoirs and other water bodies.

The Contractor shall provide and maintain appropriate temporary erosion and sedimentation control measures, including, as necessary, diversion drains, silt fences, sediment traps, check dams, sedimentation basins, settling ponds and other suitable measures to control surface runoff and prevent the discharge of silt, sediment and construction pollutants from the Site.

At suitable locations, sedimentation basins or settling ponds with impervious lining, where required, shall be constructed and maintained for containing, settling and trapping silt and sediment carried by surface runoff, thereby preventing the premature siltation or pollution of downstream watercourses, drains, ponds, tanks and reservoirs.

The Contractor shall regularly inspect, clean, maintain and, where necessary, modify or enlarge such erosion and sedimentation control measures to ensure their continued effectiveness, particularly during and following periods of rainfall.

No untreated or contaminated runoff, wastewater, slurry, concrete wash water, fuel, oil, chemicals or other construction-related pollutants shall be discharged into any natural watercourse or water body.

Any accumulated silt, sediment or construction waste shall be removed and disposed of at approved locations in accordance with applicable environmental requirements. Any damage, erosion, sedimentation or pollution resulting from the Contractor's operations shall be promptly controlled, cleaned up and rectified by the Contractor at his own cost to the satisfaction of the Engineer and the relevant authority, where applicable.

All costs associated with the design, provision, construction, operation, maintenance, cleaning, removal and reinstatement of erosion and sedimentation control measures shall be deemed to be included in the Contract Price.

## 50 CONSERVATION OF FAUNA AND FLORA

The Contractor shall plan and execute the Works in a manner that minimizes disturbance to existing fauna, flora, vegetation and natural habitats within and adjacent to the Site, to the extent reasonably practicable.

The Contractor shall not fell, cut, damage or remove any tree, shrub or other vegetation except where such removal is specifically required for the Permanent Works, approved Temporary

Works, access, excavation or other activities authorized under the Contract or by the Engineer and the relevant authority, where applicable.

Felling of trees or removal of vegetation for fuel, firewood or any other unauthorized use shall not be permitted. The Contractor shall not hunt, trap, capture, injure or intentionally disturb wildlife or otherwise undertake any activity that may unnecessarily harm fauna within or adjacent to the Site.

The Contractor shall protect trees and vegetation designated for retention from damage caused by construction Plant, equipment, storage, excavation or other operations and shall take appropriate protective measures as directed by the Engineer.

Where any tree or vegetation is damaged or removed without authorization as a result of the Contractor's operations, the Contractor shall, at his own cost, take appropriate remedial measures, including replacement or replanting where required, to the satisfaction of the Engineer and the relevant authority.

Upon completion of the Works, the Contractor shall restore disturbed areas and reinstate vegetation where required by the Contract or directed by the Engineer. All costs associated with compliance with this Clause shall be deemed to be included in the Contract Price.

## 51 FUEL AND CHEMICAL STORAGE

All fuel, oil, lubricants, chemicals and other hazardous substances shall be stored in designated areas approved by the Engineer and located on an **impervious and chemically resistant base** within a suitably bunded/embanked containment area. Storage areas shall be securely fenced or otherwise protected against unauthorized access and shall be located away from watercourses, drains, wetlands, groundwater recharge areas and other environmentally sensitive locations, as far as reasonably practicable.

The bund, base and containment walls shall be impermeable and shall have sufficient capacity to contain **not less than 110% of the capacity of the largest storage tank** within the containment area, or such greater capacity as may be required by applicable law or authority requirements. The containment area shall be maintained free from accumulated rainwater, fuel, oil and other contaminants.

Tanks, drums and containers shall be suitable for the substance being stored, securely positioned and protected against damage, overturning, leakage and unauthorized access. The contents of each tank, drum or container shall be clearly and durably labelled, including the name of the substance and, where applicable, relevant hazard warnings.

Filling, transfer and refueling operations shall be carried out only in designated areas under controlled conditions and in accordance with documented procedures. Appropriate supervision and spill-prevention measures shall be maintained during all such operations.

All valves, pumps, hoses, dispensing equipment and trigger guns shall be suitably protected against unauthorized interference, accidental operation and vandalism. Valves, trigger guns and other dispensing controls shall be turned off and securely locked when not in use.

Appropriate spill-control and emergency-response equipment, including suitable absorbent materials, spill kits and containment equipment, shall be readily available at all fuel and chemical storage and refueling areas. Personnel involved in handling hazardous substances shall be suitably trained in safe handling and spill-response procedures.

The Contractor shall take all necessary precautions to prevent leakage, spillage, seepage or discharge of fuel, oil, chemicals or other hazardous substances into the ground, drains, sewers, watercourses, wetlands or other water bodies

Any spill or leakage shall be immediately contained, cleaned up and safely disposed of by the Contractor in accordance with applicable environmental requirements. Contaminated soil or other materials shall be removed and disposed of at an approved location, and the affected area shall be restored to the satisfaction of the Engineer and the relevant authority, where applicable.

Storage areas, tanks, containers, bunds, valves, hoses and associated facilities shall be regularly inspected and maintained. Any defect, leakage or deterioration shall be promptly rectified.

The Contractor shall comply with all applicable laws, regulations, permits and requirements relating to the storage, handling, transportation and use of fuel, chemicals and other hazardous substances.

All costs associated with the provision, construction, operation, maintenance, inspection, security and removal of fuel and chemical storage facilities, including spill-prevention and emergency-response measures, shall be deemed to be included in the Contract Price.

## 52 WATER QUALITY

The Contractor shall take all necessary measures to prevent pollution, contamination or other interference with any surface water or groundwater resources, including watercourses, canals, drains, lakes, ponds, reservoirs and underground or percolating water, arising from or affected by the execution of the Works.

The Contractor shall ensure that his operations do not adversely affect any existing supply of, or abstraction from, water sources. Where any interference with an existing water supply or abstraction is unavoidable, the Contractor shall promptly notify the Engineer and shall take all necessary measures to maintain, protect or reinstate the affected supply or abstraction in accordance with the Contract and applicable requirements.

Areas where water is regularly or repeatedly used for dust suppression shall be suitably graded and drained to settlement tanks, sediment traps or other approved settling facilities to allow suspended particulate matter and sediment to settle. After adequate settling, the water may be reused for dust suppression where suitable and safe to do so.

All wastewater, liquid waste, contaminated water and other liquid discharges arising from the Site, construction activities, washing operations, equipment maintenance or other Contractor's operations shall be collected, contained, treated where necessary and disposed of at approved locations and in accordance with applicable environmental requirements, in a manner that does not cause nuisance, pollution or contamination.

The Contractor shall not discharge, deposit or allow any material, wastewater, slurry, sediment, fuel, oil, chemical or other pollutant arising from the execution of the Works to enter any watercourse, drainage system, groundwater, water body or other location unless specifically permitted by the Engineer and the relevant regulatory authority.

The Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes, ponds, reservoirs and similar water bodies from pollution, silting, obstruction, flooding, erosion and other adverse effects resulting from the execution of the Works

The Contractor shall provide and maintain suitable temporary drainage and water-management measures to control surface runoff and prevent uncontrolled discharge from the Site. Such measures shall include, as appropriate, surface channels, diversion drains, sediment traps, settlement tanks, washing/vehicle-cleaning basins, discharge pits and other necessary facilities.

Prior to commencing construction of the temporary drainage system, the Contractor shall submit to the Engineer for review and approval details of the proposed system, including its layout, capacity, discharge arrangements, surface channels, sediment traps, washing basins, settlement tanks and discharge pits, together with the proposed method of maintenance and cleaning.

The Contractor shall regularly inspect, clean, maintain and, where necessary, modify or increase the capacity of temporary drainage and water-quality control measures to ensure

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their continued effectiveness throughout the execution of the Works, particularly during and following rainfall.

Any pollution, contamination, silting, erosion or other adverse impact on water resources resulting from the Contractor's operations shall be immediately contained and rectified by the Contractor at his own cost, including removal and proper disposal of contaminated materials and reinstatement of affected areas, to the satisfaction of the Engineer and the relevant authority.

All costs associated with water-quality protection, temporary drainage, sediment control, collection, treatment, disposal, maintenance and reinstatement required under this Clause shall be deemed to be included in the Contract Price.

## 53 AIR QUALITY

The Contractor shall plan and execute the Works in a manner that minimizes dust, gaseous emissions, fumes and other airborne pollutants/emissions and shall take all reasonable measures to prevent or minimize adverse impacts on air quality.

Construction Plant, machinery and equipment, including bituminous hot-mix plants, concrete batching plants and other emission-generating facilities, shall be located, operated and maintained in accordance with applicable environmental requirements and, where practicable, at suitable distances from residential areas, agricultural activities, industrial establishments and other sensitive receptors.

The Contractor shall adopt effective dust-suppression measures during the handling, loading, unloading, processing and transportation of materials. Such measures shall include appropriate watering or other approved dust-control methods, particularly during dry, hot or windy weather. Stored materials shall be adequately dampened or otherwise protected where necessary to prevent wind-blown dust.

Stockpiles of fine, friable or otherwise dust-generating materials shall be located in sheltered or suitably enclosed areas, away from sensitive receptors and drainage paths. Where necessary, such stockpiles shall be covered with clean, securely fastened tarpaulins or equivalent approved covers and shall be dampened during dry and windy conditions.

Stockpiles of debris and demolition or construction waste shall be suitably contained and, where necessary, dampened before handling, loading or transportation, except where such dampening is incompatible with the material or the requirements of the Contract.

Vehicles with open load-carrying areas used for transporting potentially dust-generating materials shall have suitable sideboards and tailboards. Such materials shall not be loaded above the level of the sideboards or tailboard and shall be securely covered with clean and

their continued effectiveness throughout the execution of the Works, particularly during and following rainfall.

Any pollution, contamination, silting, erosion or other adverse impact on water resources resulting from the Contractor's operations shall be immediately contained and rectified by the Contractor at his own cost, including removal and proper disposal of contaminated materials and reinstatement of affected areas, to the satisfaction of the Engineer and the relevant authority.

All costs associated with water-quality protection, temporary drainage, sediment control, collection, treatment, disposal, maintenance and reinstatement required under this Clause shall be deemed to be included in the Contract Price.

## 53 AIR QUALITY

The Contractor shall plan and execute the Works in a manner that minimizes dust, gaseous emissions, fumes and other airborne pollutants/emissions and shall take all reasonable measures to prevent or minimize adverse impacts on air quality.

Construction Plant, machinery and equipment, including bituminous hot-mix plants, concrete batching plants and other emission-generating facilities, shall be located, operated and maintained in accordance with applicable environmental requirements and, where practicable, at suitable distances from residential areas, agricultural activities, industrial establishments and other sensitive receptors.

The Contractor shall adopt effective dust-suppression measures during the handling, loading, unloading, processing and transportation of materials. Such measures shall include appropriate watering or other approved dust-control methods, particularly during dry, hot or windy weather. Stored materials shall be adequately dampened or otherwise protected where necessary to prevent wind-blown dust.

Stockpiles of fine, friable or otherwise dust-generating materials shall be located in sheltered or suitably enclosed areas, away from sensitive receptors and drainage paths. Where necessary, such stockpiles shall be covered with clean, securely fastened tarpaulins or equivalent approved covers and shall be dampened during dry and windy conditions.

Stockpiles of debris and demolition or construction waste shall be suitably contained and, where necessary, dampened before handling, loading or transportation, except where such dampening is incompatible with the material or the requirements of the Contract.

Vehicles with open load-carrying areas used for transporting potentially dust-generating materials shall have suitable sideboards and tailboards. Such materials shall not be loaded above the level of the sideboards or tailboard and shall be securely covered with clean and

serviceable tarpaulins or other suitable covers. Covers shall be adequately secured to prevent the escape of dust and materials during transportation.

During periods of high wind, the Contractor shall suspend, modify or implement additional controls for dust-generating activities where necessary to prevent significant off-Site dust impacts, particularly within or adjacent to residential areas and other sensitive receptors.

All construction vehicles, Plant and machinery shall be maintained in good working order and shall be operated in accordance with the manufacturer's recommendations and applicable emission requirements. Engines shall be switched off when vehicles, Plant or machinery are not required to remain running for operational or safety reasons.

The Contractor shall take appropriate measures to minimize exhaust emissions from construction vehicles, Plant, machinery and temporary power-generation equipment. Details of proposed dust and emission-control measures shall be included in the Contractor's Environmental Management/Mitigation and Monitoring Plan submitted to the Engineer.

In residential areas and other sensitive locations, including schools, hospitals, nurseries and similar facilities, the Contractor shall take appropriate measures to minimize disturbance from dust, fumes and emissions. Where construction activities are likely to materially affect such areas, reasonable advance notice shall be given to the potentially affected persons or authorities, as appropriate, so that some measures can be taken by them before commencement of the works.

Any open vehicle used for transporting freshly mixed asphalt concrete for pavement or other works shall be provided with a full, securely fastened and suitable tarpaulin cover to minimize the release of fumes and emissions and to protect the material during transportation.

The Contractor shall comply with all applicable environmental laws, regulations, permits, standards and requirements relating to ambient air quality, dust, smoke, fumes and emissions. Where required by the Contract or relevant authority, the Contractor shall undertake appropriate air-quality monitoring and shall implement additional mitigation measures where monitoring indicates that applicable limits or requirements may be exceeded.

Any cost associated with dust suppression, emission control, covering of stockpiles and loads, maintenance of vehicles and Plant, environmental monitoring and other measures required under this Clause shall be deemed to be included in the Contract Price.

## 54 NOISE

The Contractor shall recognize noise and vibration as environmental and occupational health concerns and shall plan and execute the Works in a manner that minimizes noise and vibration

impacts on the surrounding environment, nearby properties, workers and other persons at or adjacent to the Site.

The Contractor shall use construction Plant, machinery and equipment that comply with applicable laws, standards, environmental requirements and manufacturer's recommendations relating to noise, vibration and emissions. All Plant and equipment shall be properly maintained and operated to minimize unnecessary noise and vibration.

The Contractor shall, as far as reasonably practicable, control noise and vibration **at source** through appropriate measures, including proper equipment selection and maintenance, acoustic enclosures or barriers, silencers, isolation, damping and suitable positioning of noisy Plant and equipment. The Contractor shall avoid unnecessary idling and shall switch off Plant, machinery and vehicles when not required for operational or safety reasons.

Noisy or vibration-generating activities shall, where reasonably practicable, be scheduled to minimize disturbance to nearby residential areas and other sensitive receptors such as schools, hospitals and similar facilities. Where applicable statutory restrictions or approved working-hour requirements exist, the Contractor shall comply with them.

The Contractor shall include details of proposed noise and vibration control measures in the Environmental Mitigation and Monitoring Plan submitted to the Engineer and shall implement such measures throughout the execution of the Works.

Where required by the Contract, applicable regulations or the Engineer, the Contractor shall undertake appropriate noise and vibration monitoring at representative locations and shall implement additional mitigation measures where monitoring indicates that applicable requirements or specified limits may be exceeded.

The Contractor shall promptly investigate and address any substantiated noise or vibration complaint arising from his operations and shall maintain records of significant complaints and corrective measures taken.

The Contractor shall comply with all applicable environmental, health and safety laws, regulations, standards and requirements relating to noise and vibration.

All costs associated with noise and vibration control, including equipment maintenance, barriers, enclosures, monitoring and other mitigation measures required under this Clause, shall be deemed to be included in the Contract Price.



## 55 SAMPLING

The Contractor shall, whenever required by the Contract or instructed by the Engineer, take representative samples of materials, products, Plant, workmanship or other items required for inspection and testing.

The Contractor shall provide, at his own cost, all necessary labour, qualified personnel, tools, sampling equipment, containers, packaging, labels, protective materials, transportation and other facilities required for the proper collection, identification, preservation, handling and delivery of samples to the approved Laboratory or such other laboratory or testing facility as directed by the Engineer.

Samples shall be representative of the material or work from which they are taken and shall be properly identified with the project name, material/product, source or supplier, location, relevant BOQ/Specification reference, date of sampling and sample identification number.

The Contractor shall ensure that samples are properly sealed, protected against contamination, deterioration or damage, and transported promptly under suitable conditions to preserve their integrity until testing.

Sampling, inspection or testing by or on behalf of the Engineer shall not relieve the Contractor of his responsibility for ensuring that all materials, Plant and Works comply with the requirements of the Contract.

All costs associated with sampling, handling, packaging, transportation and delivery of samples required for routine contractual testing shall be deemed to be included in the Contract Price.

## 56 PRESERVATION OF ARCHAEOLOGICAL, CULTURAL, RELIGIOUS ASSETS

The Contractor shall take all necessary precautions and measures to protect and preserve any archaeological, historical, cultural or religious assets, structures, sites, artefacts, antiquities or other items of heritage value encountered within or adjacent to the Site during execution of the Works, in accordance with applicable laws and the requirements of the Engineer.

Where any archaeological, historical, cultural or religious asset, antiquity or site is shown on the Drawings, identified in the Bidding Documents, or discovered during execution of the Works, the Contractor shall immediately notify the Engineer and shall take all necessary measures to prevent damage, disturbance, removal or deterioration thereof. Such assets shall be protected by suitable fencing, barriers, coverings or other protective measures to the satisfaction of the Engineer.



The Contractor shall not excavate, remove, relocate, damage, alter or otherwise interfere with any such asset without the prior written instruction of the Engineer and, where applicable, the approval of the competent authority. Where an unexpected archaeological find or antiquity is discovered, the Contractor shall immediately suspend the affected work in the vicinity of the find to the extent necessary to protect it and shall promptly notify the Engineer for further instructions.

Where access to any protected religious or cultural asset is required for worship, visitation or paying respects, the Contractor shall maintain safe and reasonable access at all times, unless otherwise directed by the Engineer or competent authority. Any unavoidable restriction of access shall be coordinated in advance and suitable alternative access shall be provided where practicable.

Any damage to archaeological, historical, cultural or religious assets caused by the Contractor, his Subcontractors, suppliers or personnel through negligence, omission or failure to comply with this Clause shall be repaired, restored or otherwise remedied at the Contractor's cost, to the satisfaction of the Engineer and the competent authority.

## 57 ENVIRONMENT ENHANCEMENT AND SITE RESPOTRATION

The Contractor shall take all necessary measures to maintain the Site, existing roads, access routes and areas affected by the Works in a clean, safe and orderly condition throughout the execution of the Works.

All existing highways, roads, streets, access roads and other routes used by vehicles of the Contractor, Subcontractors, suppliers or other personnel in connection with the Works, and any new roads or access routes forming part of the Works and being used by traffic, shall be kept free from dust, mud, debris and other extraneous materials deposited by vehicles, construction activities or the Works. Any such materials spreading onto or deposited on adjoining roads or public areas shall be removed immediately by the Contractor.

Clearance shall be carried out by manual sweeping and removal of debris or, where directed by the Engineer, by mechanical sweeping, washing or other suitable cleaning equipment. Dust, mud and debris shall be completely removed from road and access surfaces. Where necessary, the Contractor shall hose or water the affected surfaces using suitable equipment to control dust and maintain cleanliness.

Any damage to existing roads, pavements, kerbs, drains, footpaths, access routes or other public or private infrastructure caused by the Contractor's construction equipment, vehicles, operations or personnel shall be made good by the Contractor, at his own cost, to the satisfaction of the Engineer and the relevant authority or owner.

The Contractor shall prevent unnecessary disturbance, scarring, erosion or contamination of areas adjacent to the Works. On completion of the Works, all areas disturbed or affected by the Contractor's operations, including temporary access areas, working areas, storage areas and other temporary facilities, shall be properly cleared, graded, reinstated and, where appropriate, restored with suitable vegetation to the satisfaction of the Engineer.

The Contractor shall remove all construction debris, waste materials, discarded materials, packaging, surplus materials, contaminated soil and other extraneous materials arising from his operations. All such materials shall be transported to and disposed of at locations and by methods approved by the Engineer and in accordance with applicable environmental laws, regulations and requirements.

Where directed by the Engineer, the Contractor shall improve and reinstate any area affected by informal activities, unauthorized dumping, temporary storage, construction operations or other site-related disturbance by removing debris and contaminated materials, restoring the area to appropriate natural or approved ground levels, and re-establishing suitable vegetation or other surface treatment where appropriate. All debris and contaminated materials shall be disposed of off Site at approved disposal facilities, unless otherwise specifically approved in writing by the Engineer.

The Contractor shall promptly rectify any environmental damage, pollution, contamination, deterioration or unsatisfactory condition attributable to his operations, including those of his Subcontractors, suppliers or personnel, at his own cost and to the satisfaction of the Engineer and the relevant authority.

The works under this Clause shall neither be measured nor paid for separately. All costs associated with cleaning, sweeping, washing, watering, road protection, restoration, reinstatement, disposal, environmental enhancement and other obligations under this Clause shall be deemed to be included in the Contractor's quoted rates and the Contract Price.

In the event of the Contractor's failure to comply with any provision of this Clause, the Engineer may, after giving the Contractor reasonable notice where practicable, direct the Contractor to immediately undertake the necessary remedial measures. Where the Contractor fails to do so, the Employer may arrange for such measures to be undertaken and recover the reasonable actual cost thereof from monies due or becoming due to the Contractor, in accordance with the Conditions of Contract.



## 58 SITE OFFICES AND TEMPORARY FACILITIES FOR THE EMPLOYER / THE ENGINEER / THE ENGINEER'S REPRESENTATIVE / CONSULTANTS

Within fourteen (14) days of the Engineer's Notice to Commence the Works, or within such other period as directed by the Engineer, the Contractor shall provide, equip, furnish, operate and maintain suitable office accommodation and associated temporary facilities at the Site for the use of the Employer, the Engineer, the Engineer's Representative and their site staff.

The facilities shall be of adequate size, quality and standard for the proper administration, supervision, inspection, testing and management of the Works and shall be subject to the approval of the Engineer. The facilities may comprise properly equipped site offices, prefabricated buildings or steel containers, provided that they are suitably insulated, ventilated, air-conditioned, furnished and maintained.

The Contractor shall provide and maintain all necessary utilities and services, including electricity, water supply, sanitation, sewerage, internet connectivity, cleaning and janitorial services, office support and other facilities necessary for proper use of the offices throughout the Contract Period.

All such facilities shall be maintained in good, clean, safe and functional condition until completion of the Works, unless otherwise directed by the Engineer.

**Site Offices**

The Contractor shall provide two (2) fully furnished offices for the Engineer / Engineer's Representative / Consultants, each with adequate lighting, ventilation, air-conditioning, electrical outlets and other necessary services.

The offices shall include, as a minimum:

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|---|---|
| i. Tables | = 02 Nos. |
| ii. Revolving Chairs | = 02 Nos. |
| iii. Visitor Chairs | = 06 Nos. |
| iv. Notice Board | = 01 No. |
| v. Wall Clock | = 01 No. |
| vi. Reversible Air Conditioner (1.5 Ton Capacity) | = 02 Nos. |
| vii. File Racks | = 03 Nos. |
| vii. Attached Bath/Toilet (for the Engineer Office) | = 01 No |
| viii. Water Dispenser | = 01 No. |

The Contractor shall provide adequate electrical power, lighting, air-conditioning, internet connectivity and other services necessary for the effective operation of the offices.

a. **Record Room (Size 100 sq.ft min)**

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The Contractor shall provide a Record Room of not less than 100 sq. ft. for the storage and maintenance of project records, drawings, correspondence, reports and other documents. The Record Room shall be provided with, as a minimum:

| | |
|---|---|
| i. File Racks | = 04 Nos. |
| ii. Table | = 01 No. |
| iii. Revolving Chair | = 01 No. |
| iv. Visitor Chairs | = 02 Nos. |

The room shall be secure, adequately ventilated and air-conditioned or otherwise suitably protected from heat, moisture, dust and other conditions that may damage project records.

**b. Meeting Room (At least having size of 20' x 16')**

The Contractor shall provide a fully furnished Meeting Room of not less than 20 ft. × 16 ft., or such other size as approved by the Engineer, suitably equipped for project meetings, presentations and coordination activities. The Meeting Room shall include, as a minimum:

| | |
|---|---|
| i. Conference Table | = 01 No. |
| ii. Chairs | = 10 Nos. |
| iii. Wall Clock | = 01 No. |
| iv. Reversible Air Conditioner (2.0 Ton Capacity) | = 01 No. |
| v. White Board | = 01 No. |
| vi. Green Board | = 01 No. |
| vii. Multimedia Projector with Screen | = 01 No. |
| viii. Water Dispenser | = 01 No. |

**Computer and IT Facilities:**

The Contractor shall provide, operate and maintain the following computer and office equipment for the use of the Engineer / Engineer's Representative for the Contract Period:

c. **Provision of Laptop Computers** = 02 Nos.

Two (2) high-performance professional laptop computers, with current-generation processor, minimum 24 GB RAM, minimum 1 TB SSD storage, 16-inch or larger display, suitable graphics capability, Wi-Fi/Bluetooth connectivity and all necessary accessories, including operating system and standard productivity software.

Equivalent or superior equipment of any reputable manufacturer shall be acceptable, subject to the Engineer's approval.

d. **Provision of Desktop Computers** = 02 Nos.

Two (2) desktop computers with, as a minimum:

Intel Core i7 14th Generation or equivalent current-generation processor; 16 GB DDR5 RAM, 500 GB or larger NVMe SSD, 24-inch Full HD IPS LED Display, 650 VA or higher UPS, Windows 11 Pro licensed operating system, keyboard, mouse with all necessary accessories. Equivalent or superior equipment shall be acceptable, subject to the Engineer's approval.

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e. **A3 Multifunction Printer / Photocopier** = 01 No.

One (1) A3 multifunction printer/photocopier with printing, copying and scanning facilities, suitable for routine project office requirements, with necessary accessories and initial consumables. Panasonic (DP-8045)/Konica Minolta, equivalent or superior equipment shall be acceptable, subject to the Engineer's approval.

f. **Provision of Colour Printer (A3 Size)** = 01 No.

One (1) A3 colour printer with suitable printing speed, resolution and paper-handling capacity for project drawings, reports and documents, with necessary accessories and initial consumables. HP or equivalent, subject to the Engineer's approval.

All computer and office equipment shall be new, unused and of current commercially available models at the time of procurement, unless otherwise approved by the Engineer.

The Contractor shall provide necessary maintenance, repairs, replacement consumables and technical support for the equipment throughout the Contract Period for which the facilities are required.

g. **Transportation Facilities / (Vehicles)**

The Contractor shall provide, operate and maintain vehicles for the exclusive use of the Engineer / Engineer's Representative for transportation requirements directly related to administration, supervision, inspection and management of the Works.

The minimum transportation facilities shall comprise:

1. 01 No. Toyota Yaris, 1300 cc or above, automatic transmission, brand new/current model;
2. 01 No. Suzuki Cultus, 1000 cc or above, manual transmission, brand new/current model; and
3. 02 Nos. motorbikes, 125 cc, brand new/current model.

All vehicles shall be as approved by the Engineer. The vehicles shall be available from the date of the Engineer's Notice to Commence the Works and shall remain available throughout the Contract Period, including any approved Extension of Time where the services of the vehicles continue to be required.

The Contractor shall provide all fuel, lubricants, tyres, batteries, repairs, preventive maintenance, comprehensive insurance, registration, statutory requirements and other operating expenses, together with suitably licensed and experienced drivers where required.

The vehicles shall be maintained in clean, safe, reliable and roadworthy condition at all times. Any vehicle becoming unavailable due to breakdown, maintenance, accident or any other

reason shall be promptly repaired or replaced by an equivalent vehicle at the Contractor's cost.

The Contract Price shall be deemed to include fuel consumption up to 250 liters per month for each car and 60 liters per month for each motorcycle.

The use and operational deployment of the vehicles shall be under the direction and control of the Engineer / Engineer's Representative for Contract-related activities.

**Maintenance and Continuity of Facilities:**
The Contractor shall ensure uninterrupted availability of the offices, utilities, equipment, furniture and vehicles required under this Clause. Any defective, damaged, lost or unserviceable facility, equipment or vehicle shall be repaired or replaced promptly at the Contractor's cost.
The Contractor shall not withdraw, relocate, replace or materially reduce any facility provided under this Clause without the prior approval of the Engineer.

**Ownership and Provision:**
All facilities, equipment, furniture and vehicles provided under this Clause shall remain the property of the Contractor. The Contractor may procure or provide such facilities on a rental or lease basis, provided that this does not affect their availability, quality, performance or continuity of service.

**Cost and Payment:**
The Contractor shall include in his Bid all costs associated with the provision/facilities, installation, furnishing, operation, utilities, internet connectivity, maintenance, repair, replacement, fuel, insurance, drivers, consumables, transportation and eventual removal of the facilities and equipment specified under this Clause.

***No separate payment shall be made to the Contractor for any of the facilities or services specified under this Clause.***

## 59 COORDINATION WITH MEPCO AND PROVISION OF PERMANENT / DEDICATED ELECTRICITY CONNECTION

The Contractor shall coordinate and fully cooperate with the Multan Electric Power Company (MEPCO) and the Employer for obtaining and establishing the permanent electricity connection(s), feeders (two dedicated feeders from different Grid Stations) and associated electrical supply infrastructure required for the Project, in accordance with the approved electrical load, design and applicable MEPCO requirements.

The Contractor, on behalf of Employer, shall be responsible for submitting the application to MEPCO, providing the ownership/title and other documents required from the Employer, obtaining the Demand Notice and other statutory/utility approvals including but not limited to the Demand Notice amount, official connection charges, security deposit(s), statutory fees and other charges levied by MEPCO for provision of the permanent electricity connection(s) and feeders.

The Contractor shall, at his own cost, provide all necessary technical assistance, drawings, load details, supporting documents, coordination, site access, testing and other reasonable assistance required by the Employer and MEPCO for processing and execution of the permanent electricity connection. The Contractor shall also execute, at his own cost and within his contractual scope, all Works required for receiving, distributing and integrating the permanent electricity supply into the Project's electrical system, including all necessary interfaces, as specified in the Contract Documents.

The Contractor shall coordinate the sequence of his electrical Works with the Employer and MEPCO and shall provide timely assistance to facilitate connection and energization so that the permanent electricity supply is integrated into the Project without adversely affecting the approved programme and the Time for Completion, to the extent attributable to the Contractor.

For the avoidance of doubt, all Demand Notice amounts, official connection charges, security deposits, statutory fees and other charges levied by MEPCO for the permanent electricity connection(s) and feeders shall be paid directly by the Employer to MEPCO and shall not form part of the Contractor's Contract Price.

The Contractor shall not be entitled to any additional payment for the coordination, technical assistance, preparation of drawings and load details, testing, site access or other obligations expressly assigned to him under this provision, except where otherwise specifically provided in the Contract.

Nothing in this Clause shall relieve the Contractor of responsibility for completing, at his own cost, all permanent electrical Works falling within his contractual scope and necessary to receive, distribute, protect, control, test and integrate the permanent electricity supply into the Project.

## 60 PERMITS, APPROVALS AND STATUTORY REQUIREMENTS

The Contractor shall obtain and maintain, at his own cost, all permits, licences, approvals, certificates, inspections and clearances required by applicable laws, regulations and competent authorities for the execution, testing and commissioning of the Works, except those expressly stated under the Contract to be the responsibility of the Employer.

The Contractor shall comply with all applicable requirements of Government departments, local authorities, utility agencies, environmental authorities, Civil Defence/Rescue services and other competent authorities relevant to his Works, and shall provide all necessary technical documents, drawings, calculations, test reports and assistance required for such approvals and inspections.

The Contractor shall promptly notify the Engineer of any statutory requirement or approval that may affect the programme or execution of the Works and shall coordinate with the relevant authorities to avoid delay. The Contractor shall be responsible for any delay, cost or consequence arising from his failure to obtain, maintain or comply with permits, approvals or statutory requirements falling within his responsibility.

Any permits, approvals, statutory fees or charges expressly assigned to the Employer under the Contract shall be obtained or paid by the Employer. For avoidance of doubt, the specific provisions relating to the permanent electricity connection and MEPCO charges shall prevail in respect of such connection.

Copies of all permits, approvals, certificates and inspection records obtained by the Contractor shall be submitted to the Engineer and maintained as part of the project records.

All costs associated with the Contractor's permits, approvals, licences, inspections, statutory compliance and related requirements shall be deemed to be included in the Contract Price unless expressly provided otherwise in the Contract.

## 61 EMERGENCY PREPAREDNESS AND RESPONSE

The Contractor shall establish and maintain an appropriate Emergency Preparedness and Response Plan for the Site covering foreseeable emergencies and hazards associated with the Works, including fire, electrical incidents, flooding or water ingress, fuel or chemical spills, structural or construction accidents, major equipment failure, severe weather and other relevant emergencies.

The Contractor shall provide and maintain suitable emergency arrangements, including emergency communication, first-aid facilities, fire-fighting equipment, emergency lighting, safe access and escape routes, evacuation arrangements, emergency contact information and other resources necessary for prompt response.

The Contractor shall ensure that all personnel are suitably briefed and trained in applicable emergency procedures and shall conduct emergency drills where reasonably required by the Engineer or applicable authorities.

The Contractor shall immediately notify the Engineer of any serious accident, fire, major equipment failure, hazardous-material incident, significant environmental incident or other emergency affecting the Works, Site or persons, and shall take immediate measures to protect life, property and the Works and to control and mitigate the consequences.

The Contractor shall coordinate emergency response arrangements with the Employer, Engineer, relevant utility agencies and competent emergency services, as applicable. Following any emergency, the Contractor shall promptly investigate the incident, implement necessary corrective measures and submit an incident report to the Engineer.

All costs associated with emergency preparedness, response arrangements, training, drills, equipment and related measures required under this Clause shall be deemed to be included in the Contract Price.

## 62 TESTING, COMMISSIONING AND INTEGRATED SYSTEMS TESTING

The Contractor shall be responsible for the complete testing, pre-commissioning, commissioning and performance verification of all Works, Plant, equipment and systems in

accordance with the Contract, Technical Specifications, Drawings, approved Method Statements, applicable Codes and Standards and manufacturers' recommendations.

The Contractor shall prepare and submit a comprehensive Testing and Commissioning Plan for the Engineer's review, identifying the sequence, procedures, test requirements, acceptance criteria, test instruments, responsible personnel and required records for all major systems.

Testing shall include, as applicable, Factory Acceptance Tests (FAT), Site Acceptance Tests (SAT), individual equipment testing, functional and performance testing, pre-commissioning and commissioning of the Civil/Structural, Electrical, HVAC, Firefighting, Plumbing/Sewerage, ICT/Networking and other systems forming part of the Works.

The Contractor shall construct, install, test and commission the Works in accordance with the Employer's Drawings, Specifications and other Contract Documents so as to achieve the specified fault-tolerant and resilient Data Centre configuration corresponding to Rated IV requirements. The critical infrastructure shall incorporate the specified dual active/redundant paths and systems-level redundancy, including 2N, N+N or equivalent configurations, as applicable to the power, cooling and telecommunications systems.

The Contractor shall ensure that the required physical and functional segregation/compartmentalization of critical electrical, mechanical, telecommunications and associated architectural zones and distribution paths is properly implemented in accordance with the Contract Documents. The specified DCIM/BMS monitoring and control systems shall be fully integrated, configured, tested and commissioned to provide the required monitoring, control, alarm, operational visibility, security, maintainability and system resiliency.

Following successful commissioning of individual systems, the Contractor shall carry out comprehensive Integrated Systems Testing (IST) to demonstrate that the interfaced systems operate together correctly under normal, abnormal and emergency conditions. The IST shall include, as applicable, demonstration and simulation of single-fault conditions, power failure and restoration, automatic changeover, redundancy transfer, alarm, protection, control, monitoring, cooling response and other specified operating scenarios, in order to demonstrate that a single fault in a critical component, equipment or distribution path does not interrupt the critical operation of the Data Centre or compromise the required redundancy.

Compliance with the specified fault tolerance, redundancy and resiliency requirements shall be demonstrated for the complete integrated critical infrastructure and distribution architecture. The mere installation of individual redundant components or equipment shall not, by itself, constitute compliance with the specified requirements.

The Contractor shall demonstrate, through inspection, FAT, SAT, site testing, integrated systems testing, commissioning and other verification procedures specified in the Contract that the completed Works conform to the specified fault-tolerance, redundancy, resiliency and Rated IV requirements.

The Contractor shall obtain and submit the required independent certification/assessment of the completed Data Centre Facility, in accordance with the requirements of the Contract, confirming conformity of the implemented Works with the specified Rated IV requirements, or such internationally recognized equivalent certification as may be expressly accepted by the Employer. The Contractor shall provide all necessary coordination, documentation, testing records and assistance required for such certification/assessment.

The Contractor shall provide all necessary labour, specialist personnel, testing equipment, calibrated instruments, temporary arrangements, consumables and other resources required for testing, commissioning and Integrated Systems Testing. All tests shall be witnessed by the Engineer/Employer where required, and complete test results, certificates, commissioning records, IST records and reports shall be submitted for review

Any failure, defect or non-conformity identified during testing, commissioning, Integrated Systems Testing or certification/assessment shall be rectified by the Contractor at his own cost, and the affected equipment, system or integrated system shall be retested until the specified acceptance criteria are achieved.

No system or facility shall be considered successfully commissioned until the applicable testing, performance verification, Integrated Systems Testing and, where required, independent certification/assessment have been satisfactorily completed and accepted in accordance with the Contract.

The Contractor shall remain responsible for the proper execution, installation, testing, commissioning and integration of the Works notwithstanding any inspection, witnessing, review, certification or acceptance by the Engineer/Employer.

All costs associated with testing, pre-commissioning, commissioning, Integrated Systems Testing, retesting, certification/assessment, documentation and related activities shall be deemed to be included in the Contract Price.

## 63 OPERATION AND MAINTENANCE MANUALS, TRAINING AND HANDOVER

The Contractor shall prepare and submit comprehensive Operation and Maintenance (O&M) Manuals covering all Plant, equipment, systems and Works forming part of the Contract, including Civil/Structural, Electrical, HVAC, Firefighting, Plumbing/Sewerage, ICT/Networking and other specialist systems.

The O&M Manuals shall include, as applicable, manufacturer's manuals, equipment schedules, operating procedures, preventive and corrective maintenance requirements, troubleshooting procedures, recommended spare parts and consumables, warranties, test and commissioning records, calibration certificates, approved as-built drawings and other information necessary for proper operation and maintenance of the facility.

The Contractor shall submit draft O&M Manuals sufficiently in advance of commissioning for the Engineer's review and shall incorporate the Engineer's comments. Final approved O&M Manuals shall be submitted before Taking-Over in the number and format specified by the

Engineer, including hard copies and electronic copies in searchable PDF and, where applicable, native/editable formats.

The Contractor shall provide practical training to the Employer's designated personnel for the operation, monitoring, maintenance, troubleshooting and emergency procedures of the relevant systems. The training shall be conducted by suitably qualified Contractor, Subcontractor or manufacturer's personnel and shall include demonstrations and relevant training materials.

The Contractor shall submit a Handover and Close-Out Plan and shall ensure that all required inspections, tests, commissioning, training, documentation, as-built drawings, warranties, certificates, spare parts and other contractual handover requirements are completed before Taking-Over, except for items expressly permitted under the Contract.

The Contractor shall rectify any deficiencies identified during the handover process and shall provide the Employer with all information and assistance reasonably required for safe and effective operation and maintenance of the completed Works.

All costs associated with preparation and updating of O&M Manuals, training, demonstrations, handover documentation and related activities shall be deemed to be included in the Contract Price.

## 64 WARRANTIES, GUARANTEES AND AFTER-SALES SUPPORT

The Contractor shall provide all warranties, guarantees and certificates required under the Contract for the Works, Plant, equipment, materials and systems supplied or installed under the Contract. Such warranties shall be in the name of the Employer and shall be submitted before Taking-Over, unless otherwise specified in the Contract.

The Contractor shall obtain and pass on to the Employer all applicable manufacturer's and supplier's warranties and shall remain responsible for coordinating and enforcing such warranties throughout their applicable periods.

For critical and specialist equipment and systems, including Electrical, HVAC, Firefighting, UPS, batteries, generators, control and monitoring systems, ICT/Networking and other DRDC equipment, the Contractor shall ensure the availability of adequate technical support, qualified service personnel, spare parts and after-sales services in Pakistan for the applicable warranty period.

The Contractor shall promptly attend to any defect, failure or malfunction covered by the applicable warranty and shall repair, replace or rectify the affected item at no additional cost to the Employer, in accordance with the Contract and applicable warranty requirements.

Where a defective item is replaced under warranty, the replacement shall be of equal or superior quality and performance and shall carry the applicable warranty for the period specified in the Contract.

The Contractor shall submit warranty certificates, manufacturer's contact details, service arrangements, response procedures and other relevant warranty documentation as part of the handover documentation.

The Contractor's warranty and after-sales support obligations shall be in addition to, and shall not limit, any other obligations or liabilities of the Contractor under the Contract.

All costs associated with obtaining, administering and fulfilling the Contractor's warranty and after-sales support obligations shall be deemed to be included in the Contract Price.

## 65 WARRANTIES EXCEEDING ONE YEAR OF DEFECTS LIABILITY PERIOD

Where any Plant, equipment, material, component or system supplied or installed under the Contract is subject to a manufacturer's or supplier's warranty extending beyond the Defects Liability Period, the Contractor shall obtain such warranty in the name of the Employer and shall ensure that it remains valid and transferable to the Employer for the full applicable warranty period.

The Contractor shall provide all warranty certificates, manufacturer's documentation, contact details and other information necessary for the Employer to enforce such extended warranties. The Contractor shall also provide reasonable assistance to the Employer in lodging and pursuing warranty claims during the applicable warranty period.

Expiry of the Defects Liability Period or issuance of the relevant Performance Certificate shall not relieve the Contractor of any specific warranty obligation that expressly extends beyond the Defects Liability Period under the Contract.

Where a defect or failure covered by such extended warranty occurs, the Contractor shall, upon notification by the Employer, coordinate with the manufacturer or supplier and facilitate the repair or replacement of the affected item in accordance with the applicable warranty, without additional cost to the Employer to the extent covered by such warranty.

All costs associated with obtaining, documenting and transferring such warranties and providing the assistance specified under this Clause shall be deemed to be included in the Contract Price.

## 66 INVENTORY OF SPARES, SPECIAL TOOLS AND CONSUMABLES

The Contractor shall prepare and submit an inventory of all recommended spare parts, special tools, testing equipment, maintenance tools and consumables required for the proper operation and maintenance of the Works and all Plant, equipment and systems provided under the Contract.

The inventory shall identify, as applicable, the item description, manufacturer, model/reference number, quantity, recommended service interval, expected service life and source of supply. Particular attention shall be given to critical and specialist equipment and systems, including

Electrical, HVAC, Firefighting, UPS, batteries, generators, control and monitoring systems, ICT/Networking and other DRDC systems.

Where the Contract or Technical Specifications require specific spare parts, special tools or consumables to be supplied as part of the Works, the Contractor shall procure and deliver them in new and unused condition, properly identified, packaged and stored in suitable conditions.

The Contractor shall submit the inventory and proposed quantities to the Engineer for review sufficiently in advance of procurement. All supplied spare parts, special tools and consumables shall be handed over to the Employer with the relevant manufacturer's documentation and shall be recorded in the final asset/handover records.

Unless expressly provided otherwise in the Contract or BOQ, all costs associated with the preparation of inventories and the supply of any specified spare parts, special tools and consumables shall be deemed to be included in the Contract Price.

## 67 PAYMENT FOR WORK REQUIRED BY SPECIAL PROVISIONS

Unless otherwise expressly provided or specifically stated in the Contract, all Works, materials, labour, Plant, equipment, temporary facilities, services, testing, inspection, protection, restoration and other requirements arising from or required under the Special Provisions shall be deemed to be included in the Contract Price and the Contractor's quoted rates.

No separate measurement or payment shall be made for such requirements unless expressly provided for elsewhere in the Contract or BOQ.

## 68 MANDATORY ONE-YEAR OPERATIONS, MAINTENANCE, WARRANTY MANAGEMENT & SERVICE LEVEL AGREEMENT (O&M/SLA)

The Contractor shall, as an integral and mandatory part of the Contract, provide comprehensive Operations, Maintenance, Warranty Management and Service Level Agreement (O&M/SLA) Services for a period of one (01) year / 365 calendar days, commencing from the date of issuance of the Taking-Over Certificate under Sub-Clause 48.1 for the whole of the Works.

The Contractor shall remain the single point of contractual and operational responsibility for the O&M/SLA Services during the entire Service Period. The O&M/SLA Services shall cover the Data Center and all associated systems, equipment and infrastructure supplied, installed, tested and commissioned under the Contract, including electrical systems, UPS and batteries, generators and ATS/AMF, precision HVAC/cooling systems, firefighting systems, DCIM/BMS,

CCTV/VSS, access control, racks/intelligent PDUs and other associated systems and facilities specified in the Contract.

The Contractor shall provide 24×7×365 O&M coverage, including operation and monitoring, preventive and corrective maintenance, fault diagnosis, incident response and service restoration, OEM coordination and warranty claims/management, repair/replacement of defective components, critical spares, routine maintenance consumables, and all related reporting and documentation necessary to maintain the required availability, reliability and redundancy of the Data Center.

The Contractor shall maintain, as a minimum deployment requirement, the O&M manpower specified in the Contract, including six (06) technical Resident Engineers and an O&M Supervisor, together with required facility support staff and adequate relievers/substitutes to ensure continuous 24×7 coverage. The six technical Resident Engineers shall provide three-shift coverage with, as a minimum, one HVAC and one Electrical Resident Engineer onsite during each shift. The Contractor shall deploy additional manpower where necessary to fulfil its contractual O&M/SLA obligations.

The Contractor shall carry out OEM-compliant preventive and corrective maintenance in accordance with the maintenance schedules, procedures and requirements specified in the Contract. All applicable OEM/manufacturer warranties, support entitlements, licences and subscriptions shall, where applicable, be registered in the name of the Employer (PITB) as the end customer/end user and warranty beneficiary. The Contractor shall administer, coordinate and pursue all warranty claims during the O&M/SLA Service Period and shall not charge separately for any item already covered by the Contract or applicable OEM warranty/support entitlement.

The Contractor shall maintain the approved critical spare inventory and minimum stock levels throughout the O&M/SLA Service Period. Upon approval, supply and acceptance, the initial critical spare inventory shall become the property of the Employer (PITB) and shall be retained at the DRDC. Where a failed component is replaced under an OEM warranty, the Contractor shall utilize the applicable OEM entitlement and ensure replenishment of the critical spare inventory so that the approved minimum stock levels are maintained and the required inventory is available to the Employer (PITB) at the end of the O&M/SLA Service Period.

The O&M/SLA Service Price shall include all costs, expenses, overheads, manpower, relievers, consumables, routine maintenance, warranty management, repairs/replacements, critical spares and other obligations necessary to perform the Services in accordance with the Contract, except for items expressly identified in the Contract as excluded from the Contractor's obligations.

The Contractor shall comply with the incident classification, response, restoration and permanent resolution times, SLA measurement methodology, service deductions, root cause analysis (RCA), reporting and record-keeping requirements, training obligations, and transition/final O&M handover requirements specified in the Contract.

The Contractor shall submit monthly and quarterly O&M/SLA reports and maintain complete records of manpower deployment, preventive and corrective maintenance, incidents and faults, SLA performance, OEM/warranty claims, critical spares, consumables, repairs/replacements, RCA and pending issues. At the end of the O&M/SLA Service Period, the Contractor shall complete the required O&M close-out and transition handover to the Employer (PITB), including all applicable records, maintenance history, warranty information, open claims, spare inventory, configurations, manuals and other documents specified in the Contract.

The mandatory O&M/SLA Services shall be additional to and shall not replace, reduce or limit the Contractor's obligations under Clause 49 (Defects Liability Period). The O&M/SLA Service Period shall run concurrently with the Defects Liability Period, unless otherwise expressly provided in the Contract.

The price of the mandatory Year-1 O&M/SLA Services shall be separately identified in the Bill of Quantities, shall form part of the Accepted Contract Amount, and shall be paid quarterly in arrears in accordance with Sub-Clause 60.1.

The Year-1 O&M/SLA Service Price shall be firm and fixed throughout the O&M/SLA Service Period and shall not be subject to price adjustment under Sub-Clause 70.

The Contractor shall comply with the detailed O&M/SLA requirements, including manpower deployment, maintenance schedules, SLA service levels, incident classification, deductions/service credits, critical spare inventory, consumables, reporting, training and transition requirements specified in the Contract.

## 69 RELATIONSHIP OF O&M SERVICES WITH DEFECTS LIABILITY PERIOD

The mandatory one (01) year Operations, Maintenance and Service Level Agreement (O&M/SLA) Service Period shall run concurrently with the Defects Liability Period of 365 days commencing from the date of the Taking-Over Certificate.

The O&M/SLA obligations are additional to and shall not replace, reduce or limit any obligation of the Contractor under Clause 49 of the Conditions of Contract relating to the completion of outstanding Works and remedying of defects.

The Contractor shall remain responsible for the proper operation, maintenance, repair and service restoration of the Data Center infrastructure throughout the O&M Service Period,

irrespective of whether the relevant defect, failure or malfunction is covered by an OEM warranty, provided that the Contractor shall utilize and administer all applicable OEM warranty entitlements without duplicate payment to the Employer.

Expiry of the O&M Service Period shall not affect any OEM/manufacturer warranty or other warranty obligation that expressly extends beyond the Defects Liability Period.



# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTRE AT PITB MULTAN
# VOLUME 3 (B1)

## TECHNICAL SPECIFICATIONS – FOR WORKS



# DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

## SECTION 00 01 00 - DOCUMENT CONTROL AND TENDER BASIS

| Item | Requirement |
|---|---|
| Document | PITB Multan - Technical Specifications |
| Revision | Issued for Tender |
| Basis | Original PITB Multan technical specifications reorganized and technically standardized into CSI/MasterFormat-style Divisions and Sections in numerical order using Part 1 / Part 2 / Part 3 format, with the approved networking specifications integrated into Divisions 27 and 28, the issued electrical technical update incorporated into Division 26, the PAC/HVAC specifications incorporated into Division 23, and cross-reference notes added where subject matter is specified under another functional Division rather than as a standalone Section. |
| Primary standards policy | SCC 5.2 governs Contract Document precedence. Within these Technical Specifications, American standards are the default technical reference; BS/EN/IEC standards are used only where expressly stated, required by the serving utility/AHJ, or adopted as a complete approved system. |
| Units | SI units govern. Inch-pound units may be shown parenthetically for reference. |
| Design coordination | Tender drawings, BOQ, geotechnical information, fire strategy, SLDs/studies, hydraulic calculations, approved network design and authority requirements govern project-specific design values and shall be coordinated with these Specifications. |
| Status | ISSUED FOR TENDER |

### 1.01 DOCUMENT STATUS

These Technical Specifications are issued for tender and form part of the Contract Documents for PITB Multan. They shall be read together with the tender drawings, Bill of Quantities, schedules, geotechnical information, fire and life-safety design criteria, electrical single-line diagrams/studies, hydraulic calculations and applicable authority requirements.

### 1.02 TECHNICAL BASIS

The specification uses Pakistan statutory and Authority Having Jurisdiction requirements as mandatory local constraints and an American-standards-first technical basis. BS, BS EN, EN and IEC standards are used only where expressly stated, where no directly applicable American standard is available, or where required by the serving utility/AHJ or a complete approved IEC/EN product system. Requirements from different product-standard families shall not be mixed unless compatibility is demonstrated and approved.



## 1.03 SCOPE APPLICABILITY

A technical Section applies where the related work is shown, scheduled, described in the BOQ, required by the Contract Documents, or necessary for a complete and operational installation. Inclusion of a Section does not by itself authorize a change in project scope; omissions or conflicts shall be raised during the tender clarification period.

## 1.04 DESIGN-DEPENDENT REQUIREMENTS

Where a numerical requirement depends on final structural design, geotechnical exposure, occupancy or fire hazard, hydraulic demand, utility fault level, environmental conditions, equipment selection or authority approval, the value shown on the tender drawings/schedules or established by the specified design calculation shall govern. The Contractor shall not assume a less stringent value without written approval.



## SECTION 00 01 10 - TABLE OF CONTENTS

Section register for the Tender Issue. Section numbers and titles are contractual identifiers and shall be used in submittals, method statements, RFIs and inspection records.


| Division / Section | Title / Status |
|---|---|
| **DIVISION 00** | **PROCUREMENT AND CONTRACTING REQUIREMENTS** |
| 00 01 00 | Document Control And Tender Basis |
| 00 01 10 | Table Of Contents |
| 00 01 20 | CSI/MasterFormat Nomenclature and Reading Guide |
| **DIVISION 01** | **GENERAL REQUIREMENTS** |
| 01 00 00 | General Requirements, Standards And Precedence |
| 01 42 19 | Reference Standards Register |
| **DIVISION 02** | **EXISTING CONDITIONS** |
| 02 41 00 | Site Clearance And Setting Out |
| **DIVISION 03** | **CONCRETE** |
| 03 15 13 | Waterstops |
| 03 16 00 | Water-Retaining Concrete Structures |
| 03 20 00 | Concrete Reinforcing |
| 03 30 00 | Cast-In-Place Concrete |
| 03 35 00 | Concrete Flooring And Screeds |
| **DIVISION 04** | **MASONRY** |
| 04 20 00 | Unit Masonry |
| **DIVISION 05** | **METALS** |
| 05 50 00 | Metal Fabrications |
| **DIVISION 06** | **WOOD, PLASTICS, AND COMPOSITES** |
| 06 20 00 | Finish Carpentry, Woodwork And Wood Doors |
| **DIVISION 07** | **THERMAL AND MOISTURE PROTECTION** |
| 07 10 00 | Damp-Proofing, Roofing And Waterproofing |
| 07 21 13 | Rigid Polystyrene Insulation |
| 07 42 43 | Aluminum Composite Panels |
| **DIVISION 08** | **OPENINGS** |
| 08 40 00 | Aluminum Doors, Windows, Curtain Walls And Glazing |
| **DIVISION 09** | **FINISHES** |
| 09 24 00 | Portland Cement Plastering |
| 09 30 13 | Ceramic And Porcelain Tiling |
| 09 63 40 | Stone And Marble Tiling |
| 09 91 00 | Painting And Polishing |
| 09 97 00 | Specialty Textured Coatings |
| **DIVISION 10** | SPECIALTIES - NO STANDALONE SECTION; REFER TO SECTION 22 40 00 AND DIVISION 21 WHERE APPLICABLE |
| **DIVISION 11** | EQUIPMENT - NO STANDALONE SECTION; REFER TO DIVISIONS 21, 23, 26, 27 AND 28 |
| **DIVISION 12** | FURNISHINGS - NO STANDALONE SECTION; REFER TO DIVISION 27 AND SECTION 28 20 00 WHERE APPLICABLE |


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| Division / Section | Title / Status |
|---|---|
| **DIVISION 13** | SPECIAL CONSTRUCTION - NO STANDALONE SECTION; REFER TO SECTION 23 81 23 AND DIVISIONS 26, 27 AND 28 |
| **DIVISION 14** | CONVEYING EQUIPMENT - NOT APPLICABLE TO THIS VOLUME |
| **DIVISION 15** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 16** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 17** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 18** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 19** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 20** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 21** | **FIRE SUPPRESSION** |
| 21 13 00 | Water-Based Fire Suppression Systems |
| 21 22 00 | Clean-Agent Fire Suppression - FK-5-1-12 |
| **DIVISION 22** | **PLUMBING** |
| 22 05 00 | Common Work Results For Plumbing |
| 22 11 16 | Domestic Water Piping - Galvanized Steel And PP-R |
| 22 13 16 | Sanitary Waste And Vent Piping |
| 22 40 00 | Plumbing Fixtures And Accessories |
| **DIVISION 23** | HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) |
| 23 34 00 | HVAC Fans |
| 23 81 23 | Computer Room Air-Conditioning Units (Precision Air Conditioning) |
| 23 81 26 | Split-System Air-Conditioners (Comfort Air Conditioning) |
| **DIVISION 24** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 25** | INTEGRATED AUTOMATION - NO STANDALONE SECTION; REFER TO SECTIONS 21 22 00, 23 81 23, 26 32 13, 26 33 13 AND DIVISION 27 |
| **DIVISION 26** | **ELECTRICAL** |
| 26 05 00 | Common Work Results for Electrical |
| 26 05 13 | Medium-Voltage Cables and Accessories |
| 26 05 19 | Low-Voltage Conductors and Cables |
| 26 05 26 | Grounding and Bonding |
| 26 05 33 | Raceways and Boxes |
| 26 11 00 | MV/LV Distribution Network and Switchgear |
| 26 24 13 | Low-Voltage Switchboards and Panelboards |
| 26 27 26 | Wiring Devices |
| 26 29 23 | Variable-Frequency Drives and Harmonic Control |
| 26 32 13 | Engine Generators (Diesel Generating Sets) and Fuel Systems |
| 26 33 13 | Uninterruptible Power Supply (UPS) Systems and VRLA Batteries |
| 26 36 00 | Automatic Transfer Switches and Generator Paralleling Switchgear |
| 26 41 00 | Lightning Protection System |
| 26 51 00 | Interior and Emergency Lighting |
| 26 56 13 | Exterior Lighting Poles |

Engineering Consultancy Services Punjab (Pvt) Ltd. ECSP

| Division / Section | Title / Status |
|---|---|
| **DIVISION 27** | **COMMUNICATIONS** |
| 27 10 00 | Structured Cabling And Intelligent Patching |
| 27 21 00 | Network Switches And Wireless LAN |
| 27 21 30 | Enterprise Storage - Hard Disk Drives |
| **DIVISION 28** | **ELECTRONIC SAFETY AND SECURITY** |
| 28 13 00 | Access Control System |
| 28 20 00 | IP CCTV System And Network Video Recording |
| 28 31 00 | Fire Detection And Alarm |
| **DIVISION 29** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 30** | RESERVED - NOT USED IN THIS VOLUME |
| **DIVISION 31** | **EARTHWORK** |
| 31 20 00 | Earth Moving |
| 31 23 19 | Dewatering |
| 31 23 33 | Utility Trenching And Backfill |
| 31 31 16 | Termite Control |
| **DIVISION 32** | **EXTERIOR IMPROVEMENTS** |
| 32 01 16 | Pavement Restoration |
| 32 14 00 | Unit Paving And Parking Areas |
| 32 90 00 | LANdscaping |
| **DIVISION 33** | **UTILITIES** |
| 33 05 13 | Utility Bedding |
| 33 11 00 | Water Utility Distribution - HDPE |
| 33 24 00 | Water Wells |
| 33 31 00 | Sanitary Sewerage - Reinforced Concrete Pipe |
| 33 39 13 | Sanitary Sewer Structures And Manholes |
| 33 40 00 | Stormwater Drainage |



## SECTION 00 01 20 - CSI/MASTERFORMAT NOMENCLATURE AND READING GUIDE

### PART 1 - GENERAL

1.01 PURPOSE

This Section is an explanatory navigation guide only. It explains how the CSI/MasterFormat-style numbering and the internal article structure used in this Volume are read. It does not change scope, technical requirements, or the order of precedence established by SCC Sub-Clause 5.2.

1.02 HOW TO READ A SIX-DIGIT SECTION NUMBER

CSI/MasterFormat organizes construction information by work result. Section identifiers are written as three pairs of digits: XX YY ZZ. The number is an information-classification code, not a priority ranking.

| Element | Meaning | Example | How to Read It |
|---|---|---|---|
| XX | Division | 03 | Division 03 - Concrete. The first pair identifies the broad family of work. |
| YY | Subject / work-result group within the Division | 30 | Within Division 03, 30 narrows the subject to cast-in-place concrete. |
| ZZ | More specific Section identifier | 00 or 26 | 00 commonly denotes a broader section at that level; a non-zero pair identifies a more specific work result. |

1.03 WORKED EXAMPLES

- **03 30 00 - CAST-IN-PLACE CONCRETE** - 03 = Concrete; 30 = Cast-in-Place Concrete subject; 00 = broad project Section for that subject.

23 81 23 - COMPUTER ROOM AIR-CONDITIONING UNITS - 23 = HVAC; 81 = decentralized/unitary HVAC equipment subject; 23 = the computer-room precision air-conditioning work result.

- **26 05 26 - GROUNDING AND BONDING** - 26 = Electrical; 05 = common electrical work results; 26 = the specific grounding and bonding Section.
- **27 21 00 - NETWORK SWITCHES AND WIRELESS LAN** - 27 = Communications; 21 = data communications/networking subject; 00 = the project Section covering network switches and wireless LAN.
- **28 13 00 - ACCESS CONTROL SYSTEM** - 28 = Electronic Safety and Security; 13 = access-control subject; 00 = the project access-control Section.

1.04 DIVISIONS AND "NOT APPLICABLE"

Division headings group related Sections in numerical order. A skipped Division is not automatically outside the project scope. This Volume uses the status statements below so the reader can distinguish between work that is genuinely not applicable, work that is specified under another functional Division, and MasterFormat Divisions that are formally reserved.

- NOT APPLICABLE - No standalone technical requirement for that Division is presently specified in this Volume. This does not override work expressly required by higher-priority Contract Documents under SCC Sub-Clause 5.2.
- NO STANDALONE SECTION - REFER TO... - The subject matter exists in the Works, but its requirements are intentionally specified under the cited functional Division(s)/Section(s).
- RESERVED - The Division number is reserved in CSI/MasterFormat and is intentionally not used for technical Sections in this Volume.

1.05 HOW EACH TECHNICAL SECTION IS ORGANIZED

| Part | What It Contains |
|---|---|
| PART 1 - GENERAL | Scope/summary, references, submittals, |

| | |
|---|---|
| | quality assurance, coordination and administrative requirements specific to that Section. |
| PART 2 - PRODUCTS | Materials, equipment, components, performance requirements, fabrication and product quality. |
| PART 3 - EXECUTION | Examination, preparation, installation, workmanship, testing, field quality control, commissioning and acceptance. |

1.06 ARTICLE AND PARAGRAPH NUMBERING

- 1.01, 1.02, 1.03, etc. are Articles within PART 1 - GENERAL.
- 2.01, 2.02, etc. are Articles within PART 2 - PRODUCTS.
- 3.01, 3.02, etc. are Articles within PART 3 - EXECUTION.
- 3.90 is used in this Volume as a project convention for field quality control, testing and acceptance requirements.
- Bullets beneath an Article are subordinate requirements of that Article and are mandatory unless the wording expressly makes them conditional.

1.07 HOW TO USE SECTION NUMBERS IN PROJECT ADMINISTRATION

Use the full six-digit Section number and title when preparing material submittals, method statements, Inspection and Test Plans, RFIs, test records, nonconformance reports and as-built documentation. Example: "RFI - 26 05 26 Grounding and Bonding - Main Earth Grid Resistance." This allows all parties to trace a requirement to the same location in the Contract Documents.

1.08 PRECEDENCE

Numerical order does not establish contractual priority. Where requirements conflict between Contract Documents, SCC Sub-Clause 5.2 governs the order of precedence. A bidder or Contractor shall not select the less stringent requirement solely because its Section number appears earlier or later in this Volume.



# DIVISION 01 - GENERAL REQUIREMENTS

## SECTION 01 00 00 - GENERAL REQUIREMENTS, STANDARDS AND PRECEDENCE

PART 1 - GENERAL

1.01 ORDER OF PRECEDENCE - SCC 5.2

The order of precedence of the Contract Documents shall be governed exclusively by SCC Sub-Clause 5.2. This Section does not create a separate or competing order of precedence. The SCC 5.2 order shall be read as follows:

- Contract Agreement.
- Letter of Acceptance.
- Forms of Bid.
- Special Stipulations.
- Special Conditions of Contract - Part II (the document referred to in SCC 5.2 as the Particular Conditions of Contract - Part II).
- Conditions of Contract - Part I.
- Priced Bill of Quantities.
- Appendices.
- Drawings.
- Specifications, including this Volume III.

1.02 CONTRACT DOCUMENT TERMINOLOGY

For consistency throughout this Volume, references to "Particular Conditions", "Particular Conditions of Contract - Part II" or similar wording shall mean the Special Conditions of Contract - Part II identified in the Contract Agreement. The term "Particular/Project Specifications" shall not be used as a separate defined Contract Document unless that document is expressly identified in the Contract Agreement.

1.03 STANDARDS POLICY

American standards are the default technical reference within these Specifications. Where there is no directly applicable American standard, or where the serving utility/AHJ requires an IEC/EN/BS product system, the applicable BS, BS EN, EN or IEC standard may be used with Engineer approval. Requirements from different standards shall not be mixed within the same product or assembly unless a documented compatibility/equivalency review demonstrates that the combined requirements are coherent and no safety or performance requirement is reduced. Mandatory statutory and AHJ requirements apply independently of this technical standards policy; Contract Document precedence remains as stated in SCC 5.2.

1.04 EDITION DATE

Where an edition year is stated in this document, that edition applies unless superseded by mandatory law or AHJ requirement. Where no year is stated, use the edition current 30 days before Tender Closing Date, including published amendments and errata. The Contractor shall identify any edition conflict before procurement.

1.05 SUBMITTALS

- Material Approval Request with manufacturer, country of origin, product data and exact referenced standard.
- Certificate of Compliance and third-party test reports where specified.
- Method statement and Inspection and Test Plan (ITP) for each major work activity.
- Shop drawings showing dimensions, interfaces, sleeves/openings, supports, access/maintenance clearances and coordination with other disciplines.
- Design calculations where delegated design is specified, signed by a competent engineer.
- Samples, mock-ups and benchmark panels where appearance or workmanship is material.
- Testing, commissioning and calibration certificates.
- As-built drawings and operation/maintenance manuals.



## 1.06 QUALITY ASSURANCE

Testing laboratories shall be accredited to ISO/IEC 17025 for the relevant test or otherwise approved by the Engineer. Inspection agencies for concrete and structural work shall meet applicable ASTM E329 requirements. Calibrations shall be traceable to recognized national or international standards. Approval of submittals does not relieve the Contractor of compliance responsibility.

## 1.07 SI UNITS AND CONVERSIONS

SI values are governing. Where both SI and inch-pound values are stated, the SI value governs unless the referenced standard is explicitly inch-pound and the Contract Documents expressly adopt that value. Any dimensional discrepancy shall be referred to the Engineer before fabrication or installation.



## SECTION 01 42 19 - REFERENCE STANDARDS REGISTER

### PART 1 - GENERAL

The following register identifies the principal normative standards to be used within these Technical Specifications. It is not exhaustive; standards invoked by a listed standard also apply where relevant. Mandatory statutory/AHJ requirements remain applicable, while Contract Document precedence is governed exclusively by SCC 5.2 and Section 01 00 00.

| Work / System | Primary Standard | Subject | Project Note |
|---|---|---|---|
| Structural concrete | ACI CODE-318-25 | Building Code for Structural Concrete | Primary American design code. |
| Concrete construction | ACI SPEC-301-20 | Specifications for Concrete Construction | Primary concrete construction specification. |
| Environmental/water-retaining concrete | ACI 350 / project-adopted edition | Code Requirements for Environmental Engineering Concrete Structures | Use for tanks and liquid-retaining structures. |
| Concrete aggregate | ASTM C33/C33M | Concrete Aggregates | Replaces BS 882 as primary basis. |
| Portland cement | ASTM C150/C150M | Portland Cement | Types selected by exposure/design. |
| Blended cement | ASTM C595/C595M | Blended Hydraulic Cements | Where approved by mixture design. |
| Ready-mixed concrete | ASTM C94/C94M | Ready-Mixed Concrete | Production and delivery. |
| Concrete mixing water | ASTM C1602/C1602M | Mixing Water Used in Hydraulic Cement Concrete | Water acceptance. |
| Concrete sampling/testing | ASTM C172/C172M; C31/C31M; C39/C39M; C143/C143M; C1064/C1064M | Sampling, cylinders, compressive strength, slump and temperature | Field quality control. |
| Reinforcement | ASTM A615/A615M; ASTM A706/A706M | Deformed reinforcing bars | Grade 60 [420 MPa] default; A706 where weldability/ductility required. |
| Rebar welding | AWS D1.4/D1.4M | Structural Welding Code - Reinforcing Steel | When welding is permitted. |
| Earthwork | ASTM D2487; D2488; D698; D1557; D6938; D1556; D4318 | Soil classification, compaction and field density | Primary earthwork QA. |
| Brick and masonry | ASTM C62; C216; C67/C67M; C270; C144; TMS 402/602 | Clay brick, testing, mortar and structural masonry | As applicable to unit type and design. |

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| Work / System | Primary Standard | Subject | Project Note |
|---|---|---|---|
| Cement plaster | ASTM C926; ASTM C897; ASTM C207 | Portland cement plaster, aggregate and lime | Primary plastering basis. |
| Ceramic/porcelain tile | ANSI A137.1; ANSI A108/A118; ASTM C373; ASTM C648 | Tile product and installation standards | Porcelain absorption <=0.5%. |
| Dimension stone/marble | ASTM C503; C97/C97M; C99/C99M; C170/C170M | Marble and stone physical tests | As applicable. |
| Roof/waterproofing | ASTM D1970; ASTM C836/C836M; ASTM D6162/D6163/D6164; ASTM D5957 | Membranes and flood testing | Select system by drawings/BOQ. |
| Vapor retarder | ASTM E1745 | Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill | Minimum Class and thickness as specified. |
| EPS insulation | ASTM C578 | Rigid Cellular Polystyrene Thermal Insulation | ASTM performance basis for EPS insulation. |
| Coatings | AMPP/SSPC surface preparation standards; ASTM D7091; ASTM D3359 | Surface preparation, DFT and adhesion | Use coating manufacturer system requirements. |
| Structural steel/fabrications | ASTM A36/A36M; A500/A500M; A123/A123M; AWS D1.1/D1.1M | Steel, HSS, galvanizing and welding | For miscellaneous metal work. |
| Aluminum/glazing | ASTM B221/B221M; B209/B209M; E283; E330/E330M; E331; C1036; C1048; ANSI Z97.1; AAMA 2604/2605 | Aluminum, performance and glass | Curtain wall/window testing as scheduled. |
| Concrete pavers | ASTM C936/C936M; ASTM C140/C140M | Interlocking concrete paving units and testing | Exterior paving. |
| Landscaping | ANSI Z60.1; ANSI A300; ASTM D5268 | Nursery stock, tree care and topsoil | American primary. |
| Domestic steel pipe | ASTM A53/A53M; ASME B16.3; B16.5; B1.20.1 | Galvanized steel pipe and fittings | Replaces BS 1387 where steel pipe is specified. |
| PP-R piping | ASTM F2389 | Pressure-rated polypropylene piping systems | Use system manufacturer-compatible pipe/fittings. |
| PVC DWV | ASTM D2665 | PVC Drain, Waste | Building drainage. |

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| Work / System | Primary Standard | Subject | Project Note |
|---|---|---|---|
| | | and Vent Pipe and Fittings | |
| Buried PVC gravity sewer | ASTM D3034; ASTM F477; ASTM D2321 | PVC sewer pipe, seals and installation | BS EN 1329 only where an approved EN system is specifically selected. |
| HDPE water mains | AWWA C906; ASTM F714/D3035; ASTM D3261; ASTM D3350; ASTM F2620 | PE pressure pipe, fittings, resin and fusion | PE4710 where specified/available. |
| RCC sewer/storm pipe | ASTM C76/C76M; ASTM C443/C443M | Reinforced concrete pipe and joints | Do not mix C76 and C655 unless design is explicitly D-load based. |
| Water wells | AWWA A100 | Water Wells | Primary American water-well construction basis. |
| Plumbing code | Applicable Pakistan/local code; 2024 International Plumbing Code as supplementary basis where approved | Plumbing systems | Local statutory/AHJ requirements govern. |
| Precision cooling / CRAC | AHRI 1360/1361; ANSI/ASHRAE 90.4; ANSI/TIA-942; ASHRAE 15; ASHRAE 34; IEC 60335-2-40; ASTM B280; NFPA 75 | Computer/data-processing room air-conditioning, refrigerant safety and data-center cooling | Use with project Tier 4/fault-tolerant requirements and exact equipment schedule. |
| Comfort split-system air-conditioning | Applicable ASHRAE; AHRI; IEC; ISO; UL/CE requirements stated in Section 23 81 26 | Comfort split-system air-conditioning and high-ambient performance | Project source specification governs exact certification and capacity requirements. |
| HVAC / smoke-extract fans | Applicable international/local fan standards; ERP and APPULUS certification as specified | HVAC fans and fire/smoke extraction performance | Complete fan assembly required to be certified for 400 deg C for 2 hours where specified. |
| Electrical installations | NFPA 70-2026 (NEC) | National Electrical Code | Primary American building electrical code, subject to MEPCO/AHJ. |
| Electrical acceptance testing | ANSI/NETA ATS-2025 | Acceptance Testing Specifications for Electrical Power Equipment and Systems | Use for field acceptance/commissioning. |
| Grounding | NFPA 70-2026; IEEE 80 (substations only); | Grounding design and testing | IEEE 80 not blanket basis for ordinary building |

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| Work / System | Primary Standard | Subject | Project Note |
|---|---|---|---|
| | IEEE 81-2025 | | grounding. |
| Power quality / harmonics | IEEE 519-2022 | Harmonic Control in Electric Power Systems | Limits apply at the point of common coupling; use study-based limits rather than a blanket 5% THD everywhere. |
| Lightning protection | NFPA 780-2023; UL 96; UL 96A | Lightning Protection Systems | IEC/BS EN 62305 may be accepted for a complete IEC LPS. |
| LV assemblies | UL 891; UL 67; UL 489 / or approved IEC 61439 system where required | Switchboards, panelboards and breakers | Do not mix incompatible UL and IEC assembly certification. |
| Electrical conduit | ANSI C80.1; UL 651 | Rigid steel and PVC conduit | As applicable. |
| Building wire/cable | UL 83; UL 44; applicable ICEA/NEMA; or complete approved IEC cable system | Insulated conductors and cables | Select one coherent product standard family. |
| Structured cabling | ANSI/TIA-568; ANSI/TIA-606; ANSI/TIA-607 | Copper/fiber cabling, administration and bonding | ISO/IEC 11801 may be used only where a complete approved ISO/IEC cabling system is selected. |
| Network switching / PoE | IEEE 802.3; IEEE 802.3af/at/bt; IEEE 802.1Q; IEEE 802.1X; IEEE 802.1D/1w/1s | Ethernet, PoE, VLAN, access control and loop prevention | Enterprise managed switching; design values as scheduled. |
| Wireless LAN | IEEE 802.11; IEEE 802.1X; IEEE 802.3 PoE | Enterprise wireless LAN and authentication | RF/safety requirements and approved network design also apply. |
| Access control | UL 294; NFPA 70; IEEE 802.3/802.1X; applicable credential standards | Electronic access control, power and network interfaces | IEC/EN access-control standards may supplement a complete approved system where required. |
| IP video / NVR | ONVIF applicable profiles; IEEE 802.3; IEC 62676 | IP video surveillance, interoperability and recording | IEC 62676 retained where no directly equivalent comprehensive American CCTV system standard applies. |
| Enterprise storage / HDD | SATA/SAS interface standards; host-equipment manufacturer requirements | Enterprise hard-disk/storage compatibility and reliability | Factory-new drives; capacity as scheduled; manufacturer warranty documentation required at handover. |
| Fire sprinklers | NFPA 13-2025 | Installation of Sprinkler Systems | Primary. |
| Standpipes/hose | NFPA 14-2024 | Installation of | Primary. |

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| Work / System | Primary Standard | Subject | Project Note |
|---|---|---|---|
| | | Standpipe and Hose Systems | |
| Fire pumps | NFPA 20-2025 | Installation of Stationary Pumps for Fire Protection | Primary. |
| Fire water tanks | NFPA 22-2023 | Water Tanks for Private Fire Protection | Where applicable. |
| Private fire mains | NFPA 24-2025 | Private Fire Service Mains and Their Appurtenances | Primary. |
| Fire alarm/signaling | NFPA 72-2025 | National Fire Alarm and Signaling Code | Primary. |
| IT equipment fire protection | NFPA 75-2024 | Protection of Information Technology Equipment | Where data-center/IT areas are within scope. |
| Clean agent | NFPA 2001-2025 | Clean Agent Fire Extinguishing Systems | Use generic FK-5-1-12 designation, not a discontinued brand requirement. |
| Engine generators | ISO 8528 series; NFPA 110-2024; NFPA 37; NFPA 30-2024; UL 142 | Generating sets, standby power and diesel fuel systems | Use project ratings and site derating stated in Section 26 32 13. |
| UPS systems | IEC/EN 62040-1/-2/-3; IEC 60896-21/-22; NFPA 70; ANSI/NETA ATS-2025 | UPS safety, EMC, performance and VRLA batteries | Complete UPS/battery system per Section 26 33 13. |
| Automatic transfer switches | UL 1008; IEC 60947-6-1; IEC 60947-2; NFPA 110; NFPA 70 | Automatic transfer switching and associated breakers | Coordinate with generator paralleling controls in Section 26 36 00. |



# DIVISION 02 - EXISTING CONDITIONS

## SECTION 02 41 00 - SITE CLEARANCE AND SETTING OUT

### PART 1 - GENERAL

#### 1.01 SUMMARY

Clear, protect and prepare the site; establish permanent survey control; set out buildings and external works from approved coordinates and benchmarks.

#### 1.02 REFERENCES

- ASTM D2488 where soil identification is required during clearing/excavation.
- Project survey control, approved architectural/civil drawings and applicable authority survey requirements.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

#### 2.01 SURVEY CONTROL

- Use calibrated total station/level equipment of suitable accuracy.
- Protect permanent benchmarks and reference points; replace disturbed control only with Engineer approval.

#### 2.02 PROTECTION

- Protect existing utilities, trees/works designated to remain, property boundaries and adjacent structures.

### PART 3 - EXECUTION

#### 3.01 CLEARING

- Remove vegetation, rubbish, abandoned minor obstructions and unsuitable surface material within limits of work; dispose at approved locations.
- Do not burn waste on site unless expressly permitted by authority.

#### 3.02 SETTING OUT

- Verify dimensions and levels before construction.
- Immediately report discrepancies between coordinates, dimensions and site conditions; do not scale drawings where figured dimensions are available.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Submit survey setting-out record before foundations.
- Maximum positional tolerances shall be those on drawings or the relevant trade standard; tighter structural/architectural tolerance governs.



# DIVISION 03 - CONCRETE

## SECTION 03 15 13 - WATERSTOPS

### PART 1 - GENERAL

#### 1.01 SUMMARY

PVC/elastomeric waterstops at construction and movement joints in water-retaining or below-grade concrete.

#### 1.02 REFERENCES

- USACE CRD-C 572 - PVC Waterstop, where PVC waterstop is used.
- ASTM D412 - Tensile Properties of Vulcanized Rubber/Thermoplastic Elastomers.
- ASTM D2240 - Rubber Hardness.
- ACI 350 joint detailing requirements where applicable.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Joint/waterstop layout showing factory/field splices and intersections.

### PART 2 - PRODUCTS

#### 2.01 WATERSTOP

- Type, width, rib/bulb profile and material shall match joint movement and hydrostatic head shown on drawings.
- Use factory-made intersections where practicable.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Center and securely fix waterstop in joint; maintain full embedment and prevent folding/displacement.
- Field heat-weld PVC only using manufacturer-approved equipment; splices shall be watertight and maintain full profile.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Inspect all splices and installed waterstop before concrete placement.

## SECTION 03 16 00 - WATER-RETAINING CONCRETE STRUCTURES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Reinforced concrete tanks/chambers and other liquid-retaining structures.

#### 1.02 REFERENCES

- ACI CODE-350 - Environmental Engineering Concrete Structures, project-adopted edition.
- ACI SPEC-301-20 and ACI CODE-318-25 where not modified by ACI 350.
- ASTM D5957 or project hydrostatic test procedure for leakage testing where applicable.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Joint/waterstop layout and crack-control reinforcement details from structural design.

### PART 2 - PRODUCTS

#### 2.01 CONCRETE

- Strength, w/cm, cementitious system and permeability provisions shall comply with structural drawings and ACI 350 exposure/crack-control design.

### PART 3 - EXECUTION

#### 3.01 EXECUTION

- Minimize construction joints; install waterstops to Section 03 15 13.
- Cure rigorously and delay filling until design strength/age criteria are met.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Hydrostatic/leakage test after curing and before final finishes/backfill where accessible; repair leakage by an engineered compatible method and retest.



## SECTION 03 20 00 - CONCRETE REINFORCING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Reinforcing steel, supports, cutting, bending, placing, splicing and welding where permitted.

#### 1.02 REFERENCES

- ASTM A615/A615M - Deformed and Plain Carbon-Steel Bars.
- ASTM A706/A706M - Low-Alloy Steel Deformed and Plain Bars.
- ACI CODE-318-25; ACI SPEC-301-20.
- AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Bar bending schedules and mill certificates by heat/lot.

### PART 2 - PRODUCTS

#### 2.01 REINFORCING BARS

- ASTM A615/A615M Grade 60 [420 MPa] unless drawings specify otherwise.
- Use ASTM A706/A706M Grade 60 where welding is required or where the structural/seismic design specifically requires enhanced weldability/ductility.
- Mass, dimensional and deformation tolerances shall comply with the applicable ASTM reinforcement product standard.

#### 2.02 ACCESSORIES

- Chairs, spacers and supports shall maintain specified cover and bar position without staining exposed concrete. Concrete/plastic spacers shall be compatible with exposure.

### PART 3 - EXECUTION

#### 3.01 FABRICATION

- Cold bend bars using approved equipment and bend diameters required by ACI 318/approved bar schedule.
- Hot bending and field heating are prohibited unless specifically engineered and approved.
- Bars partially embedded in hardened concrete shall not be bent or straightened without written design approval.

#### 3.02 PLACEMENT

- Reinforcement shall be clean of loose scale, mud, oil, grease or coatings detrimental to bond.
- Secure bars against displacement during concrete placement.
- Cover, spacing, lap splices, mechanical splices and development lengths shall be as shown on drawings and comply with ACI 318.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Verify bar grade, diameter, spacing, cover, laps, couplers and cleanliness before each pour.
- Welded reinforcement shall be inspected to AWS D1.4/D1.4M and the approved WPS.



## SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

### 1.01 SUMMARY

Cast-in-place structural and nonstructural concrete, including materials, mixture design, production, placement, consolidation, finishing, curing, field testing and acceptance.

### 1.02 PRIMARY REFERENCES

- ACI SPEC-301-20 - Specifications for Concrete Construction.
- ACI CODE-318-25 - Building Code for Structural Concrete.
- ACI PRC-308-26 - Curing of Concrete - Guide, where referenced by the Engineer.
- ASTM C33/C33M, C150/C150M, C595/C595M, C94/C94M, C1602/C1602M.
- ASTM C172/C172M, C31/C31M, C39/C39M, C143/C143M, C1064/C1064M and applicable air-content test standards.

### 1.03 SUBMITTALS

- Concrete mixture designs from an approved laboratory for each class/exposure, including target mean strength, cementitious materials, aggregate sources/gradings, admixtures, w/cm, slump, density and trial results.
- Current cement and aggregate test certificates.
- Batching plant calibration certificates.
- Concrete pour card/inspection request before each placement.
- Concrete test register linked to pour locations.

## PART 2 - PRODUCTS

### 2.01 CEMENTITIOUS MATERIALS

- Portland cement: ASTM C150/C150M. Blended cement: ASTM C595/C595M where approved.
- Cement type and supplementary cementitious material content shall satisfy ACI 318 exposure/durability requirements and project structural notes.
- Cement chemical and physical acceptance shall comply with the selected ASTM cement standard and the exposure/durability requirements of ACI CODE-318 and the approved mixture design.
- Use one approved cement source/type within a structural member unless an approved transition procedure demonstrates compatibility.

### 2.02 AGGREGATES

- ASTM C33/C33M. Individual deleterious-substance, grading, soundness and durability limits shall comply with ASTM C33/C33M and the approved concrete mixture requirements.
- Nominal maximum coarse aggregate size: 19 mm unless drawings/mixture design require otherwise. Use 13 mm where reinforcement congestion or member geometry requires, subject to ACI size limitations.

### 2.03 WATER AND ADMIXTURES

- Mixing water: ASTM C1602/C1602M.
- Admixtures: ASTM C494/C494M or other directly applicable ASTM standard; chloride-bearing admixtures shall not be used where prohibited by ACI 318.
- Admixture compatibility with cementitious system shall be demonstrated.

### 2.04 CONCRETE CLASSES AND MINIMUM STRENGTH

| Class | Minimum 28-day cylinder strength f'c | Use / Note |
|---|---|---|
| C7 | 7 MPa | Lean/blinding concrete only. |
| C17 | 17 MPa | Nonstructural plain concrete only where drawings/BOQ permit. |

| Class | Minimum 28-day cylinder strength f'c | Use / Note |
|---|---|---|
| C21 | 21 MPa | Structural/nonstructural only where explicitly shown and compatible with ACI durability requirements. |
| C28 | 28 MPa | Default general reinforced structural concrete unless drawings require higher strength. |
| CXX | As drawings/design | Foundations, water-retaining members, special structures or higher exposure classes. |

Concrete classes shall be designated by specified 28-day cylinder strength. Where the drawings or ACI durability provisions require a higher strength, lower w/cm or other more stringent compatible requirement, that requirement governs.

### 2.05 WATER-CEMENTITIOUS RATIO AND SLUMP

- Maximum w/cm shall comply with ACI 318 exposure class requirements and the approved mixture design; strength alone is not a durability criterion.
- Unless otherwise approved through the mixture design, slump at point of placement shall not exceed 100 mm. Higher slump obtained by approved water-reducing/high-range water-reducing admixture is permitted when w/cm is maintained.
- Uncontrolled addition of water at site is prohibited.

## PART 3 - EXECUTION

### 3.01 PRODUCTION AND PLACEMENT

- Produce concrete to ASTM C94/C94M where ready-mixed concrete is used.
- Place continuously to avoid unintended cold joints; construction joints shall be at approved locations.
- Consolidate with mechanical internal vibrators; avoid segregation, displacement of reinforcement and over-vibration.
- Concrete temperature and hot/cold weather procedures shall comply with ACI 301 and applicable ACI guidance.

### 3.02 CURING

- Begin curing promptly after finishing. Maintain curing for not less than 7 days for ordinary Portland-cement concrete unless ACI 301, mixture type or approved curing method establishes another compliant period.
- Curing compound, if used, shall be compatible with subsequent finishes/waterproofing.
- Water-retaining and severe-exposure members shall receive the curing duration and method required by ACI 350/project durability design.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Sampling frequency shall comply with ACI 301/ACI 318 and, as a project baseline, provide at least one strength-test sample for each concrete class placed each day, each 115 m3 or fraction thereof, and each 465 m2 of slab/wall surface or fraction thereof, unless the Engineer requires more frequent testing.
- Make and cure field specimens to ASTM C31/C31M; compressive strength to ASTM C39/C39M; slump to ASTM C143/C143M; temperature to ASTM C1064/C1064M.
- Strength acceptance: comply with ACI 318. For f'c <=35 MPa, average of any three consecutive strength tests shall equal or exceed f'c and no individual strength test shall fall more than 3.5 MPa below f'c. For higher strengths, ACI 318 percentage-based deficiency criterion applies.
- Investigate low-strength results in accordance with ACI 318/ACI 301, including core testing where directed.

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## SECTION 03 35 00 - CONCRETE FLOORING AND SCREEDS

### PART 1 - GENERAL

### 1.01 SUMMARY

Cement concrete floor toppings, screeds and hard-finished concrete floors where indicated.

### 1.02 REFERENCES

- ACI SPEC-301-20.
- ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction.
- ASTM C109/C109M where proprietary cementitious screed strength testing is specified.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

### 2.01 SCREED/TOPPING

- Mix, thickness and strength shall be as shown on BOQ/drawings; minimum strength shall be compatible with service and substrate.
- Bonding agent, if used, shall be manufacturer-approved for the substrate.

### PART 3 - EXECUTION

### 3.01 EXECUTION

- Prepare substrate by mechanical cleaning/roughening for bonded toppings.
- Set levels to required finished floor elevations and falls.
- Finish to required texture; avoid excessive surface water/cement dusting.
- Cure cementitious flooring.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Flatness/levelness shall meet project finish requirements; as a baseline, localized deviation shall not exceed 3 mm under a 2 m straightedge for tiled/finished areas unless the finish system requires tighter tolerance.



# DIVISION 04 - MASONRY

## SECTION 04 20 00 - UNIT MASONRY

### PART 1 - GENERAL

#### 1.01 SUMMARY

Burnt clay brick masonry, mortar, ties, reinforcement where indicated and workmanship.

#### 1.02 REFERENCES

- ASTM C62 - Building Brick.
- ASTM C216 - Facing Brick, where exposed facing brick is specified.
- ASTM C67/C67M - Sampling and Testing Brick and Structural Clay Tile.
- ASTM C270 - Mortar for Unit Masonry.
- ASTM C144 - Aggregate for Masonry Mortar.
- TMS 402/602 where masonry is structural.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Brick sample panel and mortar mix submittal.

### PART 2 - PRODUCTS

#### 2.01 CLAY BRICK

- Well-burnt, sound, uniform units free from cracks, deleterious inclusions and objectionable efflorescence.
- Nominal local project size may follow drawings/BOQ; dimensional tolerances shall be established in the approved sample.
- Minimum brick compressive strength shall be 14 MPa unless the drawings or structural masonry design require a higher value. Test in accordance with ASTM C67/C67M.

#### 2.02 MORTAR

- ASTM C270. Type S for exterior/load-bearing/below-grade applications unless design permits otherwise; Type N may be used for interior non-load-bearing masonry where approved.
- Do not add uncontrolled site additives.

### PART 3 - EXECUTION

#### 3.01 LAYING

- Set out courses to maintain dimensions/openings; fully bed units and fill head joints.
- Bond and reinforcement/ties shall follow drawings and TMS 602 where applicable.
- Do not use broken units except accurately cut closures. Protect top of unfinished walls from rain.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Perform brick compressive/absorption tests at approved frequency.
- Inspect line, level, plumb, joint filling, embeds and ties before concealment.



# DIVISION 05 - METALS

## SECTION 05 50 00 - METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.01 SUMMARY

Railings, ladders, grilles, brackets, miscellaneous steel, support frames and metal fabrications not specified elsewhere.

#### 1.02 REFERENCES

- ASTM A36/A36M - Carbon Structural Steel.
- ASTM A500/A500M - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing.
- ASTM A123/A123M - Hot-Dip Galvanized Coatings.
- AWS D1.1/D1.1M - Structural Welding Code - Steel.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Shop drawings showing sections, welds, anchors, finishes and interfaces.

### PART 2 - PRODUCTS

#### 2.01 STEEL AND FASTENERS

- Steel grade/section as drawings; use certified material.
- Exterior or corrosive-exposure fabrications shall be hot-dip galvanized after fabrication where specified, or receive the approved protective coating system.

### PART 3 - EXECUTION

#### 3.01 FABRICATION AND ERECTION

- Fabricate square, true and free of sharp edges/distortion.
- Weld to AWS D1.1/D1.1M by qualified welders.
- Provide isolation at dissimilar metals and seal hollow sections where required.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Visual weld inspection 100%; additional NDT where required by structural drawings/ITP.
- Galvanizing/coating thickness shall meet the specified standard and coating system.



# DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

## SECTION 06 20 00 - FINISH CARPENTRY, WOODWORK AND WOOD DOORS

### PART 1 - GENERAL

#### 1.01 SUMMARY

Interior/exterior joinery, timber frames, cabinets/panels and flush wood doors where shown.

#### 1.02 REFERENCES

- ASTM D4442 - Direct Moisture Content Measurement of Wood.
- AWPA U1 - Use Category System for preservative-treated wood where treatment is required.
- ANSI/HPVA HP-1 - Hardwood and Decorative Plywood.
- ANSI A208.1 - Particleboard; ANSI A208.2 - MDF.
- WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Shop drawings, hardware preparation and finish samples.

### PART 2 - PRODUCTS

#### 2.01 TIMBER

- Sound seasoned timber of species/grade shown; free of decay, active insect attack, excessive warp, shakes and defects impairing service.
- Maximum moisture content at installation: 12% for conditioned interior joinery and 15% for exterior/unconditioned joinery unless a species/product standard requires otherwise.

#### 2.02 PANEL PRODUCTS AND DOORS

- Use panel products complying with the applicable ANSI/HPVA standard and formaldehyde/emission requirements of the project/AHJ.
- Flush doors shall comply with WDMA I.S. 1A or approved equivalent construction/class.

### PART 3 - EXECUTION

#### 3.01 FABRICATION AND INSTALLATION

- Acclimatize joinery before installation.
- Provide preservative treatment where termite/moisture exposure requires.
- Install plumb, level, rigid and accurately fitted; seal concealed cut ends as required.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Verify moisture content before enclosure/finishing.
- Reject delaminated, warped, split or visibly defective work.



# DIVISION 07 - THERMAL AND MOISTURE PROTECTION

## SECTION 07 10 00 - DAMP-PROOFING, ROOFING AND WATERPROOFING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Damp-proof courses, under-slab vapor retarders, roof membranes, tanking and associated protection/termination work.

#### 1.02 REFERENCES

- ASTM E1745 - Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill.
- ASTM D1970/D1970M - Self-Adhering Polymer Modified Bituminous Sheet Materials.
- ASTM C836/C836M - High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane.
- ASTM D6162/D6163/D6164 as applicable to modified bituminous sheet membranes.
- ASTM D5957 - Flood Testing Horizontal Waterproofing Installations.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- System warranty and complete manufacturer detail set for terminations, penetrations, joints and drainage outlets.

### PART 2 - PRODUCTS

#### 2.01 VAPOR RETARDER / POLYETHYLENE

- Under slabs on ground, provide ASTM E1745 vapor retarder, minimum 0.25 mm (10 mil) thickness unless a more stringent class/thickness is shown.
- Lap not less than 150 mm and seal laps and penetrations with system-compatible tape/accessories.

#### 2.02 WATERPROOFING MEMBRANE

- Use the membrane type shown in BOQ/drawings. Complete system shall be from one approved manufacturer or documented as compatible.
- Proprietary product references shall not be the sole acceptance criterion; each product shall comply with the applicable ASTM performance standard and the approved system requirements.

### PART 3 - EXECUTION

#### 3.01 PREPARATION AND APPLICATION

- Substrate shall be sound, dry or conditioned as required by system, smooth and free of laitance, sharp projections, dust and contaminants.
- Prime where required; reinforce corners, cracks, construction joints and penetrations in accordance with the manufacturer detail.
- Provide protection board/screed where membrane is subject to backfill or traffic.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Flood-test horizontal waterproofing for at least 24 hours, or longer if required by ASTM D5957/system/AHJ; no leakage permitted.
- Repair defects and repeat the test before covering.

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## SECTION 07 21 13 - RIGID POLYSTYRENE INSULATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

Rigid expanded/extruded polystyrene insulation where shown for roofs, walls or other thermal applications.

#### 1.02 REFERENCES

- ASTM C578 - Rigid, Cellular Polystyrene Thermal Insulation.
- ASTM C518 - Steady-State Thermal Transmission Properties.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

#### 2.01 INSULATION BOARD

- Provide ASTM C578 type and compressive strength appropriate to the application and loading; identify density/thermal resistance by manufacturer certification.
- Flame-spread/fire requirements shall comply with the applicable building/fire code and assembly listing.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Install dry, tightly butted and protected from damage, solvent attack and prolonged UV exposure.
- Coordinate vapor retarder/waterproofing and mechanical protection.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Reject boards that are wet, crushed, warped or do not match submitted product properties.



## SECTION 07 42 43 - ALUMINUM COMPOSITE PANELS

### PART 1 - GENERAL

#### 1.01 SUMMARY

Aluminum composite panel rainscreen/cladding, subframing, fasteners, sealants and interfaces.

#### 1.02 REFERENCES

- ASTM E330/E330M - Structural Performance of Exterior Windows, Doors, Curtain Walls by Uniform Static Air Pressure.
- ASTM E283 - Air Leakage.
- ASTM E331 - Water Penetration.
- AAMA 2604/2605 for factory-applied organic coatings where applicable.
- NFPA 285 or applicable local façade fire-test requirement where combustible components are used.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Delegated design calculations for wind loads, supports/anchors and panel deflection.
- Fire-performance documentation for the complete wall assembly.

### PART 2 - PRODUCTS

#### 2.01 PANELS AND FINISH

- Panel skin thickness, core classification, overall thickness and coating system shall be as drawings/BOQ and approved fire strategy.
- Exterior finish shall comply with AAMA 2604 or 2605 as specified for required durability.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Coordinate subframe tolerances and movement; isolate dissimilar metals.
- Provide drained/ventilated joints and flashings where rainscreen principle is used.
- Seal penetrations and perimeter interfaces without blocking required drainage.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Perform field water testing where specified.
- No oil-canning, loose panels, misalignment or sealant discontinuity beyond approved benchmark.

# DIVISION 08 - OPENINGS

## SECTION 08 40 00 - ALUMINUM DOORS, WINDOWS, CURTAIN WALLS AND GLAZING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Aluminum framed doors/windows, curtain walls, spider glazing where shown, glass, hardware, sealants and insect screens.

#### 1.02 REFERENCES

- ASTM B221/B221M - Aluminum extrusions.
- ASTM B209/B209M - Aluminum sheet/plate.
- ASTM E283 - Air Leakage.
- ASTM E330/E330M - Structural Performance.
- ASTM E331 - Water Penetration.
- ASTM C1036 - Flat Glass.
- ASTM C1048 - Heat-Treated Flat Glass.
- ANSI Z97.1 - Safety Glazing.
- AAMA 2604/2605 - Organic coatings.
- ASCE 7-22 - Wind loads, where project structural basis adopts ASCE 7.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Delegated-design calculations and system test reports for curtain wall/window performance.
- Glass make-up, heat-treatment and safety-glazing schedule.

### PART 2 - PRODUCTS

#### 2.01 ALUMINUM

- Alloy/temper adequate for structural and fabrication requirements; finish as scheduled.
- Separate aluminum from incompatible cementitious/steel/copper substrates as required.

#### 2.02 GLASS

- Glass thickness/type shall be determined by panel size, support, wind load, thermal stress and safety requirements; do not use a blanket 5 mm requirement for all locations.
- Safety glazing shall comply with ANSI Z97.1 where required.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Install frames plumb/square with anchors designed for loads and movement.
- Provide perimeter air/water seals, flashings and drainage paths.
- Glaze with setting blocks, gaskets and sealants compatible with glass coatings and frame finishes.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Field water testing to AAMA 501.2/ASTM E1105 or approved project procedure where specified.
- Air/water/structural performance shall meet project design values and the approved system test evidence.

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# DIVISION 09 - FINISHES

## SECTION 09 24 00 - PORTLAND CEMENT PLASTERING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Internal/external cement plaster, base preparation, corner beads, screeds and curing.

#### 1.02 REFERENCES

- ASTM C926 - Application of Portland Cement-Based Plaster.
- ASTM C897 - Aggregate for Job-Mixed Portland Cement-Based Plasters.
- ASTM C207 - Hydrated Lime for Masonry Purposes where lime is used.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Finish sample/mock-up for each exposed texture.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- Cement and sand shall comply with the concrete/masonry material standards and ASTM C926/C897.
- Premixed proprietary plaster may be used when approved and supported by manufacturer test data.

### PART 3 - EXECUTION

#### 3.01 PREPARATION

- Remove dust, laitance, oil and loose material; roughen/suction-condition substrates as required.
- At dissimilar backgrounds and service chases, provide approved alkali-resistant mesh/lath where cracking risk exists.

#### 3.02 APPLICATION

- Thickness and number of coats shall follow drawings/BOQ and ASTM C926. Maintain true planes, plumb arrises and uniform texture.
- Cure cement plaster adequately; protect from rapid drying and direct hot wind.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Maximum deviation in finished plane: 3 mm under a 2 m straightedge unless a tighter finish tolerance is specified.
- No hollow, debonded, crazed or visibly cracked plaster accepted.



## SECTION 09 30 13 - CERAMIC AND PORCELAIN TILING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Ceramic/porcelain floor and wall tile, adhesives, grout, trims and movement joints.

#### 1.02 REFERENCES

- ANSI A137.1 - Ceramic Tile.
- ANSI A108/A118 - Installation Materials and Methods.
- ASTM C373 - Water Absorption of Ceramic Tile.
- ASTM C648 - Breaking Strength of Ceramic Tile.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Tile and grout samples; slip-resistance data for wet/public floor areas where required.

### PART 2 - PRODUCTS

#### 2.01 PORCELAIN TILE

- Porcelain tile water absorption shall not exceed 0.5% when tested to ASTM C373.
- Size, thickness, surface finish, slip classification and shade shall be as scheduled/approved.

#### 2.02 SETTING MATERIALS

- Use ANSI A118-compliant mortar/adhesive and grout compatible with tile, substrate, exposure and service.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Substrate shall meet flatness/moisture requirements of the selected system.
- Provide movement joints at structural joints, perimeters and intervals required by ANSI A108/project design.
- Wet-area floors shall maintain designed falls to drains without ponding.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Lippage and alignment shall meet ANSI installation tolerances and the approved benchmark area.
- No loose, cracked or hollow-sounding tiles accepted in critical traffic/wet areas.



## SECTION 09 63 40 - STONE AND MARBLE TILING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Marble/natural stone floor and wall finishes, bases, thresholds and associated setting materials.

#### 1.02 REFERENCES

- ASTM C503 - Marble Dimension Stone.
- ASTM C97/C97M - Absorption and Bulk Specific Gravity.
- ASTM C99/C99M - Modulus of Rupture.
- ASTM C170/C170M - Compressive Strength.
- ANSI A108/A118 for compatible tile-setting materials where thin-set systems are used.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Full-size samples showing range of color, veining and finish; approved control sample.

### PART 2 - PRODUCTS

#### 2.01 STONE

- Sound selected stone of uniform approved range, free of cracks, open seams and repairs not represented in the approved sample.
- Thickness, size and finish shall be as scheduled.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Sort and blend units for uniform appearance.
- Use full bedding or approved thin-set method; eliminate voids where load/wet exposure requires full support.
- Maintain joints and movement joints; do not bridge structural movement joints.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Finished lippage, plane and joint width shall comply with approved mock-up and applicable ANSI installation tolerance.
- Reject hollow/loose units and staining caused by incompatible setting materials.



## SECTION 09 91 00 - PAINTING AND POLISHING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Protective/decorative painting, enamel, emulsion, exterior coatings, wood polishing and related surface preparation.

#### 1.02 REFERENCES

- AMPP/SSPC-SP 1 - Solvent Cleaning.
- AMPP/SSPC-SP 2 / SP 3 - Hand/Power Tool Cleaning.
- AMPP/SSPC-SP 6/NACE No.3 or SP 10/NACE No.2 where abrasive blasting is specified.
- ASTM D7091 - Dry Film Thickness of Coatings.
- ASTM D3359 - Adhesion by Tape Test.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Coating schedule by substrate, manufacturer, generic coating type, number of coats and target DFT.
- Color/finish mock-ups.

### PART 2 - PRODUCTS

#### 2.01 COATINGS

- Use complete compatible coating system from one approved manufacturer for each substrate.
- Lead, chromate and other restricted hazardous pigments shall not be used except where expressly legal and approved.
- Products shall be delivered in unopened labeled containers with batch/expiry information.

### PART 3 - EXECUTION

#### 3.01 SURFACE PREPARATION

- Prepare each substrate to the coating manufacturer requirement and applicable AMPP/SSPC standard.
- Moisture, pH and surface cleanliness shall be within product limits before coating.

#### 3.02 APPLICATION

- Apply primer/intermediate/finish coats at manufacturer spread rate to achieve specified DFT.
- Do not apply outside approved temperature, humidity, dew-point or recoat-window limits.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Measure DFT to ASTM D7091 for protective metal coatings.
- Adhesion testing to ASTM D3359 where specified/required by the ITP.
- Finish shall be uniform in color and sheen, free of runs, sags, holidays, pinholes and visible substrate defects.



## SECTION 09 97 00 - SPECIALTY TEXTURED COATINGS

### PART 1 - GENERAL

#### 1.01 SUMMARY

Specialty textured exterior/interior coatings and aggregate finishes identified in the BOQ/drawings.

#### 1.02 REFERENCES

- ASTM D3359 - Adhesion.
- ASTM D7091 where dry-film thickness is measurable/applicable.
- Manufacturer published system requirements and relevant ASTM coating test data.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Large benchmark panel showing texture, color and joint treatment.

### PART 2 - PRODUCTS

#### 2.01 SYSTEM

- Use complete proprietary system from approved manufacturer including primer/base/texture/topcoat where required.
- Exterior product shall be UV/weather resistant and suitable for local climate.

### PART 3 - EXECUTION

#### 3.01 APPLICATION

- Prepare substrate, repair cracks and control moisture before application.
- Apply uniformly to approved benchmark; terminate neatly at joints/openings.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- No delamination, blistering, color patchiness or uncontrolled cracking.

## DIVISION 10 - SPECIALTIES

*NO STANDALONE DIVISION 10 SECTION. Plumbing fixtures and related accessories are specified in Section 22 40 00 - Plumbing Fixtures and Accessories. Fire-protection accessories are specified within Division 21 where applicable. Any other architectural specialties shown in the Drawings or BOQ remain governed by the applicable Contract Documents.*

## DIVISION 11 - EQUIPMENT

*NO STANDALONE DIVISION 11 SECTION. Project equipment is specified under its functional system Divisions, including Division 21 - Fire Suppression, Division 23 - Heating, Ventilating and Air Conditioning, Division 26 - Electrical, Division 27 - Communications, and Division 28 - Electronic Safety and Security. Refer to the applicable Sections, Drawings and BOQ for equipment requirements.*

## DIVISION 12 - FURNISHINGS

*NO STANDALONE DIVISION 12 SECTION. Rack-mounted ICT patching/equipment requirements and rack coordination are specified principally in Division 27 - Communications and Section 28 20 00 - IP CCTV System and Network Video Recording where applicable. Other furnishings, if shown in the Drawings or BOQ, remain governed by the applicable Contract Documents.*

## DIVISION 13 - SPECIAL CONSTRUCTION

*NO STANDALONE DIVISION 13 SECTION. Data-centre infrastructure normally associated with special construction is distributed among Section 23 81 23 - Computer Room Air-Conditioning Units (including hot-aisle-containment interfaces), Division 26 - Electrical critical-power systems,*

*Division 27 - Communications, and Division 28 - Electronic Safety and Security. A separate special-construction system is not specified in this Volume unless expressly shown in the Drawings or BOQ.*



## DIVISION 14 - CONVEYING EQUIPMENT - NOT APPLICABLE

*No conveying-equipment technical Section is included in this Volume. Passenger/service lifts, escalators, dumbwaiters or material-conveying systems are not specified herein; if such work is required by another Contract Document, that requirement shall govern in accordance with SCC Sub-Clause 5.2.*

## DIVISION 15 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 16 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 17 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 18 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 19 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 20 - RESERVED - NOT USED IN THIS VOLUME



# DIVISION 21 - FIRE SUPPRESSION

## SECTION 21 13 00 - WATER-BASED FIRE SUPPRESSION SYSTEMS

### PART 1 - GENERAL

#### 1.01 REFERENCES

- NFPA 13-2025 - Sprinkler Systems.
- NFPA 14-2024 - Standpipe and Hose Systems.
- NFPA 20-2025 - Stationary Pumps for Fire Protection.
- NFPA 22-2023 - Water Tanks for Private Fire Protection.
- NFPA 24-2025 - Private Fire Service Mains and Their Appurtenances.
- NFPA 72-2025 - Fire Alarm and Signaling interfaces.
- ASTM A53/A53M - steel pipe; ASTM A234/A234M - wrought fittings; applicable ASME B16 standards.
- AWWA C906 / ASTM F714 for approved underground HDPE fire main where listed/accepted by NFPA/AHJ.

#### 1.02 SUBMITTALS

- Hydraulic calculations, system drawings and equipment data as required by the applicable NFPA standard/AHJ.
- UL Listing/FM Approval evidence where specified by the project.
- Fire pump certified curve and controller data.
- Welding procedure/welder qualifications where welded pipe is used.
- Testing/commissioning plan and cause/effect integration matrix.

### PART 2 - PRODUCTS

#### 2.01 ABOVE-GROUND STEEL PIPE

- ASTM A53/A53M Schedule 40 unless the hydraulic design, listing and applicable NFPA standard permit another schedule or approved listed piping system.
- Fittings shall be listed/approved for fire service; welded fittings to ASTM A234/A234M/ASME B16 series as applicable.
- Grooved couplings/fittings shall be listed for intended service and pressure.

#### 2.02 FIRE PUMP SET

- Provide an electric-motor-driven duty fire pump, diesel-engine-driven standby fire pump and jockey/pressure-maintenance pump, unless the tender fire strategy or AHJ-approved design expressly requires a different arrangement.
- Each pump shall have its own listed controller and individual sensing line as required by NFPA 20.
- Fire pump/controller package shall be UL Listed and FM Approved where required by the project.

#### 2.03 HYDRANTS / FDC

- Hydrants, hose/standpipe outlets and FDC shall be listed/approved and sized/rated for the hydraulic design.
- Where the BOQ/product schedule specifies an 18 bar hydrant pressure rating, treat 18 bar as the minimum component pressure rating, not as the required outlet operating pressure. Actual minimum residual and maximum hose-connection pressures shall be established by the NFPA 14 hydraulic design and pressure-regulating provisions.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Install sprinklers, standpipes, private mains, pumps, valves, supports, seismic restraints where required, and FDC in accordance with applicable NFPA standards and approved drawings.
- Use long-radius elbows in pump room/pumped mains where required by NFPA 20/manufacturer and hydraulic performance.

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- Flush pipework before final commissioning and coordinate all supervisory, flow and pump signals with the fire alarm system and with BMS/DCIM interfaces where such systems are shown in the Contract Documents.

### 3.02 WELDING QUALITY

- Welders and procedures shall be qualified to the applicable pipe welding code accepted by the Engineer/AHJ.
- Provide 100% visual inspection of completed welds. Additional MT, PT, UT or RT shall be performed where required by the approved ITP, governing welding code, fire-protection listing, or Engineer. The ITP shall state the examination method, sampling rate, acceptance criteria and escalation requirements following a failed examination.

### 3.90 HYDROSTATIC AND ACCEPTANCE TESTING

- Hydrostatic test: 13.8 bar (200 psi) for 2 hours; where maximum working pressure exceeds 10.3 bar (150 psi), test at 3.4 bar (50 psi) above maximum working pressure for 2 hours. No leakage is permitted.
- Fire pump acceptance test: full required flow range in accordance with NFPA 20.
- Verify hydrant/standpipe/sprinkler hydraulic performance and alarm/supervisory interfaces.

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## SECTION 21 22 00 - CLEAN-AGENT FIRE SUPPRESSION - FK-5-1-12

### PART 1 - GENERAL

#### 1.01 REFERENCES

- NFPA 2001-2025 - Clean Agent Fire Extinguishing Systems.
- NFPA 72-2025 - detection, notification and releasing interfaces.
- NFPA 70 - electrical installation.
- UL/FM listings applicable to the selected complete clean-agent system.

#### 1.02 AGENT NAMING AND PROCUREMENT

The extinguishing agent shall be FK-5-1-12 clean agent complying with NFPA 2001 and the approved system listing. Any proposed product shall maintain the specified agent chemistry, listing, design concentration, human-exposure basis and complete-system compatibility.

#### 1.03 SUBMITTALS

- Manufacturer-authorized hydraulic/flow calculations using approved software.
- Protected volume including raised floors, ceilings and cable voids as applicable.
- Design concentration, minimum design temperature, discharge time and hold-time calculations to NFPA 2001/listing.
- Cylinder/nozzle/piping layout and nozzle orifice schedule.
- Cross-zone detection/releasing logic and complete cause/effect matrix.
- Room integrity / enclosure leakage calculations and door-fan test procedure.
- Pressure relief calculation for each protected enclosure.
- Battery calculations, alarm/notification, abort/manual release and HVAC/access control interface details.

### PART 2 - PRODUCTS

#### 2.01 COMPLETE LISTED SYSTEM

- Major components shall be part of one listed/approved system or specifically listed by the system manufacturer for combination.
- Cylinders, valves, actuators, nozzles and releasing panel shall have pressure rating/listing appropriate to system.
- Discharge piping shall be Schedule 40 or as required by approved hydraulic calculations/listing and maximum pressure.

#### 2.02 DETECTION AND RELEASING

- Use two independent detection zones arranged for cross-zoned releasing unless NFPA 2001/listing/approved fire strategy permits another verified method.
- First zone: pre-alarm; second independent zone: initiate release sequence after approved time delay.
- Provide manual release and abort function where permitted by NFPA 2001 and the system listing.
- Provide distinctive pre-discharge audible/visual warning.

### PART 3 - EXECUTION

#### 3.01 PROTECTED ROOM INDEPENDENCE

- Each protected room shall have an independent suppression arrangement unless an approved manufacturer-designed and AHJ-accepted multi-zone system is expressly shown. Activation in one room shall not cause unintended discharge in another.
- Include all required voids in protected volume and ensure enclosure integrity.

#### 3.02 INTERLOCKS

- Shut down serving HVAC/ventilation and close required motorized dampers before/upon release as designed.

- Integrate with the aspirating smoke detection system where provided, the main fire alarm panel, access control and BMS/DCIM where shown, for alarm, pre-discharge, discharge, fault, supervisory and status indications in accordance with the approved Cause-and-Effect Matrix.

## 3.90 TESTING AND COMMISSIONING

- Pressure/leak test piping in accordance with NFPA 2001 and manufacturer listing.
- 100% functional test of detectors, releasing logic, delay, alarms, manual release, abort, HVAC/dampers, access control and monitoring interfaces.
- Door-fan enclosure integrity test or other NFPA 2001-approved enclosure integrity test before final acceptance.
- Demonstrate that design concentration/discharge time/hold time are supported by final as-built calculations. Actual agent discharge test is not required unless expressly required by AHJ/contract.



# DIVISION 22 - PLUMBING

## SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

### PART 1 - GENERAL

#### 1.01 SUMMARY

General workmanship, coordination, cleaning, records, testing, O&M and protection applicable to plumbing work.

#### 1.02 REFERENCES

- Applicable Pakistan/local plumbing and public-health requirements.
- 2024 International Plumbing Code as supplementary technical basis where accepted by the AHJ.
- ASME, ASTM, AWWA and NSF standards referenced by individual plumbing Sections.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Coordinated plumbing shop drawings and builders-work/sleeve schedule.

### PART 2 - PRODUCTS

#### 2.01 GENERAL MATERIALS

- New, first-quality materials suitable for service pressure, temperature, water chemistry and environment.
- Potable-water-contact materials shall comply with NSF/ANSI/CAN 61 and lead-content requirements where applicable.

### PART 3 - EXECUTION

#### 3.01 COORDINATION AND PROTECTION

- Coordinate pipe routes before coring/cutting structural members. No structural cutting without written approval.
- Cap open pipe ends during construction. Protect fixtures and clean before handover.

#### 3.02 RECORDS AND O&M

- Maintain red-line as-built records; submit final as-built drawings and O&M manuals for valves, pumps and equipment.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Pressure, leakage, flushing and functional tests shall be witnessed as required by the Engineer.



## SECTION 22 11 16 - DOMESTIC WATER PIPING - GALVANIZED STEEL AND PP-R

### PART 1 - GENERAL

#### 1.01 SUMMARY

Domestic water distribution using galvanized steel and/or PP-R where shown in drawings/BOQ, including fittings, valves, supports, insulation/protection and testing.

#### 1.02 REFERENCES

- ASTM A53/A53M - Black and Hot-Dipped Zinc-Coated Welded and Seamless Steel Pipe.
- ASME B16.3 - Malleable Iron Threaded Fittings; ASME B16.5 - Flanges; ASME B1.20.1 - Pipe Threads.
- ASTM F2389 - Pressure-rated Polypropylene Piping Systems (PP-R/PP-RCT as applicable).
- NSF/ANSI/CAN 61 and 372 for potable-water components.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Pressure/temperature rating and PP-R fusion procedure with installer training evidence.

### PART 2 - PRODUCTS

#### 2.01 GALVANIZED STEEL PIPE

- ASTM A53/A53M, hot-dip galvanized, Schedule 40 unless the drawings/BOQ require another schedule or pressure class.
- Threaded fittings to ASME B16.3 for applicable sizes; flanged connections to ASME B16.5 as required.

#### 2.02 PP-R PIPE

- ASTM F2389 system from a single compatible manufacturer, rated for design temperature/pressure.
- Do not mix pipe and fittings from incompatible systems.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Provide unions/flanges at equipment and valves for maintainability.
- Protect concealed steel pipe against corrosion; avoid burying threaded galvanized joints in inaccessible wet zones unless specifically approved.
- Perform PP-R heat fusion strictly to manufacturer temperature/time/alignment limits.
- Support piping at manufacturer/code intervals and accommodate thermal movement.

#### 3.02 FIELD PRESSURE TEST

- Hydrostatically test completed water piping at not less than 1.5 times the normal operating pressure for 2 hours, without visible leakage or unexplained pressure loss, but never exceed the pressure rating of the lowest-rated component.
- Stabilize temperature and remove trapped air before formal readings.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Flush potable-water piping and disinfect in accordance with AHJ/approved procedure before service.
- Repair leaks; do not caulk or paint over defective joints. Repeat test after repairs.



## SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Above- and below-ground soil, waste and vent piping within buildings and to connection with external sewer.

#### 1.02 REFERENCES

- ASTM D2665 - PVC Drain, Waste, and Vent Pipe and Fittings.
- ASTM D3034 - Type PSM PVC Sewer Pipe and Fittings for buried gravity lines where applicable.
- ASTM F477 - Elastomeric Seals.
- ASTM D2321 - Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
- BS EN 1329-1 may be used only for a complete approved EN PVC-U soil/waste system where specifically selected.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Drainage riser/isometric drawings with pipe sizes, slopes, vents, cleanouts and invert levels.

### PART 2 - PRODUCTS

#### 2.01 PVC DWV

- Building DWV: ASTM D2665 unless an approved complete EN system is specified.
- Buried gravity sewer: ASTM D3034 with compatible gasketed fittings/joints where applicable.
- Do not use ASTM D1785 pressure pipe as the default gravity sanitary product standard.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Grade horizontal drainage to the slopes shown on the approved drawings and hydraulic design. Slopes shall be stated as a ratio or percentage and shall satisfy the governing plumbing/drainage code.
- Use long-sweep drainage fittings appropriate to direction change; provide cleanouts at required intervals and changes of direction.
- Extend vents and terminate in accordance with code/AHJ clearances.
- Sleeve and firestop penetrations through rated assemblies.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Water or air test sanitary piping in accordance with the governing plumbing code/AHJ before concealment.
- No leakage, backfall, obstruction or unapproved reduction in bore accepted.



## SECTION 22 40 00 - PLUMBING FIXTURES AND ACCESSORIES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Water closets, wash basins, urinals, sinks, showers, faucets, traps, accessories and connections.

#### 1.02 REFERENCES

- ASME A112.19.2/CSA B45.1 - Ceramic Plumbing Fixtures.
- ASME A112.18.1/CSA B125.1 - Plumbing Supply Fittings.
- ASME A112.19.3 for stainless-steel plumbing fixtures where applicable.
- NSF/ANSI/CAN 61 and 372 for potable-water fittings.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Fixture schedule cross-referenced to architectural room data/BOQ.

### PART 2 - PRODUCTS

#### 2.01 WATER CLOSETS

- Vitreous china to ASME A112.19.2/CSA B45.1, type and outlet configuration as scheduled.
- Unless a more stringent local/AHJ requirement applies, WC full flush shall not exceed 6.0 L; dual-flush 3/6 L nominal is preferred where scheduled.
- WC outlet and trap connection dimensions shall match the approved fixture and the drainage piping system; nominal 100 mm outlets shall be used where a 4 in. connection is specified.

#### 2.02 FAUCETS AND ACCESSORIES

- Commercial-quality fittings, corrosion resistant and suitable for supply pressure. Flow-control/water-efficiency requirements shall be as project sustainability/AHJ criteria.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Set fixtures rigid, level and sealed to adjacent finishes; use manufacturer anchors and resilient/sealant interfaces.
- Provide isolation valves and accessible traps/unions where required for maintenance.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Function-test each fixture for flow, drainage, leakage, trap seal and secure fixing.



# DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

## SECTION 23 34 00 - HVAC FANS

### PART 1 - GENERAL

### 1.01 SUMMARY

The fan shall be capable of continuously extracting the specified design air quantity at the required external static pressure, as indicated in the equipment schedule. The fan shall be specifically designed and certified for 400°C for a minimum duration of 2 hours under fire/smoke extraction conditions. The fan selection shall be based on the actual system resistance, including ductwork, fittings, dampers, grilles/louvres and other associated components.

### 1.02 CERTIFICATION AND STANDARDS

The fan shall be ERP and APPULUS certified, as specified, and shall comply with the latest applicable requirements of relevant international standards for smoke and heat exhaust fans. The manufacturer shall submit valid certification, type-test reports, performance curves, technical data and factory test certificates for the proposed fan for review and approval by the Consultant/Engineer.

### 1.03 SUBMITTALS

The Contractor shall submit manufacturer's technical literature, fan selection data, performance curves, dimensional drawings, motor details, power consumption, sound and vibration data, installation requirements, fire-rating certification, ERP and APPULUS certification, factory test reports and other relevant documentation for approval prior to procurement.

### PART 2 - PRODUCTS

### 2.01 FAN CONSTRUCTION

The fan casing shall be of heavy-duty construction, fabricated from corrosion-resistant steel of adequate thickness and suitably reinforced to withstand the specified operating conditions. The impeller shall be dynamically and statically balanced and shall be suitable for continuous operation at the specified temperature. All rotating components shall be securely mounted and protected by suitable guards where required. The fan shall be suitable for the specified installation arrangement, whether roof-mounted, floor-mounted, wall-mounted or installed within the duct system.

### 2.02 MOTOR

The electric motor shall be of suitable industrial-duty construction and shall be selected to operate reliably under the specified fan duty. The motor shall be properly sized so that the required fan performance is achieved without overloading under the specified operating conditions. Motor bearings, insulation class, enclosure, IP rating, voltage, phase and frequency shall be suitable for the installation environment and shall comply with the applicable IEC and other international and local standards.

### 2.03 BEARINGS AND DRIVE

Fan bearings shall be heavy-duty, permanently lubricated or provided with suitable lubrication facilities and shall be selected for the required operating temperature and service life. Where a belt-driven arrangement is provided, the belts, pulleys, shaft and associated components shall be suitably rated and protected. Direct-drive arrangements may be provided where suitable for the selected fan and application.

### 2.04 FIRE AND SMOKE PERFORMANCE

The complete fan assembly shall be certified for operation at 400°C for 2 hours and shall be suitable for smoke extraction during fire conditions. The fire-rating certification shall apply to the complete fan assembly and not merely to individual components. The Contractor shall submit valid test certificates from an internationally recognized testing/certification body confirming compliance with the specified fire-resistance performance.

## 2.05 VIBRATION ISOLATION AND SUPPORT

The fan shall be provided with suitable spring or neoprene vibration isolators, as appropriate to the installation, to prevent transmission of vibration to the building structure and connected ductwork. The fan shall be securely mounted on a suitable structural support arrangement designed to withstand the operating weight, dynamic loads and fire-service conditions.

## 2.06 ACCESSORIES

The fan shall be complete with all necessary accessories, including guards, flexible connections, vibration isolators, mounting frames/supports, anti-vibration arrangements, weatherproofing where required, electrical/control connections and any other components necessary for a complete and operational installation.

### PART 3 - EXECUTION

## 3.90 TESTING AND COMMISSIONING

After installation, the fan shall be tested and commissioned to verify the specified airflow, static pressure, rotational speed, motor current, vibration and overall operating performance. The Contractor shall verify the correct operation of all associated controls, interlocks and fire/smoke extraction functions. Test results shall be recorded and submitted to the Engineer for approval.

## SECTION 23 81 23 - COMPUTER ROOM AIR-CONDITIONING UNITS (PRECISION AIR CONDITIONING)

### PART 1 - GENERAL

### 1.01 SUMMARY

- This Specification covers the design, manufacture, supply, delivery, installation, testing, commissioning, adjusting, balancing and handing over of DX-type precision cooling equipment for the Disaster Recovery (DR) Data Centre, comprising the following:
  - In-Row (In-Rack), floor mounted type intelligent precision air conditioners, complete with matching DX-type outdoor condensing units, in the following two configurations: (i) with humidifier and dehumidifier; and (ii) without humidifier.
  - CRAC front / top discharge, floor mounted type intelligent precision air conditioners, complete with matching DX-type outdoor condensing units, in the following two configurations: (i) without heater and humidifier; and (ii) with heater and humidifier.
- The scope includes all refrigerant piping and fittings, insulation, control and sensors, condensate arrangements, integration with the DCIM, and all accessories, materials and services required to render each system complete, operational and fit for continuous duty, whether or not each individual component is expressly named herein.

### 1.02 APPROVED MANUFACTURERS AND ORIGIN

- All units shall be the product of Daikin, Toshiba, Schneider, Carrier, Samsung, Huawei or an equivalent manufacturer of USA, European or Japanese origin, approved in writing by the Engineer-in-Charge prior to procurement.
- The manufacturer shall be regularly engaged in the production of data centre precision cooling equipment and shall operate a quality management system certified to ISO 9001. Indoor units, outdoor units and controls shall be of the same manufacturer, factory matched as a system.
- Locally assembled, re-badged or re-manufactured equipment shall not be acceptable. Equipment shall be new, of current production, and supplied with the manufacturer's original packing, serial numbers and test certificates.

### 1.03 REFERENCES, CODES, STANDARDS AND CERTIFICATION

- All equipment, materials and workmanship shall comply with the latest editions of the following codes and standards, as applicable to the item concerned. Where more than one standard applies, the more stringent requirement shall govern.
  - AHRI 1360/1361 Performance Rating of Computer and Data Processing Room Air Conditioners.
  - ANSI/ASHRAE 90.4 Energy Standard for Data Center
  - ANSI/TIA-942 Telecommunications Infrastructure Standard for Data Center. (Rated-4 / Tier 4 mechanical infrastructure provisions)
  - UI Tier Standard Tier Classification (Tier IV — Fault Tolerant)
  - EN 14511-1 to -4 Air conditioners, liquid chilling packages and heat pumps — Rating and performance.
  - IEC 60335-2-40 Safety of electrical heat pumps, air conditioners and dehumidifiers.
  - ASHRAE 15 Refrigerating systems and heat pumps — Safety and environmental requirements.
  - ASHRAE 34 Designation and Safety Classification of Refrigerants.
  - IEC 60529 Degrees of protection provided by enclosures (IP Code).
  - AHRI 260/ 270 Determination of sound power levels; sound rating of equipment.
  - ASTM B280 Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
  - NFPA 75 Fire Protection of Information Technology Equipment.
  - ISO 9001 / 14001 Quality and environmental management systems.
- The offered models shall carry current AHRI certification or equivalent under the Computer and Data Processing Room Air Conditioners programme, and the certification shall be verifiable in the AHRI Directory against the exact model designation offered. Certified performance data sheets shall be submitted with the technical offer.

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- CE or UKCA declaration of conformity, product safety certification (EN 60335-2-40 or UL 1995), and EMC test certification or equivalent shall be submitted for each offered model.

### 1.04 CAPACITY SELECTION

- All cooling capacities stated in this Specification and in the equipment, schedule are ACTUAL (net sensible / total as installed) capacities and not nominal capacities.
- Selections shall account for the site design ambient conditions, the temperature and level adjustments between indoor and outdoor units, refrigerant piping losses, and the vertical level difference between indoor and outdoor units. Selection software output from the manufacturer shall be submitted for approval.
- Where a model of the exact stated capacity is not available in the manufacturer's range, the next larger capacity model shall be offered and provided. A model of lesser capacity shall be rejected and shall not be acceptable under any circumstance.
- Condensing units and the complete system shall be of T3 climatic rating.
- All equipment shall be designed in accordance with ambient design conditions not less than 46 0C and cooling capacity derating at high ambient temperature shall not exceed 10 percent. Certified derating curves shall be submitted in support.
- Units shall be capable of continuous, uninterrupted operation over an ambient temperature range of −20 °C to +55 °C and an ambient relative humidity of up to 95 percent RH.

### 1.05 SUBMITTALS

- The Contractor shall submit for approval, prior to procurement: manufacturer's technical catalogues and certified selection software output; AHRI certification evidence; dimensioned general arrangement and installation drawings; refrigerant piping layout and line sizing calculations; electrical single line diagrams and power / control schematics; sound data; weights and foundation loading; filter data; controller and communication documentation; and the proposed testing and commissioning procedure.
- On completion, the Contractor shall submit as-built drawings, operation and maintenance manuals, factory and site test records, commissioning reports, warranty certificates and a recommended spare parts schedule.

### 1.06 FACTORY ACCEPTANCE TEST (FAT)

- The PAC/CRAC units shall undergo a Factory Acceptance Test (FAT) at the manufacturer's facility prior to shipment.
- The Contractor/manufacturer shall provide adequate advance notice of the FAT and shall arrange all necessary test equipment, instruments, manpower, and facilities for witnessing of the tests by the Consultant and Client or their authorized representative.

### 1.07 WARRANTY, SPARES AND SERVICE

- All equipment shall carry the manufacturer's comprehensive warranty covering parts and labour from the date of successful commissioning and handing over, for the period stated in the Contract.
- The manufacturer shall have an authorised service presence in Pakistan, with trained personnel and stock of critical spares. A written undertaking of spare parts availability for a minimum of ten years shall be furnished.

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## PART 2 - PRODUCTS

### 2.01 GENERAL CONSTRUCTION AND PERFORMANCE

- The complete precision cooling system shall be designed, supplied and installed to comply with the Tier 4 (fault-tolerant) requirements of the data centre, and shall be of a fault-tolerant application configuration throughout.
- The unit casing shall be of heavy gauge galvanised sheet steel with electrostatic powder coated finish, mounted on a rigid welded base frame, with adjustable levelling feet and provision for seismic / floor anchoring.
- Internal insulation shall be non-hygroscopic, fibre free on the airstream face, of Class 0 fire rating, securely bonded and cleanable.

- All service access shall be from the front and rear only. Side clearance shall not be required, so that units may be installed directly between racks. Access doors shall be lockable, gasketed and fitted with concealed hinges.
- Unit footprint and height shall match the rack row; the unit shall be supplied in a width compatible with the containment arrangement and shall accept the top and side sealing panels of the hot aisle containment system.
- The unit shall be provided with modular, swappable cooling fan assemblies, each removable and replaceable from the front of the unit within a few minutes, without shutting down the unit and without special tools. Front-serviceability of each fan module shall be demonstrated at the factory acceptance test.
- Fan speed shall be modulated automatically by the unit controller in response to cooling demand and to the differential between hot aisle and cold aisle, so as to match airflow to the IT load and minimise fan energy.
- Failure of any single fan module shall not cause loss of cooling; the remaining modules shall automatically increase speed to compensate, and an alarm shall be raised at the controller and at the DCIM.

## 2.02 REFRIGERANT CIRCUIT AND CONDENSATE

- The refrigerant circuit shall comprise electronic expansion valve, filter drier, sight glass, liquid and suction service valves, high- and low-pressure switches or transducers, and all necessary safety devices in accordance with EN 378 / ASHRAE 15.
- A stainless-steel drain pan, sloped and fully drained, shall be provided under the coil, complete with condensate pump of not less than the unit's maximum condensate rate, with integral float switch, high level alarm and non-return arrangement.
- The refrigerant shall be of an ASHRAE 34 designated grade approved by the manufacturer for the offered model, with a safety classification acceptable for occupied data centre spaces, and shall comply with the Regulation.

## 2.03 CONTROLS, SENSORS AND DCIM INTEGRATION

- Each unit shall be provided with a microprocessor based intelligent controller with colour touchscreen display and network communication card.
- Each unit shall be configured with two to three built-in temperature sensors and one built-in combined temperature and humidity sensor, so as to measure conditions accurately and to increase system reliability. Remote rack-mounted sensors, complete with cable and all fittings, shall be provided and shall be included in the quoted cost.
- An alarm signal shall be generated whenever temperature or humidity fluctuations exceed the set limits.
- A water leak detection sensor shall be provided within the unit, and the unit shall accept the signal of the room leak detection system.
- The unit shall be provided with automatic refrigerant leakage detection, linked through the DCIM to NOC alerts, with all health check signals interconnected.
- Units shall be provided with the SIC (system interface / intelligent control card) complete with SIC card casing and kit, factory fitted and fully wired, for supervisory control and integration of the units.
- The complete system shall be fully integrated with the (DCIM) system, or any other approved centralized control and monitoring system, to facilitate centralized monitoring, control, alarm management, status indication, and data logging of all relevant system parameters.

## 2.04 HIGH-AMBIENT AND ENERGY PERFORMANCE

- The equipment should be in accordance with high ambient design condition. And minimum Energy Efficiency Ratio (EER) should be 3.5.

## 2.05 ELECTRICAL SUPPLY AND DISTRIBUTION

- Each unit shall have the built-in factory OEM dual power supply provision, by way of an OEM built-in power and electrical distribution board, fully wired and one hundred percent workable, accepting two independent incoming supplies with automatic transfer between them.

- The built-in distribution board shall be a factory-built assembly, complete with incoming isolators, protective devices, phase failure and phase sequence protection, surge protection, control transformer, terminal blocks and clearly identified wiring in accordance with standards.
- Loss of either incoming supply shall be transferred without interruption of cooling and shall be communicated locally and at the DCIM.

## 2.06 OUTDOOR CONDENSING UNIT

- The matching outdoor condensing unit shall be of the DC inverter, T3 rated, reversible heat pump type, with microchannel or copper-tube aluminium-fin condenser coil, corrosion protected, and EC condenser fans with low ambient head pressure control.
- The casing shall be of galvanised steel with powder coated weatherproof finish, with enclosure protection not inferior to IP 55.
- The condensing unit shall be installed on RCC foundations designed and constructed as recommended or required for the imposed load, complete with vibration isolators and all supports.

## 2.07 REFRIGERANT PIPING AND INSULATION

- Interconnecting refrigerant piping shall be of ACR grade seamless copper tube to ASTM B280, sealed and nitrogen charged, sized by the manufacturer's selection software and approved before installation.
- Any additional refrigerant charge, and refrigerant piping up to 100 feet as required by the manufacturer's recommendation, together with all fittings, insulation and accessories, shall be provided within the quoted cost.
- Insulation shall be closed cell elastomeric of Class 0 rating, of the thickness specified, with vapour sealed joints; outdoor sections shall be UV protected and cladded.
- Brazing shall be carried out under a continuous dry nitrogen purge. On completion, the circuit shall be pressure tested and held for 24 hours at 600 to 650 PSI, followed by triple evacuation to below 500 microns before charging.

## 2.08 DRAIN PIPING

- Drain Piping shall be UPVC. The IDU shall be connected to the drain pipe made of rigid heavy duty UPVC, density 10 KG/sqcm min 20 MM dia meter. The pipe under floor should be 20 Kg/sqcm
- The pipe shall be laid in proper slope for efficient draining of the condensate water.
- Drain pipe carrying condensate water shall be insulated with 3 MM thick Kini foam.
- The joint shall be properly sealed with R242 adhesive of polychloroprene to ensure proper bonding at the ends.
- For proper drainage of condensate U-trap shall be provided in the drain piping (wherever required).

## 2.09 IN-ROW (IN-RACK) PRECISION COOLING DX UNITS

- The units shall be of the close-coupled, row-based configuration with an integral electric heater, drawing hot air directly from the hot aisle and discharging conditioned air horizontally into the cold aisle, and shall be suitable for installation in line with the server racks within the hot aisle containment.
- Two configurations are specified under this Part:
  - Type A-1 — In-Row precision unit WITH integral humidifier and dehumidifier (PAC-1 + PCU-1, 35 kW actual).
  - Type A-2 — In-Row precision unit WITHOUT humidifier (PAC-1 + PCU-1, 35 kW actual).
- Except for the humidification and dehumidification provisions, both configurations shall be identical in construction, performance, controls, monitoring and quality, and shall be of the same manufacturer and product family so as to permit common spares and a common control interface.

## 2.10 IN-ROW HUMIDIFICATION AND DEHUMIDIFICATION

- Type A-1 units shall be provided with an integral humidifier and dehumidification function, complete with fill and drain solenoid valves, conductivity sensing, automatic flush cycle,

replaceable cylinder, and steam distribution into the discharge airstream. Water supply and drain connections, isolating valve, strainer and flexible connections shall be provided within the unit.

- Dehumidification shall be achieved by controlled reduction of coil temperature with reheat compensation, under the automatic control of the unit controller, without unacceptable variation of discharge air temperature.
- Type A-2 units shall be supplied WITHOUT humidifier. The unit shall nevertheless be supplied with the complete humidity sensing and monitoring provisions.
- Humidity adjustment range shall be 20 percent to 80 percent RH, with humidity control accuracy of 5 percent RH.

### 2.11 CRAC FRONT / TOP DISCHARGE PRECISION COOLING DX UNITS

- Units shall be of the floor standing perimeter type, with front or top air discharge as required by the room arrangement, and shall be suitable for continuous, unattended, year-round operation in a data centre environment.
- Two configurations are specified under this Part:
  - Type B-1 — CRAC precision unit WITHOUT heater and humidifier (PAC-2 + PCU-2, 27 kW actual; PAC-3 + PCU-3, 12 kW actual).
  - Type B-2 — CRAC precision unit WITH heater and humidifier (PAC-2 + PCU-2, 27 kW actual; PAC-3 + PCU-3, 12 kW actual).
- Both configurations shall be identical in construction, performance, controls, monitoring and quality, and shall be of the same manufacturer and product family.

### 2.12 CRAC HEATER AND HUMIDIFIER PROVISIONS

- Type B-2 units shall be provided with an integral electric heater and with an integral humidifier and dehumidification function, complete with condensation pump, water supply and drain connections and all associated controls.
- Type B-1 units shall be supplied WITHOUT electric heater and WITHOUT humidifier. Such units shall nevertheless be supplied with the complete temperature and humidity sensing, alarm and monitoring provisions.
- The humidity adjustment range shall be 20 percent to 80 percent RH with control accuracy of 5 percent RH.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- Installation shall be carried out strictly in accordance with the manufacturer's published instructions, the approved shop drawings and the requirements of the Engineer-in-Charge, by technicians trained and certified by the manufacturer.
- Indoor units shall be set level, anchored, and sealed to the containment. Outdoor units shall be set on approved RCC foundations with vibration isolation and adequate service and airflow clearance.
- Refrigerant piping shall be routed within the cable tray where so required, adequately supported, free of stress, and shall not obstruct access or airflow.

### 3.02 TRAINING

- The Contractor shall arrange manufacturer-led training for the Employer's operation and maintenance personnel, covering operation, control, alarm handling, routine maintenance, filter and fan module replacement, and DCIM interface.

### 3.90 TESTING AND COMMISSIONING

- Pressure testing of the refrigerant circuit shall be carried out for 24 hours at 600 to 650 PSI, and the circuit shall be evacuated and charged strictly as specified.
- Each unit shall be tested for cooling capacity, airflow, fan speed modulation, compressor modulation, heater operation, humidifier and dehumidifier operation, filter alarm, leak detection, refrigerant leak detection, dual power supply transfer, alarm annunciation and DCIM communication.

- System level tests shall demonstrate teamwork operation, lead / lag rotation, automatic standby changeover on unit failure, and fault tolerance of the complete cooling system consistent with the Tier 4 requirement.
- Air balancing of the pods shall be carried out and recorded, and the temperature and humidity conditions maintained shall be demonstrated to lie within the ASHRAE Class A1 envelope at design IT load.
- All tests shall be witnessed by the Engineer-in-Charge and shall be recorded on approved formats forming part of the commissioning documentation. Any equipment failing to achieve the specified performance shall be rectified or replaced by the Contractor at no additional cost.



## SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS (COMFORT AIR CONDITIONING)

### PART 1 - GENERAL

### 1.01 SUMMARY AND COMPLETENESS

The complete installation shall include all equipment, materials, accessories, controls, wiring, supports, drainage arrangements, refrigerant piping, insulation and other items necessary for proper operation, testing and commissioning of the system, whether specifically mentioned herein or not.

### 1.02 CODES, STANDARDS AND CERTIFICATION

All equipment, indoor units, outdoor condensing units, components and accessories shall be designed, manufactured, tested and certified in accordance with the latest applicable editions of ASHRAE, AHRI, IEC, ISO, UL, CE, and relevant international standards, as applicable to the equipment. The equipment shall be factory tested and certified for the specified performance, including cooling capacity, airflow, energy efficiency, electrical characteristics and safety requirements. All electrical and control components shall be appropriately certified/listed for the intended application. All equipment shall comply with applicable local codes and regulations and shall be from a manufacturer with established international quality-control and manufacturing standards.

### PART 2 - PRODUCTS

### 2.01 OUTDOOR UNITS

The outdoor unit shall be specifically designed for T3/high-ambient conditions and shall provide the required actual cooling/heating capacity under the specified design conditions. The system shall have a minimum EER of 3.5. All capacity corrections due to high ambient temperature, refrigerant pipe length, piping losses and vertical level difference between indoor and outdoor units shall be considered in equipment selection.

### 2.02 MANUFACTURER

The indoor units shall be manufactured by Daikin, Toshiba, Carrier, Samsung, or approved equivalent manufacturer of USA, European or Japanese origin, subject to approval by the Competent Authority.

### 2.03 CAPACITY

The indoor units shall have cooling/heating capacities as specified in the equipment schedule. The selected unit capacity shall be based on the actual rated performance under the specified design conditions and shall account for all applicable derating factors, including ambient temperature, temperature adjustments, elevation/level differences, refrigerant piping length, and other manufacturer-specified correction factors.

### 2.04 CAPACITY SELECTION

- Where the exact specified capacity/model is not available, the next higher capacity model shall be selected and provided, subject to Consultant's approval.
- A unit having a capacity lower than the specified/design requirement shall not be acceptable.
- Capacity selection shall be based on the actual available capacity at the design operating conditions, and not merely on the nominal or catalogue capacity.

### 2.05 REFRIGERANT PIPING AND ACCESSORIES

The unit shall be complete with insulated copper refrigerant piping up to 70 ft (21.3 m), interconnecting/control wiring, drain piping/connections, insulation, supports, hangers, refrigerant fittings, communication wiring, remote controller and all other accessories required for a complete and operational installation.

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## 2.06 PERFORMANCE AND DERATING

The specified capacities shall be considered on an actual capacity basis and not on nominal capacity basis. The Contractor shall consider all applicable manufacturer-recommended capacity correction factors due to ambient temperature, refrigerant pipe length, vertical level difference between indoor and outdoor units, temperature conditions, and piping losses. The unit selected shall be capable of delivering the required actual cooling/heating capacity under the specified design conditions after applying all such corrections.

### PART 3 - EXECUTION

## 3.01 INSTALLATION, TESTING AND COMMISSIONING

The complete system shall be installed strictly in accordance with the manufacturer's recommendations and shall be fully operational in all respects.

## DIVISION 24 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 25 - INTEGRATED AUTOMATION

*NO STANDALONE DIVISION 25 SECTION. BMS/DCIM and centralized monitoring interfaces are embedded in the functional system Sections, including Section 21 22 00 - Clean-Agent Fire Suppression, Section 23 81 23 - Computer Room Air-Conditioning Units, Section 26 32 13 - Engine Generators, and Section 26 33 13 - UPS Systems and VRLA Batteries. Communications/network integration is further coordinated under Division 27. These interface requirements do not constitute a separate complete BMS/DCIM specification unless one is expressly included elsewhere in the Contract Documents.*



# DIVISION 26 - ELECTRICAL

## SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

### PART 1 - GENERAL

#### 1.01 SYSTEM AND UTILITY BASIS

- Nominal LV system: 415/240 V, 3-phase, 4-wire, 50 Hz unless approved single-line diagrams state otherwise.
- Serving distribution utility for Multan: MEPCO / the serving DISCO and relevant Authority Having Jurisdiction. Utility-specific equipment, protection, metering and connection requirements shall comply with current approved MEPCO requirements.
- Contractor shall obtain/coordinate required utility approvals, metering, protection, substation and energization requirements.

#### 1.02 REFERENCES

- NFPA 70-2026 (NEC), as primary American installation basis subject to MEPCO/AHJ requirements.
- ANSI/NETA ATS-2025 for acceptance testing.
- IEEE/ANSI/UL/NEMA standards referenced by equipment Sections.
- IEC/BS/EN standards may be used only as a complete approved system where required by MEPCO/AHJ or where the equipment architecture is inherently IEC-based.

#### 1.03 STUDIES AND SUBMITTALS

- Load flow and voltage-drop study.
- Short-circuit study using available utility fault level and equipment data.
- Protective device coordination/selectivity study.
- Arc-flash study where required by project safety basis/AHJ.
- Harmonic and power-factor studies where nonlinear loads/capacitor banks are significant.
- Cable ampacity and pulling calculations for major feeders.
- Earthing/grounding study for substation/main grid.
- Shop drawings, SLDs, layouts, schematics, control diagrams, cause/effect interfaces and as-built records.

### PART 2 - PRODUCTS

#### 2.01 GENERAL EQUIPMENT RATINGS

- Equipment shall be continuously rated for site ambient conditions and 50 Hz service.
- Interrupting/withstand ratings shall be not less than the calculated available short-circuit current at the point of installation.
- Equipment enclosures/IP/NEMA ratings shall suit indoor/outdoor, dust, moisture and corrosion conditions.

### PART 3 - EXECUTION

#### 3.01 COORDINATION

- Coordinate electrical routes and equipment access with structure, fire systems, HVAC, plumbing and architectural clearances before installation.
- No unauthorized cutting of structural members.
- Label equipment, feeders, circuits and isolators consistently with approved SLDs.

#### 3.90 TESTING AND COMMISSIONING

- Acceptance testing to ANSI/NETA ATS-2025 and manufacturer requirements at voltage/rating appropriate to each equipment type.
- Submit calibrated test instrument certificates and signed test sheets.
- Demonstrate interlocks, protection, alarms, remote indications, phase sequence and emergency functions before energization/handover.



# SECTION 26 05 13 - MEDIUM-VOLTAGE CABLES AND ACCESSORIES

## PART 1 - GENERAL

### 1.01 SUMMARY

Provide 11 kV class feeder cables, joints, terminations, pulling, supports, identification and field testing. The nominal cable system shall be 8.7/15 kV unless the approved utility design requires otherwise; final conductor size and quantity shall be established by the approved load-flow, short-circuit, ampacity and voltage-drop studies and MEPCO requirements.

### 1.02 REFERENCES

- MEPCO/WAPDA procurement specification for 15 kV XLPE power cables and termination kits where required by the serving utility.
- IEC 60502-2 where an IEC utility cable system is required.
- IEC 60228 for conductor construction where applicable.
- IEEE 400 series / ANSI/NETA ATS-2025 for field testing where accepted by the cable manufacturer and utility.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Cable schedule including conductor material/size, screen, armour, oversheath, rated voltage, ampacity, short-circuit rating, pulling tension and minimum bending radius.
- Termination/joint kit manufacturer data and compatibility statement.
- Field test procedure agreed with cable manufacturer, MEPCO/AHJ and Engineer before testing.

## PART 2 - PRODUCTS

### 2.01 CABLE CONSTRUCTION

- Use a complete MEPCO/serving-utility-approved 8.7/15 kV XLPE cable system including conductor, conductor screen, insulation, insulation screen, metallic screen, armour where required and outer sheath, fully compliant with the approved utility procurement specification and cable schedule.
- Cable conductor and screen/earth-conductor sizes shall be as shown on the approved SLD/cable schedule and verified by ampacity, short-circuit, voltage-drop and utility requirements.
- Cable metallic screen/sheath short-circuit duty shall be demonstrated by calculation for the actual earth-fault clearing time.

### 2.02 JOINTS AND TERMINATIONS

- Use manufacturer-matched, voltage-class-rated kits suitable for conductor, insulation, screen and installation environment.
- Keep kits factory sealed until use; employ manufacturer-trained jointers where required.

## PART 3 - EXECUTION

### 3.01 HANDLING AND INSTALLATION

- Transport cable drums upright; do not transport on drum flanges. Use cable jacks, rollers and pulling stockings/eyes appropriate to cable construction.
- Do not exceed manufacturer maximum pulling tension or minimum bending radius. Protect cable from dragging, torsion and impact.
- Seal cable ends against moisture immediately after cutting and during storage.
- Provide route markers, phase identification and permanent cable tags at both ends, joints, manholes and accessible route changes.



## 3.02 SEPARATION AND BURIAL

- Cable separation, depth of cover, trench thermal backfill, warning tape/tiles and crossings shall comply with MEPCO/WAPDA requirements, NFPA 70 where applicable and the approved ampacity study.
- Cable cover, separation, spacing and crossing requirements shall comply with the approved utility standard, NFPA 70 where applicable, the cable ampacity study and project drawings. The most stringent compatible requirement governs.

## 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Inspect drums before installation for damage and quantity.
- Perform sheath, insulation, withstand or diagnostic tests only by a method and test voltage approved for the installed cable system, cable manufacturer, ANSI/NETA ATS and the serving utility/AHJ. Test methods that may damage XLPE insulation shall not be used.
- Submit signed field test results, test instrument calibration and cable identification.



## SECTION 26 05 19 - LOW-VOLTAGE CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.01 SUMMARY

LV power, lighting, control and earthing conductors/cables, terminations, glands and identification.

#### 1.02 REFERENCES

- NFPA 70 (NEC).
- UL 83 / UL 44 for building wires where UL/NEC product system is selected.
- Applicable ICEA/NEMA power cable standards.
- IEC 60228 / IEC 60502-1 may be accepted for a complete IEC cable system required by MEPCO/AHJ/design.
- IEC 60332, IEC 60754 and IEC 61034 only where LSZH/fire-performance requirements are specified for an IEC cable system.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Cable schedule showing conductor size, material, insulation, voltage rating, fire classification, installation method, ampacity and voltage drop.

### PART 2 - PRODUCTS

#### 2.01 CONDUCTORS

- High-conductivity annealed copper unless drawings expressly permit aluminum.
- Voltage grade shall suit system and installation. For IEC product systems, 450/750 V building wire and 0.6/1 kV feeder cable are typical where applicable.
- External/underground power cables shall be mechanically protected/armored where required by installation method/design.

### PART 3 - EXECUTION

#### 3.01 SIZING AND INSTALLATION

- Ampacity, correction factors, grouping and termination temperature ratings shall comply with NFPA 70 or the approved complete IEC design basis.
- Project voltage-drop design criterion: normally <=3% on a branch circuit and <=5% combined feeder plus branch circuit from source to utilization point, unless a more stringent design criterion is shown.
- Respect manufacturer minimum bending radius and pulling tension.
- Identify phases, neutral and protective conductors consistently and durably in accordance with the governing code and MEPCO/AHJ requirements. A single identification convention shall be used throughout the installation and shall not be mixed with another convention.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Insulation resistance and continuity testing to NETA/manufacturer/guiding cable standard using test voltage appropriate to circuit/equipment.
- No "one megger voltage for all circuits" rule; protect electronic equipment and SPDs from inappropriate test voltage.



## SECTION 26 05 26 - GROUNDING AND BONDING

### PART 1 - GENERAL

### 1.01 REFERENCES

- NFPA 70 - grounding and bonding for building electrical systems.
- IEEE 80 - substation grounding grid design only where applicable.
- IEEE 81 - measuring earth resistivity, ground impedance and earth-surface potentials.
- NFPA 780; UL 96/UL 96A for lightning protection.
- IEC 60364-5-54 / BS EN IEC 62305 may be accepted only where the project adopts a complete IEC system.

### 1.02 PERFORMANCE

- Project target resistance of the main protective earthing electrode system: <=1.0 ohm, measured without artificial soil wetting, unless the approved grounding study establishes a different value while meeting protection, touch/step potential and utility requirements.
- Substation grids shall be designed on permissible touch/step voltage and fault-clearing time, not on resistance alone.
- Lightning protection and protective electrical grounding shall be coordinated, bonded and tested in accordance with NFPA 780/NFPA 70, or in accordance with an approved complete IEC 62305 lightning-protection system where that system is adopted.

### PART 2 - PRODUCTS

### 2.01 GROUNDING MATERIALS

- Copper/copper-clad electrodes, conductors, connectors and ground bars of sizes shown by design and listed/approved for burial and fault duty.
- Exothermic welds or listed irreversible/compression connectors where buried permanent joints are required.

### PART 3 - EXECUTION

### 3.01 INSTALLATION

- Bond all normally non-current-carrying metal parts requiring grounding, including switchboards, panelboards, cable armor/trays, major equipment and metallic services as required by NFPA 70.
- Protect grounding conductors from mechanical damage and corrosion.
- Provide test links where shown for measurement/maintenance.

### 3.90 TESTING

- Measure electrode/grid performance by IEEE 81-appropriate method; record weather/soil condition and electrode configuration.
- Verify protective-conductor continuity and bonding.
- Where resistance target is not met, add engineered electrodes/grid enhancement; permanent performance shall not rely on water spraying.



## SECTION 26 05 33 - RACEWAYS AND BOXES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Conduit, trunking, pull/junction boxes, supports, sleeves and fittings.

#### 1.02 REFERENCES

- ANSI C80.1 - Electrical Rigid Steel Conduit, where RMC is used.
- UL 651 - Schedule 40/80 Rigid PVC Conduit and Fittings.
- NFPA 70.
- IEC 61386 may be accepted for a complete IEC conduit system when required.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

#### 2.01 CONDUIT

- Use heavy-duty uPVC/rigid steel type and schedule appropriate to concealment, impact, fire and outdoor exposure.
- Fittings shall be listed/compatible with conduit system and maintain required IP/NEMA rating.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Route neatly and coordinate before concrete casting; use long-radius bends for power feeders.
- Provide pull boxes where conductor pulling limits require; no hidden inaccessible joints in conductors unless specifically permitted.
- Seal underground/outdoor duct entries against water and pests.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Mandrel/clean ducts before cable pulling; verify continuity of metallic raceways/bonding.



# SECTION 26 11 00 - MV/LV DISTRIBUTION NETWORK AND SWITCHGEAR

## PART 1 - GENERAL

### 1.01 SUMMARY

MV/LV distribution substations, switchgear, transformers, main switchboards, panelboards, protective devices and associated controls as shown.

### 1.02 REFERENCES

- IEEE/ANSI C37 series applicable to medium-voltage switchgear/circuit breakers.
- UL 1558 or UL 891 for LV switchgear/switchboards as applicable; UL 67 for panelboards; UL 489 for molded-case breakers, where a UL/ANSI system is specified.
- IEC 62271 and IEC 61439 may be used for a complete approved IEC system when required by MEPCO/AHJ or project design.
- NFPA 70; ANSI/NETA ATS.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Manufacturer type-test certificates; short-circuit/withstand ratings; protection relay curves/settings; interlocking matrix; busbar temperature-rise data.

## PART 2 - PRODUCTS

### 2.01 ASSEMBLIES

- Select one certification family (ANSI/UL or IEC) for each assembly; do not mix component ratings in a way that invalidates assembly certification.
- Provide copper busbars unless approved drawings specify otherwise; busbar bracing and short-circuit withstand shall match study.

### 2.02 BREAKERS AND PROTECTION

- Breakers shall be trip-free and have interrupting rating not less than calculated fault current.
- Electronic trip/protective relay functions and settings shall match approved coordination study.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- Maintain manufacturer clearances and ventilation; provide accessible cable termination and maintenance space.
- Bond enclosures/doors; torque connections to manufacturer values and record critical bus/feeder torques.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Insulation resistance, contact resistance, breaker operation/timing where applicable, primary/secondary injection for protection, CT polarity/ratio and functional interlock tests to NETA/manufacturer.



# SECTION 26 24 13 - LOW-VOLTAGE SWITCHBOARDS AND PANELBOARDS

## PART 1 - GENERAL

### 1.01 SUMMARY

Factory-built LV switchboards, MDBs, MCCs, panelboards, metering, busbars, breakers, controls and auxiliary wiring.

### 1.02 REFERENCES

- NFPA 70-2026.
- UL 1558 / UL 891 / UL 67 / UL 489 where an ANSI/UL system is specified.
- IEC 61439 and IEC 60947 may be used as a complete IEC assembly system when required by MEPCO/AHJ or approved design.
- ANSI/NETA ATS-2025.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Certified assembly short-circuit rating/withstand documentation and temperature-rise/type-test evidence.
- Busbar sizes/material, fault bracing, breaker schedule, protection settings, metering single-line and internal wiring diagrams.

## PART 2 - PRODUCTS

### 2.01 SERVICE CONDITIONS

- Design for 415/240 V, 3-phase, 4-wire, 50 Hz service unless approved SLD states otherwise.
- Equipment shall be rated for the project ambient conditions. Unless a more severe environmental schedule is stated, equipment shall be suitable for continuous operation at 45 deg C ambient temperature and up to 90% relative humidity, non-condensing, subject to manufacturer derating requirements.

### 2.02 CONSTRUCTION

- Copper busbars unless approved drawings specify otherwise. Short-circuit withstand and SCCR shall not be less than the calculated available fault current.
- Provide earth bar, neutral bar, removable gland plates, labeled circuits and mechanically secure internal wiring.
- Powder-coated enclosures shall receive the project-specified coating system. Unless a different approved coating schedule is stated, total dry film thickness shall be not less than 120 microns.

### 2.03 BREAKERS AND PROTECTION

- MCCBs/ACBs shall be trip-free, fully rated for system voltage/frequency and have interrupting capacity not less than calculated fault current.
- Protective settings shall follow the approved coordination study.

### 2.04 METERING AND SECONDARY WIRING

- Meters and instrument transformers shall have accuracy class/burden suitable for the application and approved metering scheme.
- Minimum control-wire size shall be 1.5 mm2 copper generally and 2.5 mm2 copper for CT secondary circuits, unless the manufacturer, fault-duty calculation or governing system standard requires a larger conductor.
- CT secondary circuits shall include shorting/test facilities and shall never be left open-circuited while energized.



## PART 3 - EXECUTION

### 3.01 INSTALLATION

- Install plumb, level and rigidly supported with manufacturer-required front/rear/side access and ventilation clearances.
- Torque bus and cable terminations to manufacturer values using calibrated tools and record critical connections.
- Bond doors and removable metalwork with flexible bonding conductors where required.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Insulation resistance appropriate to equipment, contact resistance, mechanical/electrical breaker operation, protection relay/secondary injection, CT ratio/polarity, metering, interlocks and functional tests to ANSI/NETA ATS-2025 and manufacturer instructions.



## SECTION 26 27 26 - WIRING DEVICES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Switches, socket outlets, floor boxes, industrial outlets and local isolators.

#### 1.02 REFERENCES

- NFPA 70.
- UL 20 - General-Use Snap Switches; UL 498 - Attachment Plugs and Receptacles, where American device system is selected.
- BS 1363 may be used for 13 A switched socket outlets where the project/local user standard specifically requires the British-format system.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Device schedule and faceplate finish samples.

### PART 2 - PRODUCTS

#### 2.01 DEVICES

- Ratings shall be not less than circuit voltage/current and suitable for local plug standard selected by the project.
- Wet/outdoor locations shall use weatherproof/IP-rated devices and RCD/GFCI protection as required.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Install aligned at scheduled heights; coordinate with furniture/finishes.
- Label dedicated/UPS/essential power outlets where applicable.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Polarity, earth continuity, RCD/GFCI trip test and functional operation.

# SECTION 26 29 23 - VARIABLE-FREQUENCY DRIVES AND HARMONIC CONTROL

## PART 1 - GENERAL

### 1.01 SUMMARY

Variable-frequency drives, dedicated VFD panels where required, bypass/isolation where scheduled, EMC/harmonic mitigation and coordination with motors and upstream distribution.

### 1.02 REFERENCES

- IEEE 519-2022 - Harmonic Control in Electric Power Systems.
- IEC 61800 series for adjustable-speed drive systems where IEC-based equipment is selected.
- NFPA 70-2026.
- NEMA MG 1 for motors where NEMA motor system is used.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- VFD heat-loss and ventilation calculations; motor compatibility; cable length/output reactor or dv/dt filter assessment; harmonic study at the point of common coupling (PCC).

## PART 2 - PRODUCTS

### 2.01 DRIVES

- Provide VFD rating, overload duty and enclosure/IP/NEMA classification suitable for driven load, site ambient and installation.
- For motors above 75 kW, provide the VFD arrangement shown on the approved drawings. Where a dedicated VFD panel is required, coordinate space, access, ventilation/heat rejection, harmonic mitigation and bypass/isolation provisions with the MCC and room design.

### 2.02 HARMONIC PERFORMANCE

- Comply with IEEE 519-2022 voltage and current distortion limits at the defined PCC.
- Voltage and current harmonic distortion at the point of common coupling shall comply with IEEE 519-2022. Harmonic mitigation shall be selected on the basis of the approved harmonic study; equipment-specific internal distortion limits do not replace PCC compliance.
- Provide line reactors, passive/active filters, multi-pulse or active-front-end drives where required by the approved study.

## PART 3 - EXECUTION

### 3.01 COMMISSIONING

- Program acceleration/deceleration, current limits, minimum/maximum speed, motor protection and process interlocks.
- Verify rotation, local/remote control, bypass functions where provided, communications and protective trips.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Record input/output voltage/current and harmonic measurements where required by the commissioning plan; demonstrate compliance at the defined PCC under representative loading.



# SECTION 26 32 13 - ENGINE GENERATORS (DIESEL GENERATING SETS) AND FUEL SYSTEMS

## PART 1 - GENERAL

### 1.01 SUMMARY

- Diesel engine-driven standby generating sets, control and protection panels, generator paralleling/synchronizing panel, and the associated underground diesel fuel storage and transfer system, complete as shown on the approved single-line diagrams and BOQ.
- Basis of design: 2 No. diesel generating sets per zone (duty + standby, N+1 arrangement) across 2 zones, 4 No. sets in total, each rated 2,000 kVA / 1,600 kW prime power at site ambient conditions, arranged to operate in parallel/synchronized configuration through a dedicated synchronizing panel per zone.

### 1.02 REFERENCES

- ISO 8528 series - reciprocating internal combustion engine driven alternating current generating sets.
- NFPA 110-2024 - Emergency and Standby Power Systems.
- NFPA 37 - Installation and Use of Stationary Combustion Engines and Gas Turbines.
- NFPA 30-2024; UL 142 - flammable/combustible liquids code and steel storage tank construction, for the underground diesel fuel storage tank.
- IEC 61439-1/61439-2; IEC 60947-2 - low-voltage switchgear assemblies and circuit breakers used within genset control, synchronizing and transfer panels.
- EU Stage IIIA / EPA Tier 3 (or project-approved equivalent) - engine emissions basis.
- NFPA 70 (NEC); ANSI/NETA ATS-2025.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Genset manufacturer performance data: kVA/kW rating derated to site altitude/ambient, fuel consumption curves, cooling air requirements, and acoustic canopy sound pressure data at 1 metre.
- Alternator data sheet: insulation class, IP rating, excitation system and short-circuit withstand.
- Genset controller data sheet and protection/alarm schedule, including AMF logic, engine and alternator protections and communication protocol.
- Synchronizing/paralleling panel single-line diagram, control philosophy and Form/Type rating (Form 3B Type 2 to IEC 61439, or approved equivalent).
- Fuel storage tank fabrication drawings, welding procedure and hydrostatic/leak test procedure; fuel transfer pump selection and performance curves; hydraulic calculations.
- Shop drawings, method statement and ITP before commencement.

## PART 2 - PRODUCTS

### 2.01 DIESEL GENERATING SETS

- Water-cooled, turbocharged, electronically governed industrial prime-power-rated diesel engine, sized for the rated output at site conditions and compliant with EU Stage IIIA / EPA Tier 3 (or approved equivalent) emission standards. Acceptable makes: Cummins, Caterpillar (CAT), Perkins, MTU (Rolls-Royce Power Systems), Volvo Penta, Deutz, or approved equivalent.
- Brushless, self-exciting, self-regulating alternator, IP23 protection, Class H insulation, sized to match the 2,000 kVA / 0.8 PF rating. Acceptable makes: Stamford (Cummins Generator Technologies), Leroy-Somer, Marathon Electric, Mecc Alte, Siemens, or approved equivalent.
- Sound-attenuated, corrosion-protected, weatherproof steel acoustic canopy with lockable access doors, suitable for outdoor installation, sound level not exceeding 65-75 dBA at 1 metre (or as specified); critical/residential-grade exhaust silencer, flexible stainless-steel bellows, exhaust piping, rain cap and thermal lagging as required.
- Heavy-duty maintenance-free starting batteries, cables and terminals, with automatic float/boost battery charger.
- Microprocessor-based Intelligent Control Panel / Genset Controller providing Auto Mains Failure (AMF) with automatic start/stop and mains/generator changeover; engine protection (over-speed, low oil pressure, high coolant temperature, failure to start, low fuel level);

alternator protection (over/under voltage, over current, short circuit, reverse power, earth fault); digital multi-function metering (voltage, current, frequency, kW, kVAr, PF, running hours, fuel level); event/alarm logging with historical data storage; RS485/Modbus RTU port for SCADA/BMS integration; remote monitoring via GSM/GPRS/Ethernet/Wi-Fi (cloud-based monitoring optional); LCD/graphic display with multi-language configurable menu. Acceptable controller makes: DeepSea Electronics (DSE7000/8000 series), ComAp (InteliGen/InteliLite series), Woodward (easYgen series), Basler Electric (DGC series), or approved equivalent.

- Configuration: 2 No. sets per zone (duty + N+1 standby) x 2 zones = 4 No. sets total.

### 2.02 GENERATOR SYNCHRONIZING PANEL

- Floor-mounted, free-standing, compartmentalized panel, minimum 2.0 mm thick CRCA steel sheet, epoxy powder-coated (minimum 70-80 microns, standard shade RAL 7032/grey), Form 3B Type 2 to IEC 61439-1/61439-2, IEC 60529 (IP protection) and IEC 60947-2 (breakers); imported type-tested; auto-synchronizing module; 6,300 A copper busbar. 1 No. panel per zone x 2 zones.

### 2.03 DIESEL FUEL STORAGE AND TRANSFER SYSTEM

- Underground fuel-tight mild steel storage tank of 100,000-litre capacity per generating set, fabricated from minimum 4 mm thick MS plate, continuously welded to form a leak-proof shell and installed within an RCC underground containment tank; manholes/access openings and inlet, outlet, drain, vent and other required connections with local reinforcement; internal fuel-resistant epoxy coating and suitable external protective coating.
- Electrically operated diesel fuel transfer pumps in duty/standby arrangement, sized by hydraulic calculation for the maximum fuel consumption of the associated 2,000 kVA generating set and the required day/service tank filling time, with isolation and non-return valves, suction strainers, flexible connections, fuel filter/water separator, pressure gauges, fuel level sensors/switches, automatic pump start/stop control and a dedicated control panel with protections, indications and alarms.
- The tank and transfer system shall be fully compatible with the associated diesel generating set and day/service tank and shall comply with NFPA 30, NFPA 37, UL 142 and the generator manufacturer's recommendations.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- Install generating sets on approved vibration-isolated foundations/plinths with clearances for maintenance, air intake/discharge and acoustic enclosure access per manufacturer recommendation.
- Complete weld inspection, defect rectification and hydrostatic/leak testing of the fabricated fuel storage tank prior to backfill/burial.
- Coordinate exhaust routing, combustion air and cooling air paths, and fuel piping with structural, mechanical and fire-protection disciplines.

### 3.90 TESTING AND COMMISSIONING

- Factory and site acceptance testing per ISO 8528 and manufacturer procedures: no-load, load-bank (up to rated and overload capacity), fuel consumption verification, governor/AVR response and protective device functional tests.
- Auto Mains Failure sequence test (mains failure/restoration); synchronizing-panel parallel operation and load-sharing test between duty and standby sets per zone.
- Fuel system leak test, transfer pump duty/standby changeover test and low/high fuel level alarm verification.
- Acceptance testing to ANSI/NETA ATS-2025 for associated switchgear; submit commissioning report and as-built documentation; training of the Employer's O&M personnel.



# SECTION 26 33 13 - UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEMS AND VRLA BATTERIES

## PART 1 - GENERAL

### 1.01 SUMMARY

- Double-conversion online modular UPS systems with matching VRLA battery banks, serving critical computing/cooling loads and non-critical loads, complete with associated distribution, monitoring and battery accessories as shown on the approved single-line diagrams and BOQ.
- Basis of design: 600 kVA / 600 kW UPS units, 4 No. per zone x 2 zones = 8 No. total (2 No. serving compute load and 2 No. serving cooling load per zone), arranged with output synchronization so that on failure of one unit the remaining unit assumes the full load; and 120 kVA / 120 kW UPS units in 2N configuration, 1 No. per zone x 2 zones, serving non-critical loads.

### 1.02 REFERENCES

- IEC/EN 62040-1 - UPS safety requirements.
- IEC/EN 62040-2 - UPS electromagnetic compatibility (EMC) requirements.
- IEC/EN 62040-3 - UPS method of specifying performance and test requirements (VFI classification).
- IEC 60896-21/60896-22 - valve-regulated lead-acid stationary batteries.
- NFPA 70 (NEC); ANSI/NETA ATS-2025.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Detailed technical datasheets, general arrangement drawings and single-line diagrams of the proposed UPS and battery systems.
- Type-test certificates/reports to IEC 62040-1/62040-2/62040-3; efficiency curves and harmonic performance data.
- Battery sizing calculations for the specified autonomy and load profile, submitted for the Engineer's approval.
- Parallel-redundancy scheme documentation where applicable; shop drawings, wiring/control diagrams and manufacturer's installation and commissioning procedure.
- Warranty certificates for the UPS and the battery bank, submitted separately.

## PART 2 - PRODUCTS

### 2.01 UPS UNITS - CRITICAL LOAD (600 kVA)

- Double-conversion (VFI - Voltage and Frequency Independent) online UPS to IEC/EN 62040-3, transformerless, IGBT-based rectifier and inverter, 600 kVA / 600 kW at unity power factor.
- Input: 3-phase, 4-wire + earth, 380/400/415 V, 50 Hz; input power factor >=0.99 at full load; input current THD <=3-5% with active IGBT rectifier.
- Output: 3-phase, 4-wire + earth, 380/400/415 V +/-0.1%, 50 Hz; voltage regulation +/-1%; output THD <=2% (linear load), <=5% (non-linear load); crest factor capability 3:1; overload capability 125% for 10 minutes, 150% for 1 minute (or per manufacturer standard); efficiency >=96% in double-conversion mode.
- Automatic static bypass switch (make-before-break) and internal/external manual maintenance bypass switch; parallel capability for N+1 configuration where specified.
- LCD/touchscreen display, dry-contact/relay card, RS-232/RS-485 and SNMP/Modbus card for BMS integration.
- Enclosure: floor-standing, IP20 (indoor), powder-coated, front access. Acceptable makes: APC by Schneider Electric, Eaton, Vertiv, or approved equivalent.

### 2.02 UPS UNITS - NON-CRITICAL LOAD (120 kVA, 2N)

- Double-conversion (VFI) online UPS to IEC/EN 62040-3, 120 kVA / 120 kW per unit, arranged in 2N (fully independent, one unit per zone) configuration, each sized for 100% of its zone's connected non-critical load with independent input, output, battery and distribution paths.
- Electrical parameters as Article 2.01 except efficiency >=94-96%; automatic static bypass switch independent per unit; independent remote monitoring per zone with common integration to central BMS where required.

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## 2.03 VRLA BATTERY SYSTEM

- Valve-regulated lead-acid (VRLA), maintenance-free battery bank, sized for the specified backup time (15 minutes at full load, as specified) for each UPS unit, housed in matching battery cabinet(s) with adequate ventilation.
- Temperature-compensated charging, battery health monitoring, individual string protection (MCCB/fuses), battery interconnection/inter-cabinet cabling and battery disconnect switch/breaker.

## 2.04 ASSOCIATED WORKS

- Input and output MCCB panels/isolators for UPS integration; power cabling from source to UPS and from UPS to distribution board(s); earthing of UPS and battery cabinets in accordance with Section 26 05 26; cable trays/supports, glanding, ferruling and termination; labelling and identification of all UPS/battery components.

# PART 3 - EXECUTION

## 3.01 INSTALLATION

- Install UPS and battery cabinets with manufacturer-required clearances for ventilation, cabling and maintenance access; verify floor loading where batteries are floor-mounted.
- Bond enclosures and battery cabinets to the project earthing system; segregate battery cabling from control/signal cabling.

## 3.90 TESTING AND COMMISSIONING

- Factory Acceptance Test (FAT) reports/certificates, where applicable.
- On-site testing: no-load, full-load and load-bank testing; battery autonomy test; changeover (mains failure/restoration) test; static bypass transfer test; verification of independent operation of each zone's UPS for 2N confirmation.
- Commissioning report and as-built documentation; training of the Employer's O&M personnel.



# SECTION 26 36 00 - AUTOMATIC TRANSFER SWITCHES AND GENERATOR PARALLELING SWITCHGEAR

## PART 1 - GENERAL

### 1.01 SUMMARY

- Automatic/manual transfer switch (ATS) panels providing utility-to-generator changeover, complete with associated controls, protection and metering, as shown on the approved single-line diagrams and BOQ. Basis of design: 2,000 kVA-rated ATS panels, coordinated with the generator synchronizing panels specified in Section 26 32 13.

### 1.02 REFERENCES

- UL 1008 - Automatic Transfer Switches.
- IEC 60947-6-1 - Low-voltage switchgear and controlgear, automatic transfer switching equipment.
- IEC 60947-2 - circuit breakers used within transfer switch assemblies.
- NFPA 70 (NEC); NFPA 110 - Emergency and Standby Power Systems; ANSI/NETA ATS-2025.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Single-line diagram and control philosophy showing the interface with the utility incomer, the generator synchronizing panel and downstream distribution.
- Shop drawings/details, method statement and ITP before commencement.
- Test reports and inspection records required by this Section.

## PART 2 - PRODUCTS

### 2.01 ATS PANEL

- Floor-mounted panel board, fabricated with 14 SWG MS sheet (indoor type), painted with 100-micron powder-coated paint in an approved colour, front access, extendable, insulation class 600 V, IP-44; incoming and outgoing connections from the bottom with flexible copper cable suitable for 415 VAC, 3-phase, 4-wire, 50 Hz TPN&E system; rated service and short-circuit breaking capacity at 400 VAC to IEC 60947-2; assembled and wired with electrolytic copper busbars; manual changeover facility; complete with locks, indication lights, brass glands, neutral and earth bar, thimbles, digital volt/amp meters, selector switch, current transformers, controls, channels, relays and door earthing. Rated 2,000 kVA.
- Breakers are supplied/paid as a separate item and shall be coordinated with this Section's assembly.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- Install with manufacturer clearances and ventilation; provide accessible cable termination and maintenance space; interlock with the generator synchronizing panel to prevent inadvertent paralleling of utility and generator sources unless the design specifically provides for closed-transition/parallel operation.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Functional test of automatic and manual changeover sequences, interlocking, indication and alarms; verify transfer/re-transfer timing against the approved control philosophy; acceptance testing to ANSI/NETA ATS-2025.



# SECTION 26 41 00 - LIGHTNING PROTECTION SYSTEM

## PART 1 - GENERAL

### 1.01 SUMMARY

- Lightning protection system comprising air terminals (horn-type lightning arrestors), down conductors, and bonding to the project earthing/grounding system specified in Section 26 05 26, complete as shown on the approved drawings and BOQ.

### 1.02 REFERENCES

- NFPA 780-2023 - Standard for the Installation of Lightning Protection Systems.
- UL 96; UL 96A - Lightning Protection Components and Installation Requirements.
- IEC 62305 series / BS EN 62305 may be adopted only as a complete approved IEC lightning-protection system, in accordance with Section 26 05 26.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Risk assessment/design basis (strike frequency, protection level) where required by NFPA 780 or the adopted IEC 62305 system.
- Layout drawings showing air terminal positions, down-conductor routes and bonding/test link locations.
- Shop drawings/details, method statement and ITP before commencement; test reports required by this Section.

## PART 2 - PRODUCTS

### 2.01 AIR TERMINALS AND CONDUCTORS

- Horn-type lightning arrestor air terminals of approved material and rating, positioned to provide the required zone of protection.
- Down conductors: copper tape/conductor of the section required by NFPA 780/UL 96 or the adopted IEC 62305 system, secured with approved copper fixings at the spacing required by the referenced standard.
- Test links/joints at each down conductor to permit isolation for earth-resistance testing without disturbing the protective connection.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- Route down conductors by the most direct path from each air terminal to a dedicated lightning-protection earth electrode/the common earthing system, avoiding sharp bends; bond to structural steel, metallic roof features and other conductive elements as required by the referenced standard.
- Coordinate positions of air terminals and down conductors with roofing, cladding, facade and M&E installations before fixing.
- Bond and test the lightning-protection system together with the protective earthing system in accordance with Section 26 05 26; the system shall not be treated, tested or handed over as an installation separate from the main earthing system.

### 3.90 TESTING AND COMMISSIONING

- Continuity test of all down conductors and bonds; earth-resistance test of the lightning-protection earth electrode(s) jointly with the main earthing system per Section 26 05 26.
- Visual and dimensional check of the air terminal zone of protection against the approved design; submit test records and as-built drawings.



## SECTION 26 51 00 - INTERIOR AND EMERGENCY LIGHTING

### PART 1 - GENERAL

### 1.01 SUMMARY

Interior luminaires, drivers, emergency/exit lighting, controls and associated supports.

### 1.02 REFERENCES

- UL 1598 - Luminaires and UL 924 - Emergency Lighting and Power Equipment, where UL system is selected.
- NFPA 70 and NFPA 101/AHJ requirements for emergency/egress lighting where applicable.
- IEC 60598 may be accepted for a complete approved IEC luminaire system.
- IES recommendations and project lighting calculations.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Photometric files/calculations; luminaire schedule; driver/control compatibility; emergency duration data.

### PART 2 - PRODUCTS

### 2.01 LED LUMINAIRES

- Rated life, efficacy, CCT, CRI, flicker and photobiological safety shall comply with project lighting schedule and recognized test reports.
- Drivers shall be replaceable/maintainable where practical and suitable for 50 Hz supply and site temperature.

### PART 3 - EXECUTION

### 3.01 INSTALLATION

- Support independently where required; do not rely on ceiling grid where unsafe.
- Coordinate sensors/controls with space use and daylight.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Measure representative maintained illuminance where specified; test emergency transfer and rated-duration function.



## SECTION 26 56 13 - EXTERIOR LIGHTING POLES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Exterior lighting poles, brackets, foundations, luminaires, access doors, internal wiring and grounding.

#### 1.02 REFERENCES

- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, where applicable.
- ASCE 7-22 wind loads where project structural basis adopts ASCE 7.
- ASTM A123/A123M galvanizing.
- NFPA 70.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Pole structural calculations and foundation reactions for project wind/site exposure.

### PART 2 - PRODUCTS

#### 2.01 POLES

- Hot-dip galvanized steel or approved specified material, designed for luminaire EPA, wind load and fatigue/service requirements.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Set plumb; grout/baseplate/anchor system per design.
- Provide accessible fused cutout/terminal and grounding connection where required.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Check verticality, torque, earth continuity and lighting operation.



# DIVISION 27 - COMMUNICATIONS

## SECTION 27 10 00 - STRUCTURED CABLING AND INTELLIGENT PATCHING

### PART 1 - GENERAL

1.01 SUMMARY

Supply, installation and commissioning of intelligent copper and fiber patch panels, intelligent patch cords, controllers and physical-layer management interfaces.

1.02 REFERENCES

- TIA-568, TIA-606, TIA-607, ISO/IEC 11801, applicable IEEE Ethernet standards and manufacturer requirements.

1.03 SUBMITTALS

Submit panel schedules, rack elevations, port mapping, topology, product data, controller capacity calculations, method statement and test reports.

### PART 2 - PRODUCTS

2.01 INTELLIGENT COPPER PATCH PANELS

- 19-inch rack-mountable intelligent copper panels with port identification, connection/patch monitoring, status indication and integration with the intelligent hardware controller.

2.02 INTELLIGENT FIBER PATCH PANELS

- 19-inch rack-mountable intelligent fiber panels suitable for specified OS2/OM3 systems, with appropriate adapters/cassettes, bend-radius management, port identification and connection monitoring.

2.03 INTELLIGENT HARDWARE CONTROLLER

- Rack-mountable controller supporting the scheduled number of intelligent panels, local status display where specified, dual Ethernet management interfaces where specified, IPv4/IPv6, HTTPS, SNMP and REST/API interfaces, event logging and centralized monitoring.

2.04 ACCESSORIES

- Provide all intelligent patch cords, sensing modules, cables, power supplies, mounting hardware and licenses necessary for complete operation.

### PART 3 - EXECUTION

3.01 INSTALLATION

Install panels with proper cable management, bend-radius control, labeling and strain relief. Maintain fiber protection and separation from power cabling.

3.02 CONFIGURATION

Map all ports, racks and connections in the management system and configure alarms for unauthorized or unexpected patch changes.

3.03 TESTING AND ACCEPTANCE

Demonstrate port identification, patch detection, connection/disconnection alerts, controller communication, management interface and database accuracy.



# SECTION 27 21 00 - NETWORK SWITCHES AND WIRELESS LAN

## PART 1 - GENERAL

### 1.01 SUMMARY

Supply, installation, configuration, testing and commissioning of managed Ethernet switches including PoE switches, uplinks, transceivers and associated accessories, together with enterprise wireless Access Points and associated centralized management functions.

### 1.02 REFERENCES

- IEEE 802.3, 802.3u, 802.3ab, 802.3z; IEEE 802.3af/at/bt for PoE; IEEE 802.1Q, 802.1X, 802.1D/802.1w/802.1s, 802.1p; SNMP and applicable cybersecurity standards.
- IEEE 802.11 applicable standards; IEEE 802.3 PoE; IEEE 802.1Q VLAN; IEEE 802.1X authentication; applicable RF and safety requirements.

### 1.03 SUBMITTALS

- Submit product data, compliance matrix, port schedule, PoE budget, uplink design, VLAN/network topology, configuration plan, method statement and test reports.
- Submit product data, wireless coverage survey, AP layout, channel/power plan, SSID/VLAN design, capacity calculations, cybersecurity plan and test reports.

## PART 2 - PRODUCTS

### 2.01 MANAGED SWITCHES

Enterprise-grade managed switches with required copper ports and SFP/SFP+/higher-speed uplinks. Support VLAN, STP/RSTP/MSTP, LACP, QoS, IGMP Snooping, IPv4/IPv6, SNMP, NTP, syslog and secure management.

### 2.02 SECURITY

Support 802.1X, port security, MAC limiting, DHCP Snooping and other appropriate Layer-2 security functions.

### 2.03 PoE SWITCHES

PoE switches shall comply with applicable IEEE PoE standards and provide sufficient per-port and total PoE budget for connected APs, CCTV cameras and other powered devices.

### 2.04 SWITCH MANAGEMENT

Support secure Web/CLI management, SSH/HTTPS, configuration backup/restore, firmware upgrade and centralized monitoring where specified.

### 2.05 WIRELESS ACCESS POINTS

Enterprise-grade dual-band or tri-band Access Points supporting current IEEE 802.11 standards, MU-MIMO/OFDMA where applicable, multiple spatial streams, WPA2/WPA3, 802.1X, VLANs and PoE.

### 2.06 WIRELESS MANAGEMENT

Provide centralized/cloud/local management as specified, including monitoring, configuration, firmware management, RF/channel management, guest isolation and rogue AP detection where required.

### 2.07 WIRELESS PERFORMANCE

APs shall be selected to meet the approved coverage, capacity, concurrent-client and throughput requirements.

## PART 3 - EXECUTION

### 3.01 NETWORK SWITCH INSTALLATION

Install switches in designated racks with proper power, ventilation, grounding and cable management. Install SFP/SFP+ modules and fiber patching as specified.

### 3.02 NETWORK SWITCH CONFIGURATION

Configure VLANs, trunks, STP/RSTP/MSTP, LACP, QoS, PoE, management IPs, NTP, SNMP and security features according to approved network design.

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3.03 NETWORK SWITCH TESTING AND ACCEPTANCE

Test port connectivity, link speeds, VLANs, uplinks, PoE output, redundancy/failover where specified, management access, monitoring, alarms and configuration backup.

3.04 WIRELESS ACCESS POINT INSTALLATION

Install APs at approved locations and orientations with suitable mounting hardware and PoE connectivity.

3.05 WIRELESS CONFIGURATION

Configure SSIDs, VLANs, authentication, RF parameters, QoS, roaming and management access.

3.06 WIRELESS TESTING AND ACCEPTANCE

Perform coverage, signal quality, authentication, roaming, throughput, capacity and interference checks and submit test results.



# SECTION 27 21 30 - ENTERPRISE STORAGE - HARD DISK DRIVES

## PART 1 - GENERAL

### 1.01 SUMMARY

Supply, delivery, installation where applicable, testing and commissioning of hard disk drives for use in servers, storage systems, NVRs or other designated equipment as indicated in the Contract Documents.

### 1.02 REFERENCES

SATA/SAS interface standards, as applicable; applicable IEC, ISO and manufacturer standards; and applicable requirements of the host server/storage/NVR equipment manufacturer.

### 1.03 SUBMITTALS

Submit manufacturer datasheets indicating drive capacity, interface, rotational speed, cache, workload rating, MTBF/reliability specifications and compatibility with the proposed equipment.

## PART 2 - PRODUCTS

### 2.01 HARD DISK DRIVES

Provide new, unused, enterprise-grade or suitable high-reliability hard disk drives compatible with the designated server, storage system or NVR. Drives shall have minimum capacity as specified in the equipment schedule; SATA or SAS interface as required; 3.5-inch form factor unless otherwise specified; 24x7 continuous-operation capability where required; suitable rotational speed; adequate cache memory; suitable workload rating; error detection and correction capability; SMART or equivalent drive health monitoring; and support for RAID operation where required.

### 2.02 COMPATIBILITY

Hard drives shall be fully compatible with the proposed server, storage enclosure, NVR or other host equipment, including its drive interface, firmware requirements, RAID controller and drive-bay configuration.

### 2.03 QUALITY AND WARRANTY

Drives shall be factory-new and from an established manufacturer. Refurbished, repaired or reconditioned drives shall not be accepted. Provide manufacturer's standard warranty taken to name of client with warranty documentation at handover.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

Install drives in the designated equipment in accordance with the manufacturer's recommendations. Ensure correct drive seating, identification and connection.

### 3.02 CONFIGURATION

Where applicable, configure the drives as part of the approved RAID array, storage pool or volume and verify correct detection by the host equipment.

### 3.03 TESTING AND ACCEPTANCE

Verify drive detection and capacity, interface and link operation, drive health status, SMART or equivalent monitoring, RAID/storage operation where applicable, read/write operation, and drive status and fault reporting. Any defective, incompatible or failed drive identified during testing shall be replaced by the Contractor at no additional cost.



# DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

## SECTION 28 13 00 - ACCESS CONTROL SYSTEM

### PART 1 - GENERAL

1.01 SUMMARY

Supply, installation, configuration, testing and commissioning of network-based electronic access control including readers, controllers, locks, wireless gateways, exit devices, door monitoring and management software.

1.02 REFERENCES

- UL 294 - Access Control System Units, where a UL-based system is selected.
- NFPA 70 - electrical installation.
- Applicable IEC/EN standards for electronic access control; IEEE 802.3 Ethernet/PoE; applicable RFID/contactless card standards; local authority requirements.

1.03 SUBMITTALS

Submit product data, door schedule, controller/reader allocation, wiring diagrams, network topology, access levels, method statement, ITP and commissioning records.

### PART 2 - PRODUCTS

2.01 READERS

RFID/proximity readers shall support the credential technologies specified in the door schedule and provide secure identification, appropriate read range, status indication and weather protection where required.

2.02 DOOR CONTROLLERS

Controllers shall support the scheduled number of doors, TCP/IP and/or RS-485 communications, access levels, schedules, event logging, door status monitoring and offline operation with synchronization after network restoration.

2.03 LOCKS AND DOOR DEVICES

Provide specified wireless or wired electronic locks, request-to-exit devices, door-position monitoring, emergency release interfaces and all required accessories.

2.04 MANAGEMENT

Provide centralized user, credential, access-level, time-schedule and event management with role-based administration and audit trails.

### PART 3 - EXECUTION

3.01 INSTALLATION

Install readers, controllers, locks and accessories in accordance with approved door schedules and manufacturer requirements. Protect wiring and maintain required separation from power circuits.

3.02 CONFIGURATION

Configure credentials, access groups, schedules, alarms, door monitoring, time synchronization and secure administrator access.

3.03 TESTING AND ACCEPTANCE

Test authorized/unauthorized access, door locking/unlocking, door-ajar alarms, emergency release, event logging, controller operation, network failure recovery and CCTV integration where specified.



## SECTION 28 20 00 - IP CCTV SYSTEM AND NETWORK VIDEO RECORDING

### PART 1 - GENERAL

1.01 SUMMARY

Supply, installation, configuration, testing, commissioning and integration of IP cameras, mounting accessories, PoE interfaces and associated CCTV infrastructure, together with enterprise-grade Network Video Recorders and video management functions.

1.02 REFERENCES

- ONVIF profiles applicable to IP cameras and VMS; IEEE 802.3 Ethernet/PoE standards; IEC 62676 for video surveillance; TIA-568 series where structured cabling is in scope.
- IEC 62676; ONVIF applicable profiles; IEEE 802.3 Ethernet; applicable cybersecurity requirements for NVR/video management functions.

1.03 SUBMITTALS

- Submit product data, compliance certificates, camera schedule, field-of-view drawings, network topology, cybersecurity hardening plan, method statement, ITP, testing reports and as-built documentation.
- Submit NVR channel capacity, recording calculation, storage allocation, network interfaces, RAID configuration, software licenses, topology and test reports.

### PART 2 - PRODUCTS

2.01 IP CAMERAS

Commercial security-grade IP cameras. Outdoor cameras shall be suitably IP/IK rated. Cameras shall provide the scheduled resolution, lens, field of view, frame rate, WDR, low-light/IR performance, H.264/H.265 compression and required analytics.

2.02 PROJECT CAMERA TYPES

Provide 4MP bullet cameras, 4MP dome cameras and 4MP PTZ cameras in quantities and locations shown on the drawings and equipment schedules.

2.03 SYSTEM FEATURES

Cameras shall support secure network management, NTP time synchronization, user authentication, event/alarm functions and ONVIF interoperability where specified.

2.04 NETWORK VIDEO RECORDER

NVR shall support the scheduled camera count and required resolution/frame rate, H.264/H.265, continuous/scheduled/event recording, playback, search, export, user roles, NTP and ONVIF interoperability.

2.05 STORAGE INTERFACE

Provide sufficient internal/external storage interfaces, RAID capability and hot-swap support where specified. Hard disk drives shall comply with Section 27 21 30.

2.06 NETWORK AND SECURITY

Provide appropriate network interfaces, secure administration, event logging, user authentication and backup/restore facilities.

### PART 3 - EXECUTION

3.01 IP CCTV INSTALLATION

Coordinate camera views to avoid obstruction and excessive backlight. Secure equipment, route and label cabling neatly, and provide surge protection for exposed external links where required.

3.02 IP CCTV CONFIGURATION

Change default credentials, apply approved firmware, configure secure management, time synchronization, recording parameters and required analytics.

3.03 IP CCTV TESTING AND ACCEPTANCE

Demonstrate image quality day/night, field of view, recording/retrieval, time synchronization, alarms/analytics and network connectivity. Provide commissioning and test records.

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3.04 NVR INSTALLATION

Install NVRs in designated racks with appropriate power, ventilation, network connectivity and cable management.

3.05 NVR CONFIGURATION

Configure cameras, recording schedules, retention, users, time synchronization, alarms and event recording.

3.06 NVR TESTING AND ACCEPTANCE

Demonstrate live view, recording, playback, search, export, event recording, camera failure detection, storage status and recovery after network interruption.

## SECTION 28 31 00 - FIRE DETECTION AND ALARM

### PART 1 - GENERAL

### 1.01 SUMMARY

Addressable fire alarm and signaling system interfaces required for water-based fire protection, clean-agent releasing, ASD, HVAC shutdown, access control and central monitoring.

### 1.02 REFERENCES

- NFPA 72-2025 - National Fire Alarm and Signaling Code.
- NFPA 70 - wiring.
- UL 864 - Control Units and Accessories for Fire Alarm Systems, where UL system is selected.
- UL 268/521 and applicable listing standards for detection devices.

### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Cause-and-effect matrix; battery calculations; voltage-drop calculations; device address list; sequence of operation.

### PART 2 - PRODUCTS

### 2.01 SYSTEM

- Use a listed compatible system; all releasing service components shall be listed for releasing service where applicable.
- Provide monitoring modules and interfaces for pumps, flow switches, tamper switches, clean-agent status and all other functions required by the approved fire alarm Cause-and-Effect Matrix.

### PART 3 - EXECUTION

### 3.01 INSTALLATION AND PROGRAMMING

- Maintain separation/survivability requirements of NFPA 72 and fire strategy.
- Program alarm, supervisory, trouble and releasing sequences exactly to approved cause/effect.

### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- 100% device functional test and end-to-end cause/effect demonstration.
- Record audibility/visual notification tests where applicable.

## DIVISION 29 - RESERVED - NOT USED IN THIS VOLUME

## DIVISION 30 - RESERVED - NOT USED IN THIS VOLUME

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# DIVISION 31 - EARTHWORK

## SECTION 31 20 00 - EARTH MOVING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Excavation, filling, backfilling, disposal, subgrade preparation and compaction for buildings, pavements, utilities and external works.

#### 1.02 REFERENCES

- ASTM D2487 - Unified Soil Classification System.
- ASTM D2488 - Visual-manual soil description.
- ASTM D1557 - Laboratory compaction using modified effort.
- ASTM D6938 / ASTM D1556 - Field density.
- ASTM D4318 - Atterberg limits.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Geotechnical source/borrow approvals and laboratory compaction curves for each fill type.

### PART 2 - PRODUCTS

#### 2.01 STRUCTURAL FILL

- Clean, durable mineral soil free of organic matter, debris, expansive/unstable material and particles unsuitable for the compacted lift thickness.
- Gradation and plasticity shall comply with the geotechnical report; Engineer approval is required for borrow sources.

#### 2.02 WATER

- Clean water suitable for moisture conditioning and free of harmful contaminants.

### PART 3 - EXECUTION

#### 3.01 EXCAVATION

- Excavate to required lines/levels; keep founding surfaces undisturbed and protected.
- Remove soft, loose, organic or otherwise unsuitable material and replace with approved compacted fill or lean concrete as directed.

#### 3.02 FILLING AND COMPACTION

- Place fill in uniform layers not exceeding 150 mm compacted thickness unless trials demonstrate equivalent compaction at a greater thickness.
- For structural fill, building subgrade, pavement subgrade and backfill beneath slabs/pavements: compact to not less than 95% of maximum dry density by ASTM D1557, unless the geotechnical report requires a higher value.
- Maintain moisture content typically within +/-2 percentage points of optimum during compaction, unless the approved geotechnical procedure establishes another range.
- Nonstructural landscaped fill may be compacted to 90% ASTM D1557 where settlement will not affect structures, pavements or utilities.

#### 3.03 UTILITY TRENCHES

- Provide safe excavation, dewatering, bedding and side support.
- Do not compact directly against pipes until adequate cover and side support are established in accordance with the pipe installation standard.

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## 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- One field density test per 250 m2 per compacted lift for building/pavement areas as a baseline, and at least one per 30 m of utility trench per lift, unless the approved ITP requires more frequent testing.
- Failed areas shall be scarified/moisture-conditioned/recompacted and retested.



## SECTION 31 23 19 - DEWATERING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Temporary control of groundwater, seepage and surface water to permit stable, dry excavation and construction.

#### 1.02 REFERENCES

- Geotechnical report and approved temporary works design.
- Applicable local environmental discharge requirements.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Dewatering plan showing wells/sumps, pumps, standby capacity, discharge route and settlement/groundwater monitoring where required.

### PART 2 - PRODUCTS

#### 2.01 EQUIPMENT

- Provide duty and standby pumps, power supply, filters/wellpoints and discharge piping adequate for anticipated inflow.

### PART 3 - EXECUTION

#### 3.01 OPERATION

- Lower/control water without causing piping, loss of fines, instability or damaging settlement to adjacent property.
- Maintain dewatering until permanent works can resist hydrostatic effects and backfill is sufficiently complete.
- Treat/dispose pumped water in accordance with authority requirements.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Monitor groundwater and adjacent settlement where the geotechnical design identifies risk.



## SECTION 31 23 33 - UTILITY TRENCHING AND BACKFILL

### PART 1 - GENERAL

#### 1.01 SUMMARY

Trench excavation, shoring, dewatering, backfill and reinstatement for water, sewer and other underground services.

#### 1.02 REFERENCES

- ASTM D2321 where thermoplastic gravity pipe is used.
- ASTM D1557/D6938 for compaction.
- Applicable OSHA-style excavation safety principles plus Pakistan occupational safety requirements.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

#### 2.01 EMBEDMENT/BACKFILL

- Pipe embedment shall be compatible with pipe material and installation standard; free of sharp stones, organic matter and debris.

### PART 3 - EXECUTION

#### 3.01 EXECUTION

- Excavate only sufficient length for safe installation.
- Provide safe shoring/sloping and access.
- Compact trench backfill in <=150 mm lifts; below pavements/structures achieve >=95% ASTM D1557 unless design requires higher.
- Do not damage/displace piping during compaction.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Field density testing at frequencies in Section 31 20 00 or approved ITP.

## SECTION 31 31 16 - TERMITE CONTROL

### PART 1 - GENERAL

#### 1.01 SUMMARY

Preconstruction soil treatment and/or approved physical termite barrier to areas indicated on the drawings and BOQ.

#### 1.02 REFERENCES

- Applicable pesticide registration and environmental/health regulations of Pakistan.
- Manufacturer application instructions and approved product registration.
- Where a physical barrier is used, applicable ICC-ES/recognized product evaluation or approved EN/BS product standard may be accepted.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Product safety data sheet, active ingredient, application rate, dilution and treated-area plan.

### PART 2 - PRODUCTS

#### 2.01 TERMITICIDE

- Use only legally registered termiticide suitable for preconstruction soil treatment.
- Termiticide shall be a currently registered, approved product with documented efficacy for the intended application and shall be applied strictly in accordance with the manufacturer's instructions and applicable regulatory requirements.

### PART 3 - EXECUTION

#### 3.01 APPLICATION

- Prepare soil and apply at manufacturer-approved concentration and rate to foundation trenches, slab areas, wall perimeters, service penetrations and other required zones.
- Do not apply to waterlogged soil or where runoff could contaminate drains/watercourses.
- Protect treated surfaces from disturbance; retreat disturbed zones before covering.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Maintain batch/application records by area.
- Engineer may require independent verification of product concentration and application quantity.



# DIVISION 32 - EXTERIOR IMPROVEMENTS

## SECTION 32 01 16 - PAVEMENT RESTORATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

Reinstatement of roads, footpaths, paving and surfaces disturbed by utility work.

#### 1.02 REFERENCES

- Original pavement specification and relevant Sections 31 20 00 and 32 14 00.
- Applicable road authority specifications.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- Match existing/approved pavement layer materials and finish unless drawings require upgraded reconstruction.

### PART 3 - EXECUTION

#### 3.01 RESTORATION

- Saw-cut straight edges; remove undermined/damaged material.
- Restore subgrade, subbase/base and surfacing to original or specified thickness.
- Maintain drainage levels and smooth tie-ins.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- No settlement, rocking pavers, open joints or unsafe level difference at handover.



## SECTION 32 14 00 - UNIT PAVING AND PARKING AREAS

### PART 1 - GENERAL

#### 1.01 SUMMARY

Interlocking concrete pavers, bedding sand, edge restraints and prepared base/subbase.

#### 1.02 REFERENCES

- ASTM C936/C936M - Solid Concrete Interlocking Paving Units.
- ASTM C140/C140M - Sampling and Testing Concrete Masonry Units and Related Units.
- ASTM D1557/D6938 - Compaction and field density.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Paver samples/colors and pavement build-up/shop detail.

### PART 2 - PRODUCTS

#### 2.01 PAVERS

- Pavers shall comply with ASTM C936/C936M; thickness/shape/color as drawings.

#### 2.02 BEDDING AND JOINTING SAND

- Clean, hard, well-graded material suitable for interlocking concrete pavement; gradation per approved paver system.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Prepare compacted base to design profile.
- Lay bedding uniformly; install pavers in approved pattern with edge restraints.
- Compact and fill joints without damaging units; maintain drainage slopes.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Base/subgrade density >=95% ASTM D1557 unless pavement design requires more.
- Finished surface shall be even, stable and free of ponding; localized deviation <=6 mm under 3 m straightedge unless design requires tighter.



## SECTION 32 90 00 - LANDSCAPING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Topsoil, planting, turf, shrubs, trees, irrigation interfaces, establishment and maintenance.

#### 1.02 REFERENCES

- ANSI Z60.1 - American Standard for Nursery Stock.
- ANSI A300 - Tree Care Operations.
- ASTM D5268 - Topsoil Used for Landscaping Purposes.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Planting schedule, botanical names, sizes, quantities and sources; irrigation coordination.

### PART 2 - PRODUCTS

#### 2.01 PLANT MATERIAL

- Healthy, vigorous, true-to-species plants meeting scheduled container/root-ball/caliper/height requirements and ANSI Z60.1 quality.
- Reject root-bound, diseased, damaged or poorly formed specimens.

#### 2.02 TOPSOIL

- Fertile friable topsoil free of debris, toxic substances, persistent weeds and excessive salts; amend according to soil test and plant needs.

### PART 3 - EXECUTION

#### 3.01 PLANTING

- Prepare pits/beds to approved details; do not bury root flare.
- Stake/guy only where required and remove/adjust during establishment.
- Water immediately after planting; maintain through establishment period.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Replace dead/declining plants during the maintenance/defects period.
- Acceptance requires healthy established growth and weed-free planting beds.



# DIVISION 33 - UTILITIES

## SECTION 33 05 13 - UTILITY BEDDING

### PART 1 - GENERAL

#### 1.01 SUMMARY

Granular or concrete bedding and surround for underground pipes.

#### 1.02 REFERENCES

- ASTM D2321 for thermoplastic pipe.
- ASTM C1479 for concrete gravity pipe where applicable.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.

### PART 2 - PRODUCTS

#### 2.01 BEDDING MATERIAL

- Clean graded granular material meeting the selected pipe installation standard and design bedding class.

### PART 3 - EXECUTION

#### 3.01 PLACEMENT

- Shape bedding continuously to support pipe barrel and accommodate joints.
- Compact haunch zones carefully and symmetrically.
- Concrete cradle/encasement only where drawings/design require; provide movement isolation where needed.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Inspect bedding and line/grade before surround/backfill.



## SECTION 33 11 00 - WATER UTILITY DISTRIBUTION - HDPE

### PART 1 - GENERAL

#### 1.01 SUMMARY

HDPE water-supply pipelines, fittings, valves, specials, coatings/markers, joining, testing and disinfection.

#### 1.02 REFERENCES

- AWWA C906 - Polyethylene Pressure Pipe and Fittings.
- ASTM F714 / ASTM D3035 - PE pressure pipe.
- ASTM D3261 - Butt Heat Fusion PE Fittings.
- ASTM D3350 - PE materials.
- ASTM F2620 - Heat Fusion Joining of PE Pipe and Fittings.
- AWWA C651 - Disinfecting Water Mains.
- NSF/ANSI/CAN 61 and NSF/ANSI/CAN 372 for potable-water contact products where applicable.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Pipe/fitting pressure class, SDR/DR, PE compound designation, fusion procedure and operator qualification.
- Hydraulic pressure calculation including surge where relevant.

### PART 2 - PRODUCTS

#### 2.01 PE PIPE AND FITTINGS

- PE4710 or project-approved high-performance PE compound meeting ASTM D3350 and AWWA C906.
- Pressure rating shall not be less than maximum design pressure including surge with temperature/derating factors.
- Use one compatible manufacturer/system for pipe/fittings where practicable.

#### 2.02 VALVES AND APPURTENANCES

- AWWA/ASME/MSS-standard valves appropriate to service, pressure and end connection; potable components shall be NSF 61 compliant where required.

### PART 3 - EXECUTION

#### 3.01 JOINING

- Heat fusion to ASTM F2620 by trained/qualified personnel using calibrated equipment and recorded fusion parameters.
- Mechanical/electrofusion transitions only where approved and rated for service.

#### 3.02 INSTALLATION

- Bedding, cover, thrust/restraint and tracer wire/marker tape as approved details.
- Protect pipe from gouges, point loads and excessive bending.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Hydrostatic pressure/leakage test to AWWA C906/project test procedure after stabilization; pressure shall not exceed component rating.
- Flush and disinfect potable mains to AWWA C651 before service.



## SECTION 33 24 00 - WATER WELLS

## PART 1 - GENERAL

### 1.01 SUMMARY

Drilling, casing/screens, gravel pack, development, disinfection, pumping tests, water-quality sampling, wellhead sealing and pump installation for tube wells shown in the design.

### 1.02 REFERENCES

- AWWA A100-20 - Water Wells.
- AWWA C654 - Disinfection of Wells, where applicable/current.
- NSF/ANSI/CAN 61 and 372 for potable-water contact equipment where required.
- Applicable Pakistan groundwater abstraction, environmental and public-health requirements.

### 1.03 SUBMITTALS

- Drilling method and well construction program.
- Lithologic/geophysical logs and proposed screen/gravel-pack design.
- Well development method.
- Pump test instrumentation and discharge measurement method.
- Laboratory water-quality analysis.
- Pump performance curve and motor/controller data.

## PART 2 - PRODUCTS

### 2.01 CASING, SCREEN AND GRAVEL PACK

- Materials, diameters, slot sizes and joints shall be selected from the hydrogeological design and comply with AWWA A100.
- All potable-water-contact components shall be clean, non-toxic and corrosion-resistant for expected water chemistry.

### 2.02 PERMANENT PUMP

Pump type, rated discharge, total dynamic head, column/riser size, motor power, number of stages and controls shall be as shown on the tender drawings/BOQ and verified against the final pumping-test results and manufacturer's certified performance curve. Where actual test results differ materially from the tender design basis, submit the revised pump selection for approval before procurement.

## PART 3 - EXECUTION

### 3.01 DEVELOPMENT AND DISINFECTION

- Develop until sand/turbidity criteria required by AWWA A100/project are satisfied and stable hydraulic response is obtained.
- Disinfect well before water-quality acceptance.

### 3.02 PUMPING TESTS

Unless the hydrogeologist approves a more rigorous program, the pumping-test sequence below is the minimum project requirement. Use calibrated discharge and water-level measurement equipment and record stabilization and recovery data.

| Test / Activity | Minimum Duration |
|---|---|
| Pumping at 150% rated capacity - initial sand test | 1 hour |
| Initial specific-capacity measurement | Record after stabilization |
| Pumping at 150% rated capacity - redevelopment | 3 hours |
| Repeat sand test / second specific-capacity measurement | 1 hour |
| Recovery monitoring | 2 hours minimum |
| Step test at approximately 35%, 70%, 105% and 140% of | 4 hours total; approximately 1 |

| Test / Activity | Minimum Duration |
|---|---|
| rated capacity | hour each step |
| Constant-discharge test at 140% rated capacity | 4 hours minimum, unless hydrogeologist requires longer |

### 3.90 ACCEPTANCE

- Submit complete drilling/construction log, pumping-test plots/data and water-quality report.
- Wellhead shall be sealed and protected against surface contamination.
- Final pump selection shall be verified against measured dynamic head and sustainable yield.



## SECTION 33 31 00 - SANITARY SEWERAGE - REINFORCED CONCRETE PIPE

### PART 1 - GENERAL

#### 1.01 SUMMARY

Reinforced concrete gravity sewer pipe, joints, bedding, laying, testing and acceptance.

#### 1.02 REFERENCES

- ASTM C76/C76M - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- ASTM C443/C443M - Joints for Concrete Pipe and Manholes Using Rubber Gaskets.
- ASTM C1479 - Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Pipe class/wall designation schedule and manufacturer test certificates including three-edge-bearing tests.

### PART 2 - PRODUCTS

#### 2.01 RCC PIPE

- Class III, IV or other class only as shown by approved design/drawings.
- Unless design is explicitly based on ASTM C655 D-load pipe, use ASTM C76/C76M class/wall requirements and do not mix the standards.
- Concrete pipe materials, manufacture and strength class shall comply with ASTM C76/C76M. ASTM C655 shall be used only where the design is expressly based on D-load reinforced concrete pipe.

#### 2.02 JOINTS

- Rubber-gasket joints to ASTM C443/C443M where flexible watertight joints are required.

### PART 3 - EXECUTION

#### 3.01 LAYING

- Lay to line and grade on approved bedding; bell/socket orientation and joint assembly per manufacturer.
- Prevent ingress of soil/debris; keep pipe interior clean.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Inspect internal alignment and joints.
- Perform leakage/infiltration/exfiltration or low-pressure air testing in accordance with project/AHJ requirements appropriate to pipe type/diameter.
- CCTV inspection may be required before acceptance for inaccessible sewer runs.



## SECTION 33 39 13 - SANITARY SEWER STRUCTURES AND MANHOLES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Manholes, chambers, benching, channels, frames/covers, step systems and connections.

#### 1.02 REFERENCES

- ASTM C478/C478M - Circular Precast Reinforced Concrete Manhole Sections, where precast manholes are used.
- ASTM A48/A48M or applicable AASHTO/EN load-rated cover standard as approved for cast-iron/ductile-iron covers.
- ASTM C923/C923M - Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals where applicable.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Manhole schedule with invert levels, diameters/depths, cover load class and waterproofing.

### PART 2 - PRODUCTS

#### 2.01 COVERS AND FRAMES

- Traffic-area covers shall have load rating suitable for design vehicle loading; pedestrian areas shall meet accessibility and safety requirements.
- Use non-rocking, corrosion-resistant frames/covers of approved pattern.

### PART 3 - EXECUTION

#### 3.01 CONSTRUCTION

- Construct watertight walls/base; smooth channels and benches to direct flow without deposits.
- Provide flexible pipe connections and seal penetrations.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Leakage/visual inspection before backfill; cover seating and finished level shall be verified.



## SECTION 33 40 00 - STORMWATER DRAINAGE

### PART 1 - GENERAL

#### 1.01 SUMMARY

Storm drainage pipework, inlets, channels and discharge works not covered by sanitary sewer Sections.

#### 1.02 REFERENCES

- ASTM standards appropriate to selected pipe material, including ASTM C76/C76M for RCC pipe and ASTM D3034/F679 where PVC gravity pipe is selected.
- AASHTO/ASTM requirements for load-rated grates/covers where applicable.

#### 1.03 SUBMITTALS

- Product data and certificates demonstrating compliance with the specified standards.
- Method statement and ITP before commencement.
- Shop drawings/details where dimensions, interfaces or delegated design are involved.
- Test reports and inspection records required by this Section.
- Hydraulic design/invert schedule and outfall details.

### PART 2 - PRODUCTS

#### 2.01 PIPE AND STRUCTURES

- Pipe material/class/diameter shall match approved hydraulic and structural design.
- Grates shall be load-rated for location and resistant to blockage/unsafe openings.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- Maintain designed gradients and outfall levels.
- Protect outfalls against erosion; provide silt control during construction.

#### 3.90 FIELD QUALITY CONTROL AND ACCEPTANCE

- Flush/clean system and demonstrate free drainage before acceptance.



# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTRE AT PITB MULTAN

## VOLUME 3 (B2)

# OPERATIONS, MAINTENANCE, WARRANTY MANAGEMENT & SERVICE LEVEL AGREEMENT (O&M/SLA) REQUIREMENTS



# TABLE OF CONTENTS


1. Scope and Single-Point Responsibility ..... 2
2. Mandatory One-Year Comprehensive Warranty & O&M ..... 3
3. OEM/Manufacturer Warranties in PITB's Name ..... 3
4. Contractor Responsibility During OEM Warranty ..... 4
5. Non-Duplication of Warranty and O&M Charges ..... 4
6. Mandatory O&M Manpower ..... 4
7. 24×7×365 Shift Coverage and Relievers Management ..... 5
8. Preventive, Routine and Corrective Maintenance ..... 6
9. Protection of OEM Warranty ..... 6
10. Equipment Warranty & Support Matrix ..... 6
11. Critical Spare Parts ..... 7
12. All-Inclusive Consumables and Maintenance Materials ..... 7
13. Sole Exclusion – DG Fuel During Utility Outage ..... 8
14. Repair and Replacement Responsibility ..... 8
15. Incident Classification and Service Level Requirements ..... 9
16. SLA Measurement and Deductions ..... 17
17. Root Cause Analysis ..... 20
18. O&M Documentation and Reporting ..... 20
19. Treatment of OEM Warranties ..... 21
20. No Vendor Lock-In ..... 21
21. Transition and Handover at Completion of DLP/O&M ..... 22
22. O&M Handover at Commencement ..... 23
23. Overarching Commercial and Operational Principle ..... 23
24. TRAINING SERVICES ..... 25


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## OPERATIONS, MAINTENANCE, WARRANTY MANAGEMENT & SERVICE LEVEL AGREEMENT (O&M/SLA) REQUIREMENTS

### 1. Scope and Single-Point Responsibility

The Contractor shall provide complete Operations & Maintenance (O&M), warranty management and SLA services for the Data Center and all associated infrastructure supplied (inclusive of all active & passive components), installed, tested and commissioned under the Contract.

The Contractor shall remain the single point of responsibility for operation, monitoring, preventive maintenance, corrective maintenance, fault management, incident response, OEM coordination, warranty management, repair/replacement, service restoration, critical spares, consumables, documentation, reporting, maintenance of the required redundancy, reliability and operational availability of the Data Center.

Engagement of any OEM, manufacturer principal, authorized service provider, subcontractor or other third party shall not relieve the Contractor of any responsibility or obligation under the Contract or SLA.

The mandatory O&M/SLA Service Period shall be three hundred and sixty-five (365) calendar days commencing on the date of the Taking-Over Certificate issued under Sub-Clause 48.1. The Time for Completion of the Works shall remain twelve (12) months in accordance with Appendix-A to Bid. The O&M/SLA Service Period shall not extend the Time for Completion of the Works and shall not be treated as an extension of the construction period.

The O&M/SLA obligations shall run concurrently with the Defects Liability Period of 365 days and shall be additional to, and shall not replace, reduce or limit, the Contractor's obligations under Clause 49 of the Conditions of Contract.

The O&M scope shall include, but shall not be limited to:

- UPS systems, batteries, PDU/RPP and electrical distribution;
- transformers, switchgear, protection and associated electrical systems, where applicable;
- Diesel Generators, ATS/AMF and associated systems;
- precision cooling, In-Row cooling, CRAC/PAC and associated HVAC systems;
- fire detection, alarm and suppression systems;
- DCIM/BMS and environmental monitoring systems;
- CCTV/VSS and Access Control systems;
- racks and intelligent rack PDUs;
- normal lighting and emergency lighting systems;
- earthing, grounding and lightning-protection systems;
- associated facility network and communication components forming part of facility infrastructure; and
- any other equipment, system, component, accessory or facility infrastructure supplied, installed, tested or commissioned under the Contract.



## 2. Mandatory One-Year Comprehensive Warranty & O&M

The Contractor shall provide a minimum mandatory one (01) year comprehensive warranty and O&M services for the complete Data Center facility, commencing from the date of successful commissioning, Final Acceptance and formal handover to PITB.

During the O&M Service period, the Contractor shall be provide for:

a. 24×7×365 operation and monitoring;
b. preventive and scheduled maintenance
c. daily/routine inspections and maintenance
d. weekly, monthly, quarterly, half-yearly and annual maintenance, wherever applicable
e. corrective and breakdown maintenance
f. fault diagnosis and troubleshooting
g. repair/replacement of defective parts, components and equipment
h. OEM/principal coordination and escalation
i. lodging, processing and follow-up of warranty claims
j. maintenance and replenishment of critical spares
k. all maintenance materials & consumables specified herein
l. firmware/software updates and OEM support, where applicable
m. emergency response and service restoration
n. maintenance of required redundancy and operational availability and
o. complete service, maintenance, incident, warranty and asset records.

The mandatory one-year comprehensive warranty/O&M shall constitute the minimum contractual coverage and shall not supersede, reduce or otherwise affect any longer OEM/manufacturer warranty applicable to individual equipment or systems.

## 3. OEM/Manufacturer Warranties in PITB's Name

All OEM/manufacturer warranties, support entitlements, licenses and subscriptions for equipment, systems, components and accessories procured or supplied under the Contract shall, from inception, be registered directly in the name of Punjab Information Technology Board (PITB) as the end customer/end user and warranty beneficiary.

No warranty, support entitlement, subscription or license procured under the Contract shall be registered solely in the name of the Contractor, distributor, reseller, subcontractor or any other third party.

The Contractor shall ensure that:

a. PITB is identified by each OEM/principal as the end customer/end user and warranty beneficiary;
b. OEM warranties shall remain valid for their full original duration, including any period extending beyond the mandatory Year-1 O&M;
c. all OEM support entitlements and warranties shall remain available to PITB irrespective of expiry, termination or non-extension of the Contractor's O&M services;.
d. appointment of another O&M contractor/service provider by PITB shall not invalidate, restrict or otherwise adversely affect any OEM warranty/support entitlement;

e. PITB shall be provided access to OEM support/entitlement portals where such access is available to the end customer;
f. all relevant warranty certificates, licenses, subscriptions, support contracts, serial numbers, entitlement IDs and OEM escalation details shall be handed over to PITB; and
g. Warranty/support entitlement shall be independently verifiable by PITB with the respective OEM/principal.

Evidence of OEM warranty/support registration in PITB's name shall be a mandatory requirement for Final Acceptance. Equipment for which the applicable OEM warranty/support entitlement has not been properly registered and documented shall not be considered finally accepted.

## 4. Contractor Responsibility During OEM Warranty

Registration of OEM warranties in PITB's name shall not relieve the Contractor of its single-point responsibility during the mandatory Year-1 Warranty & O&M period.
The Contractor shall be responsible for initiating, coordinating, pursuing and closing all warranty claims with OEMs/principals/authorized service providers.

PITB shall not be required to directly pursue an OEM for routine warranty claims during the mandatory Year-1 period.

Referral or escalation of a fault to an OEM/principal shall not suspend, stop or otherwise affect the Contractor's SLA obligations or SLA measurement.

Failure or delay by an OEM, principal, authorized partner or subcontractor shall not relieve the Contractor from its service-restoration obligations and shall not constitute grounds for exemption from the Contractor's service-restoration obligations.

## 5. Non-Duplication of Warranty and O&M Charges

No equipment, spare, component, repair, replacement, labor, technical support, software/firmware support or service already included in the equipment purchase price or covered under an OEM/manufacturer warranty, support subscription or other contractual entitlement shall be separately charged to PITB.
The Contractor shall ensure that all available OEM/manufacturer warranty/support entitlements are fully utilized.

PITB shall not make duplicate payment for any item, component, replacement, labor, service or support already covered under the original equipment price, OEM warranty, support subscription or any other component of the Contract.

This principle shall apply throughout Year 1 O&M Service Period and to any longer OEM warranty which continues thereafter.

## 6. Mandatory O&M Manpower

The Contractor shall deploy the following minimum eight (08) dedicated resources for O&M of the Data Center:



| Position | Qty. | Minimum Qualification | Minimum Experience |
|---|---|---|---|
| HVAC Resident Engineer | 3 Nos. | DAE/Diploma in relevant field | 3 years relevant experience |
| Electrical Resident Engineer | 3 Nos. | DAE/Diploma in relevant field | 3 years relevant experience |
| O&M Supervisor | 1 No. | BS/B.Tech or equivalent in relevant engineering/technology field | 7 years relevant experience |
| Janitorial/Facility Support Staff | 1 No. | Suitable competence for assigned duties | Relevant experience |
| Total | 8 | | |

Relevant experience for technical personnel should preferably include operation and maintenance of Data Center/mission-critical electrical or HVAC infrastructure.
PITB shall have the right to review qualifications and experience of proposed resources prior to deployment and may require replacement of any resource not meeting the stipulated requirements.

## 7. 24×7×365 Shift Coverage and Relievers Management

The six Resident Engineers shall provide continuous 24×7×365 onsite technical coverage through three eight-hour shifts. At all times, including weekends and public holidays, each shift shall have at minimum: One (01) HVAC Resident Engineer + One (01) Electrical Resident Engineer onsite.

The Contractor shall prepare and submit monthly shift/duty rosters for approval/record by PITB. The O&M Supervisor shall supervise overall operations, maintenance schedules, SLA compliance, incident escalation, OEM coordination, reporting, documentation and manpower management and shall remain available for emergency escalation/on-call support outside normal duty hours.

The Janitorial/Facility Support Staff shall be deployed during the working hours/timings approved by PITB.

### 7.1 Reliever/Substitute Resources

The above manpower represents the minimum required onsite deployment and not the total manpower strength that may be required by the Contractor to meet the Contract.
The Contractor shall, at its own cost, maintain adequate additional qualified reliever/substitute resources to ensure uninterrupted staffing during:

- weekly offs;
- public holidays;
- annual leave;
- sick leave;
- emergency leave;
- training;
- resignation/termination;
- prolonged absence; or

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- any other unavailability of deployed personnel.

Absence of any employee shall not result in reduction of the required shift coverage.
Every substitute/reliever shall possess qualifications and experience equal to or better than those prescribed for the respective position.
No additional payment shall be admissible for reliever/substitute manpower.

## 8. Preventive, Routine and Corrective Maintenance

The Contractor shall prepare and maintain a comprehensive OEM-aligned maintenance schedule covering, as applicable:
Daily → Weekly → Monthly → Quarterly → Half-Yearly → Annual Maintenance for all installed equipment and systems.

All preventive and corrective maintenance shall be undertaken in accordance with OEM-prescribed procedures, frequencies and recommendations.

Where an OEM requires maintenance by OEM-certified/authorized personnel, such maintenance shall be arranged by the Contractor at its own responsibility and cost within the applicable O&M obligations.

All maintenance activities shall be properly documented through maintenance reports/checklists and equipment records and made available to PITB.

Maintenance activities shall be planned and executed so as not to compromise the required Data Center redundancy, availability and safety.

## 9. Protection of OEM Warranty

No maintenance activity, unauthorized intervention, configuration change, use of non-approved parts or other act/omission of the Contractor shall invalidate or adversely affect an OEM warranty.

Any OEM/manufacturer warranty rendered invalid, reduced or otherwise adversely affected due to an act, omission, negligence, unauthorized intervention or improper maintenance by the Contractor or its personnel/subcontractors shall be restored, repaired or replaced entirely at the Contractor's cost without any additional financial liability to PITB.

## 10. Equipment Warranty & Support Matrix

Prior to Final Acceptance, the Contractor shall submit a comprehensive Equipment Warranty & Support Matrix containing at minimum:

| Field | Requirement |
|---|---|
| Equipment/System | Description |
| OEM/Manufacturer | Name |
| Make/Model | Exact model |
| Serial Number | Individual equipment identification |
| Installation Date | Date |

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| | |
|---|---|
| Commissioning Date | Date |
| Warranty Start Date | Date |
| Warranty Expiry Date | Date |
| Warranty Duration | Years/Months |
| Warranty Coverage | Parts/Labor/Software/etc. |
| OEM Support Level | 24×7/Business Hours/etc. |
| OEM Entitlement/Contract No. | Reference |
| PITB Registration | Evidence |
| OEM Escalation Details | Contact details |
| Local Authorized Partner | Details |
| License/Subscription Expiry | Where applicable |
| Preventive Maintenance Requirement | OEM schedule |
| O&M Status | Warranty/Post-Warranty |
| Remarks | As applicable |

The Warranty Matrix shall be maintained and updated throughout the mandatory O&M Service period and shall form part of the permanent project records.

## 11. Critical Spare Parts

OEM warranty coverage shall not exempt the Contractor from maintaining adequate critical spares necessary to achieve the prescribed SLA.

The Bidder shall submit a proposed Critical Spare Parts List for PITB's approval, covering appropriate critical components of UPS, cooling, electrical, DG, fire detection/suppression, DCIM/BMS, access control, CCTV/VSS and other critical infrastructure. The Contractor shall maintain the approved minimum stock levels throughout the mandatory O&M Service period.

For procurement transparency, the initial critical spare inventory required at commencement shall be separately identified and priced in the BOQ and shall become PITB property upon payment and handover. Ongoing replenishment, replacement and consumable spare stock necessary to meet the SLA shall remain included in the Year-1 O&M price.

Where a Contractor-owned spare is utilized to restore equipment during the OEM warranty period, any subsequent replacement under warranty received from the OEM may be used to replenish the Contractor's spare stock without any additional cost to PITB. Non-availability of an appropriate spare shall not constitute grounds for suspension of SLA obligations.

## 12. All-Inclusive Consumables and Maintenance Materials

The O&M price shall be comprehensive and all-inclusive and shall cover all consumables, maintenance materials and minor items necessary for routine, preventive and corrective maintenance.

Such items shall include, but shall not be limited to:

- HVAC/precision cooling filters and filter media
- refrigerants required for normal maintenance
- oils and lubricants
- belts



- seals and gaskets
- DG engine oil
- DG coolant
- oil, air and fuel filters
- cleaning materials and specialized cleaning chemicals
- water-treatment chemicals, where applicable
- minor batteries/cells for sensors/controllers
- fuses, indicators, lamps and similar minor electrical items
- labeling/identification consumables
- fire-system maintenance consumables/refilling, where applicable and
- all other OEM-prescribed routine maintenance consumables.

No item required for scheduled/preventive maintenance in accordance with OEM recommendations shall be treated as separately chargeable.

The Contractor shall assess anticipated consumption while preparing its Financial Bid and shall maintain adequate onsite stock.

Increase in consumption, price escalation, shortage or non-availability shall not constitute grounds for an additional payment against PITB during the applicable O&M period of 01 Year.

## 13. Sole Exclusion – DG Fuel During Utility Outage

The only routine operational consumable excluded from the Contractor's O&M price shall be diesel fuel actually consumed by the Diesel Generators for electricity generation during an actual MEPCO/WAPDA utility outage. PITB shall arrange/procure or reimburse actual outage diesel under a transparent procedure approved by PITB.

All DG maintenance consumables, including engine oil, coolant, filters, lubricants, belts and other OEM-prescribed maintenance materials, shall remain included in the Contractor's O&M price.

Furthermore, no other consumable/material shall be considered excluded unless expressly identified as an exclusion by PITB in the Contract.

## 14. Repair and Replacement Responsibility

During the mandatory Year-1 Comprehensive Warranty and O&M period, the Contractor shall be fully responsible for rectification of all faults, failures and defects in the equipment, systems, components and accessories covered under the Contract, without any additional cost to PITB.

Any electronic, electromechanical or motorized part/component found faulty or defective shall be replaced with a new, genuine, unused and OEM-approved part/component and shall not be repaired refurbished, reconditioned and reinstalled as a permanent solution.

All replacement parts/components shall:

a. be brand-new, genuine (verifiable) and unused;



b. be of the same make/model and specification as the original component, or an OEM-approved equivalent or higher specification where the original component has become obsolete or unavailable
c. be fully compatible with the installed equipment/system without adversely affecting its performance, reliability, redundancy or OEM warranty and
d. carry the applicable OEM/manufacturer warranty.

Repaired, refurbished, reconditioned, used, salvaged or cannibalized parts/components shall not be acceptable as permanent replacements.

This requirement shall apply to, but shall not be limited to, electronic cards/PCBs, controllers, control modules, power modules, power supplies, VFDs, sensors, displays/HMIs, communication modules, motors, fans/blowers, pumps, compressors, actuators and other electronic, electromechanical or motorized components forming part of the Data Center infrastructure.

Where a permanent replacement is not immediately available from the OEM, the Contractor may, with prior approval of PITB, install a suitable temporary standby/replacement component or implement an approved workaround solely for the purpose of restoring the affected service and/or required redundancy within the prescribed SLA. Such temporary arrangement shall not be considered permanent rectification and shall be replaced with the required new and genuine component within the applicable permanent-resolution timeline.

OEM lead time, warranty/RMA processing, non-availability of replacement parts or implementation of a temporary workaround shall not relieve the Contractor of its SLA obligations or its responsibility for permanent replacement of the defective component.

Any defective component removed from the installed equipment shall remain properly documented and shall not be removed from the Data Center premises without authorization of PITB. Where return of the defective component to the OEM/principal is mandatory under an OEM warranty, RMA or exchange process, such movement shall be undertaken through the prescribed PITB authorization and documentation procedure, maintaining a complete audit trail.

## 15. Incident Classification and Service Level Requirements

15.1 General

All faults, alarms, failures and incidents relating to the Data Center facility and associated infrastructure shall be classified according to their actual or potential impact on Data Center availability, critical IT load, required redundancy, environmental conditions, life safety, physical security and continuity of operations.

Incident priority shall be determined primarily by operational impact and risk rather than solely by the type of equipment affected. Failure of the same equipment may therefore fall under different priority levels depending upon the availability of redundant/standby systems and the resulting impact on Data Center operations.



The following minimum SLA timelines shall apply:

| Priority | Definition | Response | Onsite Response | Service Restoration / Workaround | Target Permanent Resolution |
|---|---|---|---|---|---|
| P1 – Critical | Complete facility/service outage, interruption of critical infrastructure, serious life-safety/security condition, or condition presenting imminent risk to critical Data Center operations | ≤10 min | ≤1 hour | ≤4 hours | ≤8 hours* |
| P2 – Major | Major degradation, failure of critical equipment/path or loss of required redundancy while services remain operational | ≤15 min | ≤1 hour | ≤8 hours | ≤48 hours* |
| P3 – Minor | Non-critical equipment/component fault with no immediate impact on service availability or required redundancy | ≤30 min | ≤2 hours | ≤24 hours | ≤72 hours |
| P4 – Routine | Minor defect, service request, adjustment or routine maintenance issue having no material impact on availability, redundancy, safety or security | ≤4 hours | As required | N/A | ≤5 working days |

* Where permanent replacement cannot reasonably be completed within the target timeline due to documented OEM lead time, the Contractor shall restore the required service/redundancy through an approved temporary replacement, standby component or workaround within the applicable Service Restoration/Workaround timeline. Such temporary restoration shall not relieve the Contractor of its obligation to complete permanent rectification/replacement at the earliest possible time.

15.2 Major Fault/Incident Classification Matrix

The following matrix provides the minimum classification of anticipated Data Center infrastructure faults. The examples are indicative and not exhaustive.

| System / Equipment | P1 – Critical | P2 – Major | P3 – Minor | P4 – Routine |
|---|---|---|---|---|
| Utility / MV Supply / Transformers | Complete power loss with alternate / backup power | Failure of one transformer, feeder or protection path causing | Metering, indication or monitoring fault without power impact | Inspection, calibration, labeling or |



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| System / Equipment | P1 – Critical | P2 – Major | P3 – Minor | P4 – Routine |
|---|---|---|---|---|
| | unavailable or imminent risk of DC outage | loss of required redundancy | | scheduled maintenance |
| Diesel Generators | DG system unable to support critical load during utility outage; multiple DG failure compromising backup generation | Failure of one DG or associated subsystem resulting in loss of required generation redundancy | Minor DG alarm/sensor/accessory fault without affecting start/load capability | Routine servicing, filters, oil, testing and scheduled PM |
| ATS / AMF / Changeover System | Failure to transfer critical load during utility outage or unsafe switching condition threatening DC supply | Failure of automatic transfer/changeover function while alternate/manual arrangement remains available | Indication, communication or non-critical control fault | Testing, calibration or routine adjustment |
| UPS / A-B Power Paths | Loss of critical IT power, simultaneous A/B path failure, or UPS condition presenting imminent IT outage | Failure of one UPS/path/module/static bypass resulting in loss of required redundancy while load remains supported | Individual non-critical alarm/communication/ monitoring fault with capacity and redundancy unaffected | PM, inspection, calibration or approved firmware activity |
| UPS Battery System | Battery-system failure leaving UPS incapable of required ride-through during an actual power event | Battery bank/string degradation materially reducing required backup runtime/redundancy | Individual cell/battery monitoring alarm without material effect on required runtime | Testing, terminal inspection/cleaning and scheduled maintenance |
| LV Switchgear / PDU / RPP / Busway | Failure interrupting critical power or creating immediate unsafe electrical condition | Failure of one redundant distribution path/breaker/PDU while alternate path remains operational | Metering/display/communication or non-critical circuit fault | Thermography, tightening, labeling, inspection and PM |
| Rack Intelligent PDU / Rack Power | Loss of both A and B power feeds resulting in critical rack outage | Failure of either A or B rack power feed/PDU while alternate feed continues supporting the rack | Outlet, metering, SNMP or display fault without rack power impact | Configuration, labeling or routine inspection |

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| System / Equipment | P1 – Critical | P2 – Major | P3 – Minor | P4 – Routine |
|---|---|---|---|---|
| In-Row / CRAC / PAC / Precision Cooling | Cooling failure causing or imminently threatening unacceptable environmental conditions for critical IT equipment | Failure of cooling unit/path resulting in loss of required cooling redundancy while environment remains within acceptable limits | Individual sensor/display/communication/minor unit fault with adequate cooling capacity and redundancy remaining | Filter replacement, cleaning and scheduled PM |
| Condenser / Compressor / Refrigeration Circuit | Failure causing critical loss of cooling capacity or unsafe Data Hall temperature | Compressor/condenser/ circuit failure reducing required cooling redundancy/capacity | Minor control/refrigerant alarm without immediate cooling impact | Inspection, cleaning and routine servicing |
| Data Hall Temperature / Humidity | Environmental conditions outside critical operating limits presenting imminent equipment/service risk | Sustained abnormal environmental condition requiring urgent intervention but not yet causing outage | Localized deviation or individual sensor fault without threat to equipment | Calibration/routine environmental checks |
| Water / Leak Detection | Major water/refrigerant /condensate leakage threatening energized or critical IT equipment | Confirmed leakage requiring urgent intervention but not yet affecting critical equipment | Individual leak sensor/communication fault or minor contained issue | Sensor testing and routine inspection |
| Fire Detection & Alarm | Actual fire/smoke condition or critical failure of fire detection capability for a major protected area | Failure of detector loop/panel/module causing significant degradation of fire-detection coverage | Individual detector/device fault with adequate overall protection remaining | Detector cleaning, testing and scheduled maintenance |
| Fire Suppression System | Suppression system unavailable for a critical protected area, unintended discharge, or failure during actual fire condition | Failure of significant suppression component/zone materially reducing protection | Non-critical monitoring/indication fault without affecting suppression capability | Cylinder inspection, weighing, testing or scheduled servicing |
| DCIM / BMS | Complete loss of critical monitoring/contr | Loss of major monitoring/control/integr | Individual sensor/device/communication point failure | Dashboard, reporting, configuration or |



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| System / Equipment | P1 – Critical | P2 – Major | P3 – Minor | P4 – Routine |
|---|---|---|---|---|
| | ol materially compromising safe operation or incident response | ation/alarm functionality for critical systems | without operational impact | routine maintenance |
| Environmental Monitoring | Loss of monitoring associated with an actual critical environmental condition | Significant/multiple critical monitoring points unavailable | Single temperature/humidity/leak sensor failure with alternate monitoring available | Calibration, battery replacement or configuration |
| Access Control / Mantrap | Security failure permitting uncontrolled/unauthorized access to critical area or mantrap failure presenting safety/security risk | Failure of critical reader/controller/lock requiring alternate controlled-access arrangement | Individual non-critical access-control device fault where security remains maintained | Enrollment, access-right modification, alignment or routine maintenance |
| CCTV / VSS / NVR | Widespread surveillance/recording loss creating critical security exposure, particularly during a security incident | NVR/recording failure or loss of multiple critical cameras materially reducing security coverage | Individual camera failure where adequate overlapping coverage remains | Camera cleaning, alignment or configuration |
| MMR / Facility Communication Infrastructure | Failure of both required communication/ connectivity paths affecting critical DC services | Failure of one redundant communication path/device while alternate path remains operational | Individual non-critical management/monitoring link fault | Patching, labeling, documentation or routine maintenance |
| DCIM/BMS Communication Network | Complete communication-network failure causing loss of critical facility monitoring/control | Failure of one redundant network path/switch materially degrading monitoring resilience | Individual device communication failure | Configuration/port /labeling activity |
| Emergency Lighting / Life-Safety Systems | Failure creating immediate life-safety or evacuation risk | Significant loss of emergency lighting/signage in a critical area | Individual emergency light/sign fault with adequate remaining coverage | Battery/lamp testing or scheduled replacement |
| Normal Lighting | Widespread failure creating | Significant lighting failure affecting safe | Individual fixture/circuit failure | Lamp/fixture replacement or |



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| System / Equipment | P1 – Critical | P2 – Major | P3 – Minor | P4 – Routine |
|---|---|---|---|---|
| | immediate safety/critical operational risk | operation of a critical technical area | | routine maintenance |
| Earthing / Grounding / Lightning Protection | Dangerous loss of protective earthing or condition presenting immediate personnel/equipment risk | Failure/degradation of major grounding/bonding/lightning-protection component | Localized bonding/monitoring defect without immediate operational impact | Earth-resistance testing, inspection or tightening |
| Racks / Hot-Cold Aisle Containment | Structural failure threatening personnel/equipment or major containment failure creating critical thermal condition | Significant rack/containment failure affecting cooling, equipment security or operations | Individual door, lock, blanking panel or accessory defect | Alignment, adjustment or routine maintenance |
| Janitorial / Facility Housekeeping | Hazardous spill/contamination presenting immediate risk to personnel or critical equipment | Significant housekeeping condition presenting operational/safety risk | Localized housekeeping deficiency requiring corrective action | Normal scheduled cleaning/housekeeping |

15.3 Priority Classification Principles

Where an incident is not specifically identified in the above matrix, the following principles shall apply:

a. P1 – Critical: An incident shall be classified as P1 where it results in an actual Data Center or critical-service outage, interruption of critical IT power or cooling, serious life-safety/security condition, or an imminent and credible risk of critical service interruption requiring immediate intervention.

b. P2 – Major: An incident shall be classified as P2 where the Data Center remains operational but there is loss of required redundancy, significant degradation of capacity, failure of one critical A/B path/component, or material reduction in availability, protection or resilience.

c. P3 – Minor: An incident shall be classified as P3 where an equipment/component has failed or degraded but required services, capacity and redundancy remain available and there is no immediate material risk to Data Center operations.

d. P4 – Routine: P4 shall apply to routine/non-critical defects, minor adjustments, service requests and maintenance matters having no material impact on availability, redundancy, safety, security or continuity of operations.

15.4 Loss of Redundancy

For the avoidance of doubt, loss of required redundancy shall normally constitute at least a P2 – Major incident, even where the critical load/service continues to operate.
Where loss of redundancy, together with another failure or prevailing condition, creates an imminent risk of interruption to critical operations, the incident shall be escalated to P1 – Critical.

Accordingly, examples include:

- failure of one A/B UPS power path while the alternate path remains healthy: P2;
- failure of both required power paths resulting in rack/service outage: P1;
- failure of one cooling unit where required N+1 redundancy is lost: P2;
- failure of a cooling unit where adequate capacity and required redundancy remain available: P3; and
- multiple cooling failures resulting in unacceptable/rising Data Hall temperature and imminent IT risk: P1.

15.5 Dynamic Escalation and Reclassification

Incident priority shall be dynamic and based upon prevailing operational conditions.

A P2, P3 or P4 incident shall be immediately reclassified to the appropriate higher priority where:

a. an additional redundant/standby component fails;
b. required redundancy is subsequently lost
c. environmental conditions deteriorate
d. safety or security risk increases
e. the temporary workaround fails
f. the affected condition begins impacting other equipment/systems; or
g. actual interruption of critical services occurs or becomes imminent.

Upon escalation, the SLA applicable to the higher priority shall apply from the time the escalation condition occurs or is detected/reported, whichever is earlier.

Similarly, priority may be reduced after restoration of the affected service/redundancy, while permanent rectification remains pending, subject to PITB's approval.

15.6 Response, Restoration and Permanent Resolution

For SLA purposes:

Response Time means the period from detection/reporting of an incident until acknowledgement by the Contractor and commencement of technical response.

Onsite Response Time means the period within which the required qualified technical personnel/OEM support personnel, where necessary, shall attend the affected equipment onsite.
Service Restoration/Workaround Time means the maximum period within which the Contractor shall restore the affected service, functionality and/or required redundancy through permanent rectification or an approved temporary replacement/workaround.



Permanent Resolution Time means the period within which the root fault shall be completely rectified and the affected equipment/system restored to its normal design condition using the required new, genuine and OEM-approved replacement component/equipment, where replacement is required.

Temporary restoration shall not constitute permanent resolution.

15.7 OEM Escalation and Replacement Lead Time

Referral of an incident to an OEM, principal, authorized service provider or subcontractor shall not stop, suspend or reset the applicable SLA clock.

OEM response time, RMA processing, warranty processing, spare-part lead time or non-availability of a permanent replacement shall not relieve the Contractor from achieving the prescribed Service Restoration/Workaround target.

Where permanent replacement cannot reasonably be completed within the applicable target due to documented OEM lead time, the Contractor shall:

a. restore the affected service/redundancy within the applicable restoration timeline
b. provide an appropriate temporary replacement/standby component or PITB-approved workaround
c. maintain the required service and redundancy until permanent rectification; and
d. complete permanent replacement with a new, genuine and OEM-approved part/component at the earliest possible opportunity.

Any extension of the permanent-resolution target due to exceptional OEM lead time shall require documented justification and specific approval by PITB and shall not constitute automatic waiver of SLA obligations.

15.8 Multiple and Cascading Faults

Where multiple faults occur simultaneously or one fault causes/cascades into another system, the incident shall be classified according to the highest resulting operational impact.
Separate equipment alarms arising from the same underlying failure may be treated as one incident for root-cause purposes; however, this shall not reduce the applicable priority or Contractor's restoration obligations.

Repeated occurrence of the same or substantially similar fault after restoration may be treated as a recurring incident and shall require formal Root Cause Analysis and permanent corrective action.

15.9 Final Classification Authority

The fault examples contained in this Clause are indicative and not exhaustive.

Where an incident could reasonably fall within more than one priority category, the higher priority shall apply based on actual/potential operational impact and risk.

PITB's authorized Data Center representative shall have the final authority to determine, confirm or revise the priority classification of an incident for SLA purposes, taking into consideration



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service impact, redundancy status, equipment criticality, environmental conditions, life safety, physical security and risk to continuity of Data Center operations.

The Contractor shall not downgrade the priority of an incident without the approval of PITB.

15.10 Relationship with SLA Deductions

Failure to achieve the applicable Response, Onsite Response, Service Restoration/Workaround or Permanent Resolution target shall constitute an SLA breach and shall be subject to the applicable deductions/penalties prescribed elsewhere in the Contract.

Failure or delayed response of an OEM, principal, authorized service provider, subcontractor or any other third party engaged by the Contractor shall not constitute grounds for exemption from SLA measurement or applicable deductions, except where specifically accepted by PITB under an express contractual exclusion.

## 16. SLA Measurement and Deductions

16.1 SLA Deductions and Penalties

Failure by the Contractor to achieve any prescribed Response Time, Onsite Response Time, Service Restoration/Workaround Time, Permanent Resolution Time, mandatory manpower deployment, preventive-maintenance obligation, critical-spares obligation, reporting requirement or other measurable SLA requirement shall constitute an SLA breach and shall attract deductions in accordance with the following provisions.

16.1.1 Incident-Based SLA Deductions

| SLA Breach | P1 – Critical | P2 – Major | P3 – Minor | P4 – Routine |
|---|---|---|---|---|
| Response Time exceeded | 0.10% | 0.05% | 0.025% | 0.01% |
| Onsite Response Time exceeded | 0.20% | 0.10% | 0.05% | 0.02% |
| Service Restoration/Workaround Time exceeded | 0.50% | 0.25% | 0.10% | N/A |
| Permanent Resolution Time exceeded | 0.25% | 0.15% | 0.075% | 0.025% |

All percentages shall be calculated on the Annual O&M Contract Price applicable to the respective O&M year.

16.1.2 Continuing Delay after SLA Breach

Where the Contractor continues to remain in breach after expiry of the applicable SLA timeline, the following additional deductions shall apply until the applicable service/restoration/resolution requirement is achieved:

| Priority | Additional Deduction |
|---|---|

| | |
|---|---|
| P1 – Critical | 0.10% for each additional 2 hours or part thereof |
| P2 – Major | 0.05% for each additional 4 hours or part thereof |
| P3 – Minor | 0.025% for each additional 12 hours or part thereof |
| P4 – Routine | 0.01% for each additional working day or part thereof |

16.1.3 Other O&M/SLA Deductions

| Non-Compliance | Deduction |
|---|---|
| RCA for P1 not submitted within prescribed timeline | 0.10% per occurrence |
| RCA for P2, where required by PITB, not submitted within prescribed timeline | 0.05% per occurrence |
| Mandatory HVAC/Electrical Resident Engineer absent from prescribed shift | 0.10% per missing resource per shift |
| O&M Supervisor not deployed/available as contractually required | 0.10% per day |
| Scheduled preventive maintenance not performed within prescribed/OEM-approved schedule | 0.10% per occurrence |
| Approved critical spare unavailable when required for restoration | 0.25% per occurrence |
| Mandatory O&M/SLA report, maintenance record or other required documentation not submitted within prescribed timeline | 0.05% per occurrence |

Absence, leave, resignation, weekly off, public holiday or other unavailability of Contractor personnel shall not constitute grounds for exemption from mandatory manpower deployment or the above deductions. The Contractor shall provide qualified reliever/substitute resources at its own cost.

16.1.4 Repeated SLA Breaches

Where the same or substantially similar SLA breach recurs within a rolling period of ninety (90) days, the applicable deduction shall be escalated as follows:

| Occurrence | Applicable Deduction |
|---|---|
| First occurrence | Normal applicable deduction |
| Second occurrence | 1.25 times the applicable deduction |
| Third and subsequent occurrence | 1.50 times the applicable deduction |

Repeated SLA breaches may additionally require formal Root Cause Analysis and permanent corrective/preventive action as directed by PITB.

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16.1.5 Multiple SLA Breaches

Where more than one independently measurable SLA parameter is breached in relation to the same incident, deductions may be applied separately for each breached parameter, including Response Time, Onsite Response Time, Service Restoration/Workaround Time and Permanent Resolution Time.

However, duplicate deductions shall not be imposed under substantially identical provisions for the same underlying breach.

Where an incident is escalated to a higher priority due to deterioration of operational conditions, subsequent SLA measurement and deductions shall apply according to the higher priority from the time such escalation condition occurs or is detected/reported, whichever is earlier.

Failure of an OEM, principal, authorized partner, subcontractor or other third party to respond shall not constitute grounds for exemption from SLA obligations or applicable deductions.

Repeated failure to achieve SLA requirements shall result in escalating deductions and may, subject to the Contract, constitute material breach.

SLA exclusions may only include:

- planned maintenance specifically approved in advance by PITB;
- force majeure as defined under the Contract; and
- any other event expressly identified as an SLA exclusion in the Contract.

The Contractor shall submit monthly SLA reports containing incidents, response times, restoration times, permanent resolution times, root-cause analyses, SLA breaches, maintenance activities and pending actions.

16.1.6 Ceiling on Aggregate SLA Deductions and Termination for Persistent SLA Failure

The aggregate amount of all SLA deductions imposed under Sub-Clauses 16.1.1 to 16.1.5 in respect of the mandatory Year-1 O&M/SLA Services shall not exceed fifteen percent (15%) of the Accepted Year-1 O&M/SLA Contract Price.

For the avoidance of doubt, where P represents the Accepted Year-1 O&M/SLA Services Contract Price:

Maximum Aggregate SLA Deductions = 15% × P

Upon the aggregate SLA deductions reaching the above ceiling, the Contractor shall be deemed to have committed a Persistent SLA Performance Failure, and the Employer shall be entitled to terminate the Contract for default in accordance with Sub-Clause 63.1 and the Particular Conditions of Contract, by giving the Contractor the notice required under the Contract.

The application of the above ceiling shall not prejudice or limit the Employer's rights or remedies in respect of:

a. recovery of amounts otherwise due from the Contractor under the Contract
b. remedying defects and failures under Clause 49

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c. recovery of loss or damage where expressly recoverable under the Contract or applicable law
d. termination rights arising from any other event of default under the Contract; or
e. any specific obligation requiring immediate correction, rectification, replacement, restoration or compliance.

Achievement of the aggregate deduction ceiling shall constitute an additional contractual ground for termination under Sub-Clause 63.1 and shall be without prejudice to the Employer's other rights and remedies under the Contract.

Notwithstanding the separate measurement of individual SLA parameters, the aggregate SLA deductions attributable to any single incident shall not exceed 1.00% of the accepted Year-1 O&M/SLA Contract Price for a P1 incident, 0.75% for P2, 0.50% for P3 and 0.25% for P4, except where the Contractor's continuing delay constitutes a separate and continuing default under the Contract.

## 17. Root Cause Analysis

For each P1/Critical incident and such P2/Major incidents as required by PITB, the Contractor shall submit a formal Root Cause Analysis (RCA) report.

The RCA shall identify:

- incident chronology;
- affected equipment/services;
- actual root cause;
- response and restoration actions;
- temporary workaround, if any;
- permanent corrective action;
- preventive action to avoid recurrence;
- OEM findings, where applicable; and
- responsible action owner and completion date.

The RCA shall normally be submitted within three working days of restoration unless PITB approves otherwise.

## 18. O&M Documentation and Reporting

The Contractor shall maintain at minimum:

- shift logs;
- equipment operating logs;
- incident records;
- preventive-maintenance records;
- corrective-maintenance records;
- OEM service reports;
- warranty claims;
- spare-parts consumption/replenishment records;
- consumable inventory;
- alarm/event records;

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- environmental records;
- asset inventory;
- warranty register;
- license/subscription register; and
- monthly O&M/SLA reports.

All records generated in connection with operation of the Data Center shall be available to PITB.

## 19. Treatment of OEM Warranties

All OEM/manufacturer warranties provided for the equipment, systems, components and installations shall remain valid and enforceable in favor of PITB for their full original warranty period, including the entire one-year Defects Liability Period (DLP) and O&M period, where applicable.

The Contractor shall be responsible for identifying, coordinating, administering and utilizing all applicable OEM/manufacturer warranties during the DLP and one-year O&M period. Any repair, replacement, rectification, part, component or technical support covered under an OEM/manufacturer warranty shall be obtained from the respective OEM/manufacturer without any additional cost to PITB.

The Contractor shall not charge PITB for any repair, replacement, spare part, component, labor, technical support or other service where the same is covered under the applicable OEM/manufacturer warranty.

Where an OEM/manufacturer warranty expires during the one-year DLP/O&M period, the Contractor shall remain responsible for the continued operation, maintenance and performance of the relevant equipment/system for the remainder of the DLP/O&M period. The Contractor shall therefore be deemed to have fully accounted for any such potential maintenance, repair or replacement liability in its quoted O&M price, and no additional claim shall be admissible from PITB solely on account of expiry of an OEM/manufacturer warranty during the DLP/O&M period.

The Contractor shall maintain complete records of all OEM/manufacturer warranties, including warranty certificates, validity periods, conditions and contact details of the respective OEMs/manufacturers, and shall submit the same to PITB.

All OEM/manufacturer warranties and associated support entitlements shall remain available to PITB and shall not be restricted or made conditional upon the continued engagement of the Contractor beyond the contractual DLP/O&M period.

## 20. No Vendor Lock-In

The Contractor shall not implement any technical, commercial, licensing, warranty or administrative arrangement that creates unreasonable dependency upon the Contractor for subsequent operation and maintenance of the Data Center

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All system documentation, configurations, administrative credentials, licenses, support entitlements, OEM information, drawings, maintenance records and other information required to operate and maintain the facility shall remain available to PITB.

No password, configuration, license, warranty entitlement, proprietary configuration information or documentation necessary for normal operation/maintenance shall be withheld from PITB. Where technically feasible, licenses/subscriptions procured under the Contract shall be registered in PITB's name.

## 21. Transition and Handover at Completion of DLP/O&M

Upon completion or earlier termination of the one-year DLP/O&M period, or in the event PITB decides not to retain the Contractor for any subsequent O&M services, the Contractor shall provide complete, orderly and seamless transition/handover assistance to PITB and/or any subsequently appointed O&M Contractor.

The handover shall include, at minimum, the following:

- Complete asset register;
- Warranty and support matrix;
- OEM/manufacturer warranty certificates;
- OEM/manufacturer escalation contacts;
- Details of open/pending warranty claims;
- Preventive maintenance history;
- Corrective maintenance history;
- Incident and Root Cause Analysis (RCA) records;
- Details of pending technical issues and recommended actions;
- Critical spares and consumables inventory;
- Equipment configurations and settings;
- Administrative credentials through PITB-approved secure procedures;
- Licenses, subscriptions and entitlement information;
- As-built drawings and relevant design documentation;
- Single Line Diagrams (SLDs);
- SOPs, MOPs and EOPs;
- FAT, SAT and IST reports;
- Testing and commissioning reports;
- Preventive and corrective maintenance schedules;
- Software and firmware versions;
- OEM/manufacturer manuals and technical documentation; and
- Any other records, information, documentation or access reasonably required for uninterrupted continuation of Data Center O&M.

The Contractor shall ensure that the complete transition and handover is carried out without disruption to Data Center operations, compromise of system availability, or degradation of the required redundancy and performance levels.

The Contractor shall not withhold, restrict, disable or otherwise obstruct access to any PITB-owned information, documentation, configuration, license, subscription, entitlement, warranty,

technical record or access credential on account of expiry, completion or non-extension of its O&M services.

All PITB-owned records, data, configurations, documentation and other project information shall be handed over in usable electronic and/or hard-copy form, as applicable, before expiry of the DLP/O&M period.

The Contractor shall provide reasonable assistance to PITB and/or the incoming O&M Contractor during the transition period to ensure continuity of operations and shall rectify any deficiencies in the handover identified by PITB before final completion of its O&M obligations.

## 22. O&M Handover at Commencement

Before commencement of the mandatory O&M period and as a prerequisite to Final Acceptance, the Contractor shall provide and obtain PITB's acceptance of:

- approved as-built drawings;
- SLDs;
- OEM manuals;
- SOPs, MOPs and EOPs;
- preventive-maintenance schedules;
- OEM warranty certificates registered in PITB's name;
- OEM support entitlement details;
- OEM escalation matrix;
- complete serial-number asset inventory;
- Critical Spare Parts List;
- initial critical-spares inventory;
- license/subscription inventory;
- administrative credentials under PITB-controlled procedure;
- testing and commissioning reports;
- FAT/SAT/IST reports;
- training records; and
- Equipment Warranty & Support Matrix.

No equipment/system shall be deemed finally handed over until its applicable OEM warranty/support entitlement has been documented, verified and registered in PITB's name. This expands the handover requirements already contained in the draft.

## 23. Overarching Commercial and Operational Principle

For the avoidance of doubt, and notwithstanding any other provision of the RFP, the following principles shall govern the interpretation and administration of the O&M and SLA requirements:

23.1 Single Point of Operational Responsibility:

During the applicable O&M period, the Contractor shall remain the single point of operational responsibility and accountability for the Data Center systems and services covered under its O&M scope. The Contractor shall provide all resources necessary to achieve and maintain the prescribed SLA, availability, performance and service levels.



23.2 Comprehensive O&M Price:

The quoted O&M price shall be firm, comprehensive and inclusive of all manpower and resources required for the performance of the O&M services, including, but not limited to:

- O&M personnel and supervisory staff
- Relievers and replacement personnel
- Preventive and corrective maintenance
- Routine inspections, testing and servicing
- OEM/manufacturer coordination and technical support
- Critical and routine spare parts
- Repair and replacement of defective components, where not covered by an OEM warranty
- Maintenance materials and consumables
- Tools, equipment and test instruments
- Transportation and logistics required for O&M activities
- Software/firmware support where included within the Contractor's scope
- Emergency call-out and response services; and
- All other resources, services and incidental costs necessary to meet the prescribed SLA.

The only exception shall be DG fuel actually consumed for electricity generation during MEPCO/WAPDA utility outages, which shall be dealt with separately in accordance with the provisions of the Contract.

23.3 OEM Warranties and Entitlements:

All OEM/manufacturer warranties, support entitlements, licenses and subscriptions applicable to the installed systems shall, wherever contractually possible, be registered in the name of PITB from inception and shall remain available to PITB for their full original validity period.

The Contractor shall be responsible for coordinating and utilizing such warranties and entitlements during the O&M period. No duplicate payment shall be admissible for any repair, replacement, component, service or support that is already covered by an OEM/manufacturer warranty or any other contractual entitlement.

23.4 No Automatic Extension of O&M Services:

The one-year Warranty & O&M period shall constitute the mandatory contractual O&M period under this Contract.

Upon completion or expiry of the one-year Warranty & O&M period, the Contractor shall have no automatic, exclusive or vested right to continuation or extension of O&M services.

Any continuation of O&M services beyond the contractual one-year period, if required by PITB, shall be subject to PITB's requirements, applicable procurement rules and approval of the Competent Authority. PITB shall remain free to undertake fresh procurement or adopt any other procurement mechanism permissible under the applicable rules for subsequent O&M services.

Engineering Consultancy Services Punjab (Pvt) Ltd. ★ ESP

23.5 No Additional Claims:

Except where expressly provided otherwise in the Contract, the Contractor shall not be entitled to any additional payment on account of increased manpower requirements, routine wear and tear, frequency of maintenance, spare-parts consumption, repair requirements, OEM coordination, service calls, emergency response or other costs necessary to achieve the prescribed SLA during the applicable O&M Service period of 01 Year.

The Contractor shall be deemed to have fully considered these obligations and associated risks in its quoted O&M price.

## 24. TRAINING SERVICES

The Contractor shall develop and implement a comprehensive Training Plan for PITB personnel covering all systems, equipment, facilities and operational procedures included within the scope of the Project. The training shall be completed during the DLP/O&M period and shall be sufficient to enable PITB's designated personnel to independently operate, monitor, maintain and respond to routine and emergency conditions of the Data Center.

The Training Plan shall be submitted to PITB for review and approval and shall, as a minimum, address the following for each training requirement identified in the RFP:

1. Training Approach and Methodology
    - Training objectives and intended learning outcomes;
    - Classroom/theoretical training;
    - Practical/hands-on training;
    - On-site equipment/system demonstrations;
    - Simulation and scenario-based training, where applicable;
    - Emergency response and troubleshooting exercises; and
    - Assessment of trainees' understanding and competency.
2. Training Courses

    For each course/module, the Contractor shall clearly identify:

    - Course title and description;
    - Applicable system/equipment;
    - Training objectives and scope;
    - Course duration;
    - Number of training sessions;
    - Number and category of trainees;
    - Required trainee prerequisites, if any;
    - Trainer qualifications and relevant experience; and
    - Proposed training schedule.
3. Training Location

    Training shall generally be conducted at the Data Center premises using the actual installed systems and equipment. Where classroom, specialist OEM or manufacturer training is required, such training may be conducted at an appropriate location approved by PITB.

4. Training Aids and Resources

   The Contractor shall be responsible for providing all training aids, materials, equipment and resources necessary for effective delivery of the training, including, as applicable:

   - Training manuals and handouts;
   - Presentations and reference materials;
   - Operation and maintenance manuals;
   - SOPs, MOPs and EOPs;
   - Equipment/system demonstrations;
   - Training environment and required equipment;
   - Simulation/test facilities;
   - OEM/manufacturer technical documentation; and
   - Any other materials necessary for practical and effective training.

5. System-Specific Training

   Training shall cover, as applicable to the installed systems, at least the following:

   - Data Center infrastructure and general operations;
   - Electrical power systems;
   - UPS and battery systems;
   - Standby generators and associated systems;
   - HVAC/precision cooling systems;
   - Fire detection and suppression systems;
   - Building Management System (BMS) and/or monitoring systems;
   - DCIM and infrastructure monitoring systems;
   - Network and ICT infrastructure, to the extent included in the Contractor's scope;
   - Physical security, access control and CCTV systems;
   - Environmental monitoring;
   - Preventive and corrective maintenance procedures;
   - Alarm management and response procedures;
   - Emergency response and escalation procedures;
   - Business continuity and emergency operating procedures;
   - Safety procedures; and
   - Troubleshooting and fault-isolation procedures.

6. Operations and Maintenance Training

   The Contractor shall provide practical training enabling PITB personnel to carry out routine operation and maintenance activities in accordance with approved SOPs/MOPs/EOPs, OEM recommendations and applicable standards. Training shall include normal operating procedures, start-up/shutdown procedures, alarm response, equipment isolation, maintenance coordination and restoration following faults.

7. Emergency and Scenario-Based Training

   The Contractor shall conduct practical exercises for representative emergency scenarios, including, as applicable, power failure, UPS failure, generator failure, cooling failure, fire alarm/fire suppression activation, water leakage, equipment malfunction and loss of critical services. Such exercises shall be coordinated with PITB and shall not adversely affect the safe operation of the Data Center.



8. Training Records and Assessment

   The Contractor shall maintain complete records of all training sessions, including attendance sheets, course materials, dates, duration, trainer details and trainee assessments. Certificates of completion shall be provided to trainees, where applicable. The Contractor shall repeat or supplement training, at no additional cost to PITB, where PITB determines that the required level of competency has not been achieved.

9. Training Deliverables

   The Contractor shall submit the final Training Plan, training schedule, course materials, attendance records, assessment results and training completion report to PITB as part of the project/O&M documentation.

All costs associated with preparation and delivery of the above training, including trainers, training materials, training aids, demonstrations, practical sessions and other necessary resources, shall be deemed included in the Contractor's quoted Contract Price/O&M Price, unless specifically stated otherwise in the RFP/Bid Documents.



# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

## TENDER DRAWINGS





## AUGUST 2026

**CONSULTANT:**


**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
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**CLIENT:**

**PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) | LAHORE**

# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

## DATA CENTER

## ARCHITECTURAL TENDER DRAWINGS

AUGUST 2026



**CONSULTANT:**


**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
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# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

## LIST OF DRAWINGS (ARCHITECTURE)

| SR NO. | DRAWING NO. | DRAWING TITLE |
|---|---|---|
| | GENERAL DRAWINGS | |
| 1 | PITB-MB-MUL-04-G001 | LIST OF DRAWINGS |
| | MASTER PLAN | |
| 2 | PITB-ED-MUL-04-TP01 | TOPO SURVEY PLAN |
| 3 | PITB-ED-MUL-04-MP01 | MASTER PLAN |
| 4 | PITB-ED-MUL-04-MP01a | MASTER PLAN (DETAIL-1) |
| 5 | PITB-ED-MUL-04-MP02 | COORDINATES PLAN |
| | DATA CENTER MAIN BUILDING | |
| 6 | PITB-MB-MUL-04-A100 | 3D VIEWS |
| 7 | PITB-MB-MUL-04-A101 | GROUND FLOOR WORKING PLAN |
| 8 | PITB-MB-MUL-04-A102 | STRONG ROOM DETAIL |
| 9 | PITB-MB-MUL-04-A103 | MUMTY FLOOR WORKING PLAN |
| 10 | PITB-MB-MUL-04-A104 | TOP ROOF WORKING PLAN |
| 11 | PITB-MB-MUL-04-A151 | GROUND FLOOR FURNITURE LAYOUT PLAN |
| 12 | PITB-MB-MUL-04-A161 | FINISHES SCHEDULE |
| 13 | PITB-MB-MUL-04-A181 | GROUND FLOOR FLOORING PLAN |
| 14 | PITB-MB-MUL-04-A182 | MUMTY FLOOR FLOORING PLAN |
| 15 | PITB-MB-MUL-04-A201 | ELEVATION-1 |
| 16 | PITB-MB-MUL-04-A202 | ELEVATION-2 |
| 17 | PITB-MB-MUL-04-A203 | ELEVATION-3 |
| 18 | PITB-MB-MUL-04-A204 | ELEVATION-4 |
| 19 | PITB-MB-MUL-04-A301 | SECTION-A |
| 20 | PITB-MB-MUL-04-A302 | SECTION-B |
| 21 | PITB-MB-MUL-04-A401 | GROUND FLOOR CEILING PLAN |
| 22 | PITB-MB-MUL-04-A402 | MUMTY FLOOR CEILING PLAN |
| 23 | PITB-MB-MUL-04-A551 | DOOR & WINDOW SCHEDULE |
| 24 | PITB-MB-MUL-04-A552 | TYPICAL DETAILS |

| SR NO. | DRAWING NO. | DRAWING TITLE |
|---|---|---|
| | ELECTRICAL SUBSTATION | |
| 25 | PITB-ESS-MUL-04-A101 | GROUND FLOOR WORKING PLAN |
| 26 | PITB-ESS-MUL-04-A102 | GEN. SET SYNC-MTTM ROOM GROUND FLOOR WORKING PLAN |
| 27 | PITB-ESS-MUL-04-A103 | EXTERNAL FUEL TANK GROUND FLOOR WORKING PLAN |
| 28 | PITB-ESS-MUL-04-A104 | INCOMING & OUTGOING METERING PANEL ROOM G. F WORKING PLAN |
| 29 | PITB-ESS-MUL-04-A201 | ELEVATION-1 |
| 30 | PITB-ESS-MUL-04-A551 | DOOR SCHEDULE |
| | GUARD ROOM | |
| 31 | PITB-ED-MUL-04-A101 | GUARD ROOM DETAIL-1 |
| 32 | PITB-ED-MUL-04-A102 | GUARD ROOM DETAIL-2 |
| 33 | BOUNDARY WALL & MAIN GATE | |
| 34 | PITB-ED-MUL-04-A101 | TYP.BOUNDARY WALL PLAN & ELEVATION |
| 35 | PITB-ED-MUL-04-A102 | MAIN GATE PLAN & ELEVATION |

CLIENT:
Punjab Information Technology Board (PITB) | Lahore

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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

DRAWING TITLE: LIST OF DRAWINGS

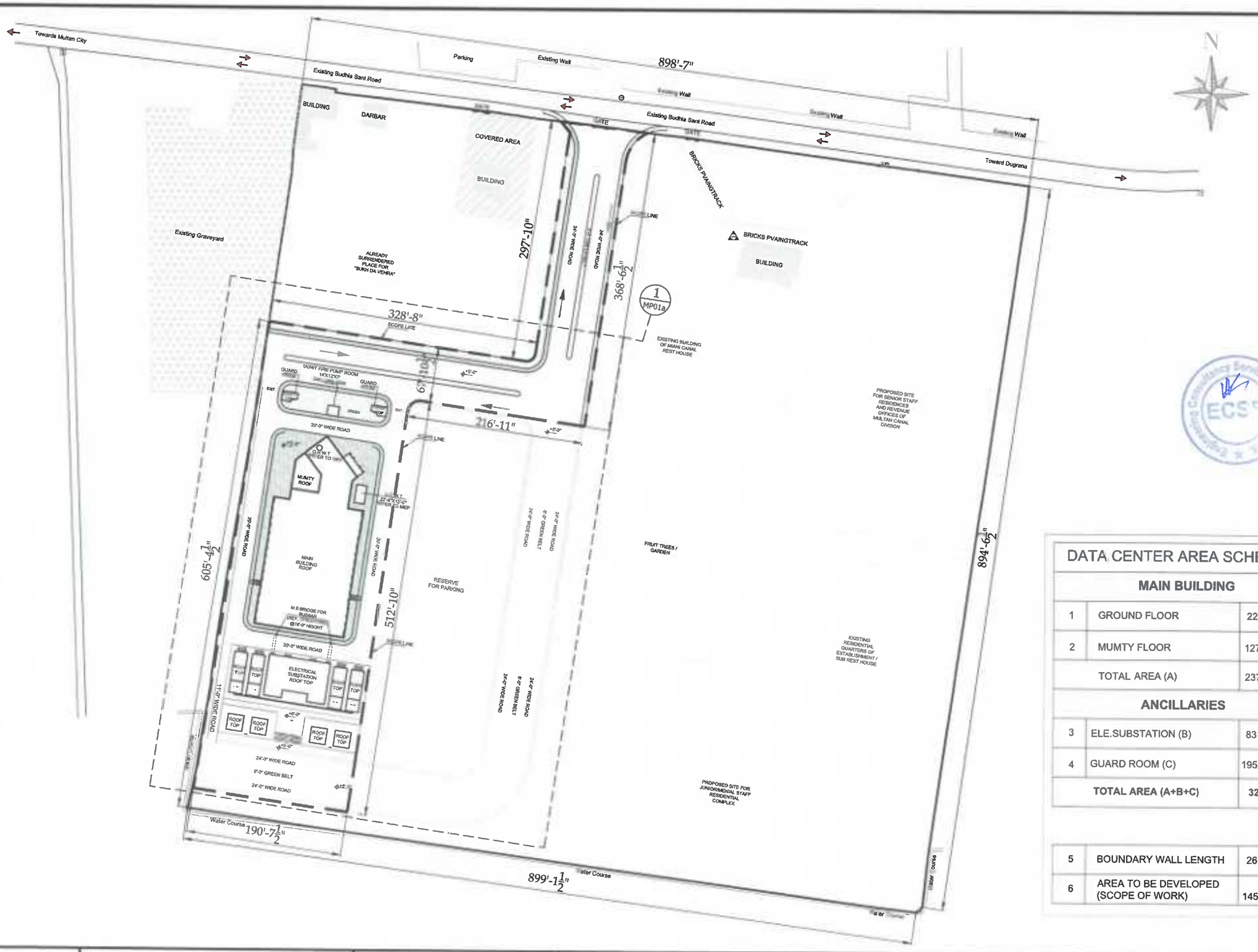
DRAWING NO: PITB-MB-MUL-04-G001

SCALE: N.T.S

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# PITB MAIN BUILDING




## DATA CENTER AREA SCHEDULE

| | | |
|---|---|---|
| **MAIN BUILDING** | | |
| 1 | GROUND FLOOR | 22508 SFT |
| 2 | MUMTY FLOOR | 1275 SFT |
| | TOTAL AREA (A) | 23783 SFT |
| **ANCILLARIES** | | |
| 3 | ELE.SUBSTATION (B) | 8315 SFT |
| 4 | GUARD ROOM (C) | 195X2= 390SFT |
| | **TOTAL AREA (A+B+C)** | **32488 SFT** |

| | | |
|---|---|---|
| 5 | BOUNDARY WALL LENGTH | 2610 RFT |
| 6 | AREA TO BE DEVELOPED (SCOPE OF WORK) | 145477 SFT |

**CLIENT:**
Punjab Information Technology Board (PITB) | Lahore

**CONSULTANTS:**
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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR.MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

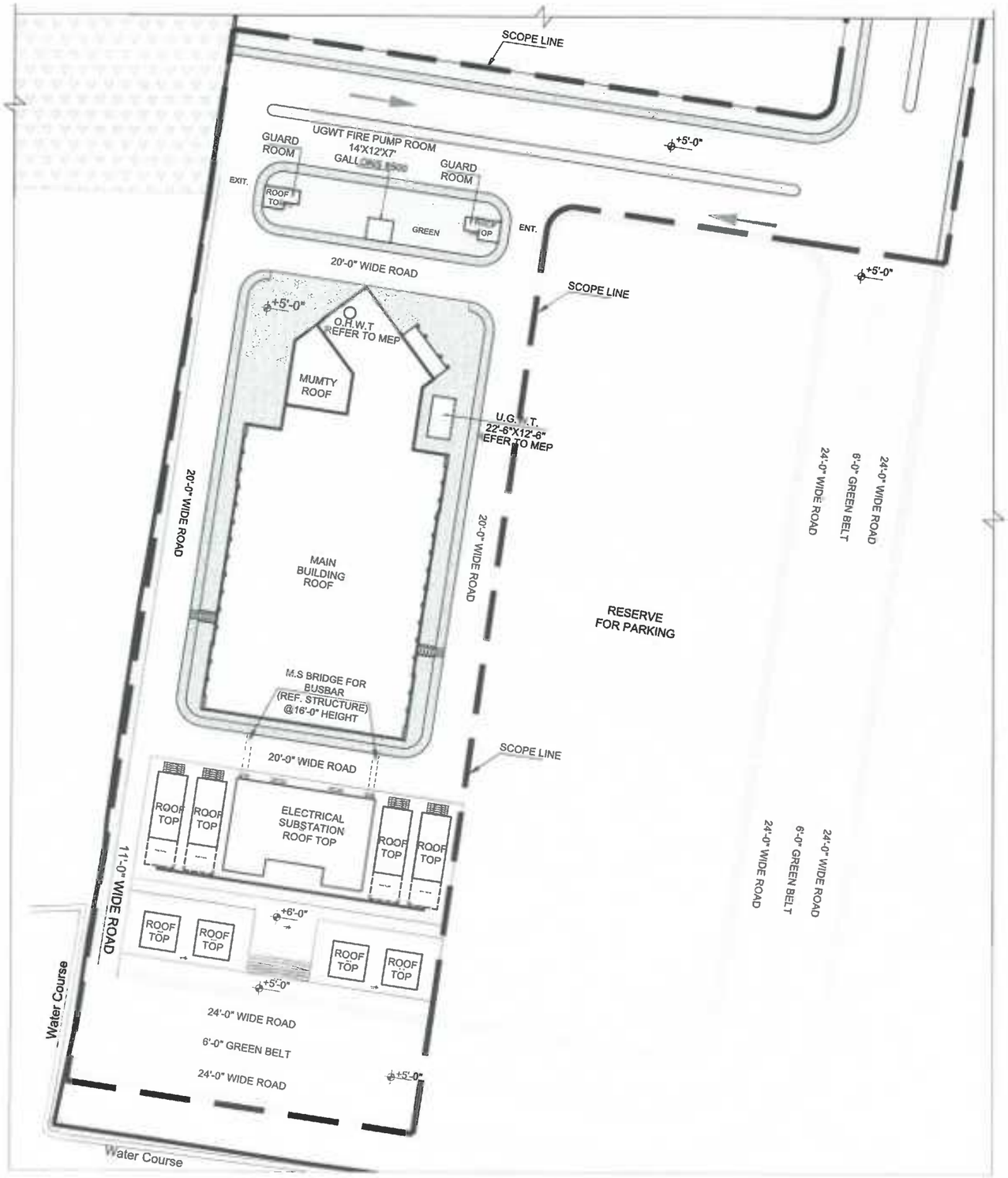
**DRAWING TITLE:** MASTER PLAN

**DRAWING NO:** PITB-ED-MUL-04-MP01

**SCALE:** N.T.S

**TENDER DRAWINGS**

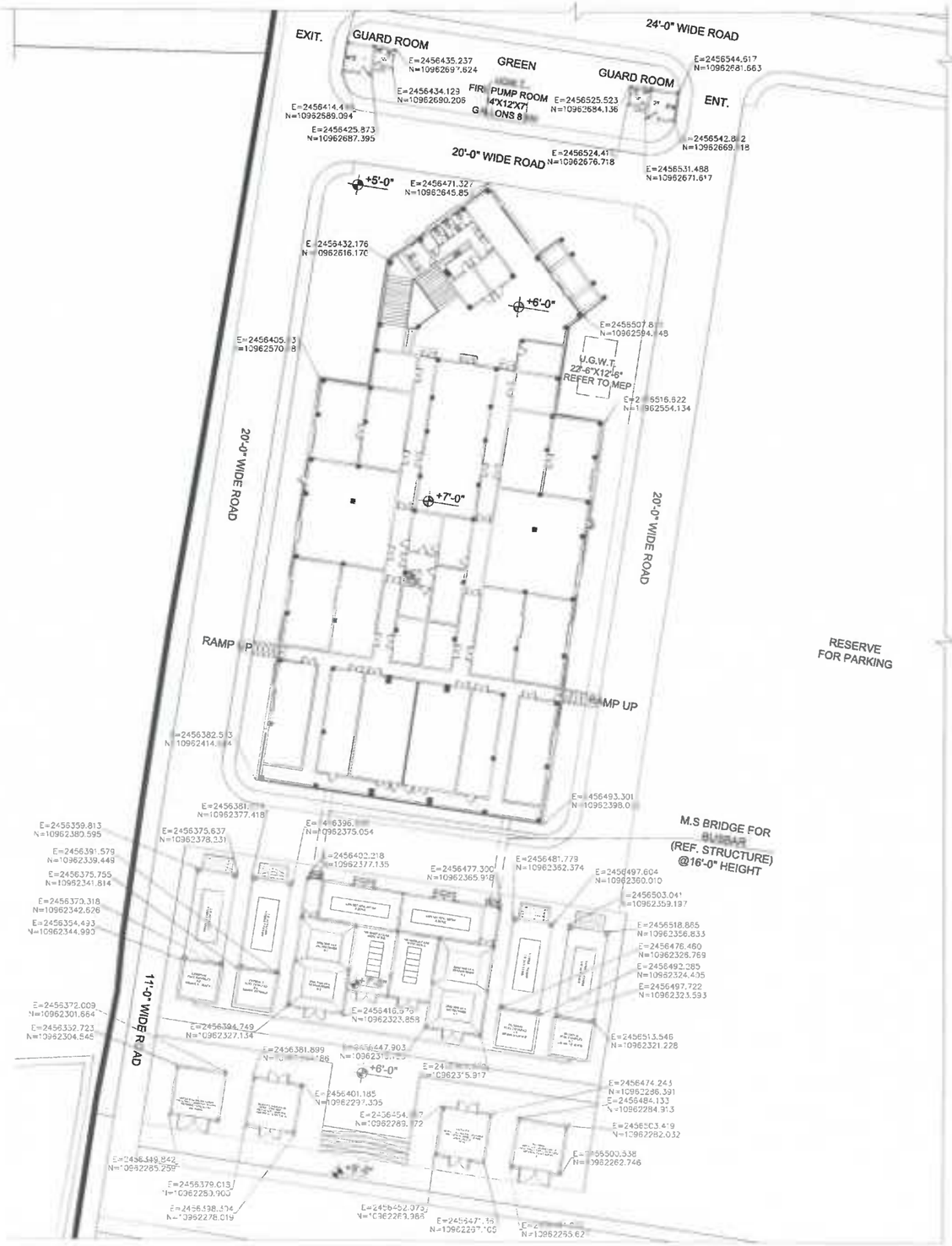
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|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR.MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** MASTER PLAN (DETAIL-1) | **DRAWING NO:** PITB-ED-MUL-04-MP01a<br>**SCALE:** N.T.S |

**TENDER DRAWINGS**

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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR.MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

**DRAWING TITLE:** COORDINATE PLAN

**DRAWING NO:** PITB-ED-MUL-04-MP02

**SCALE:** N.T.S

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
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# PITB MAIN BUILDING



VIEW -01



VIEW -02



VIEW -03

| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

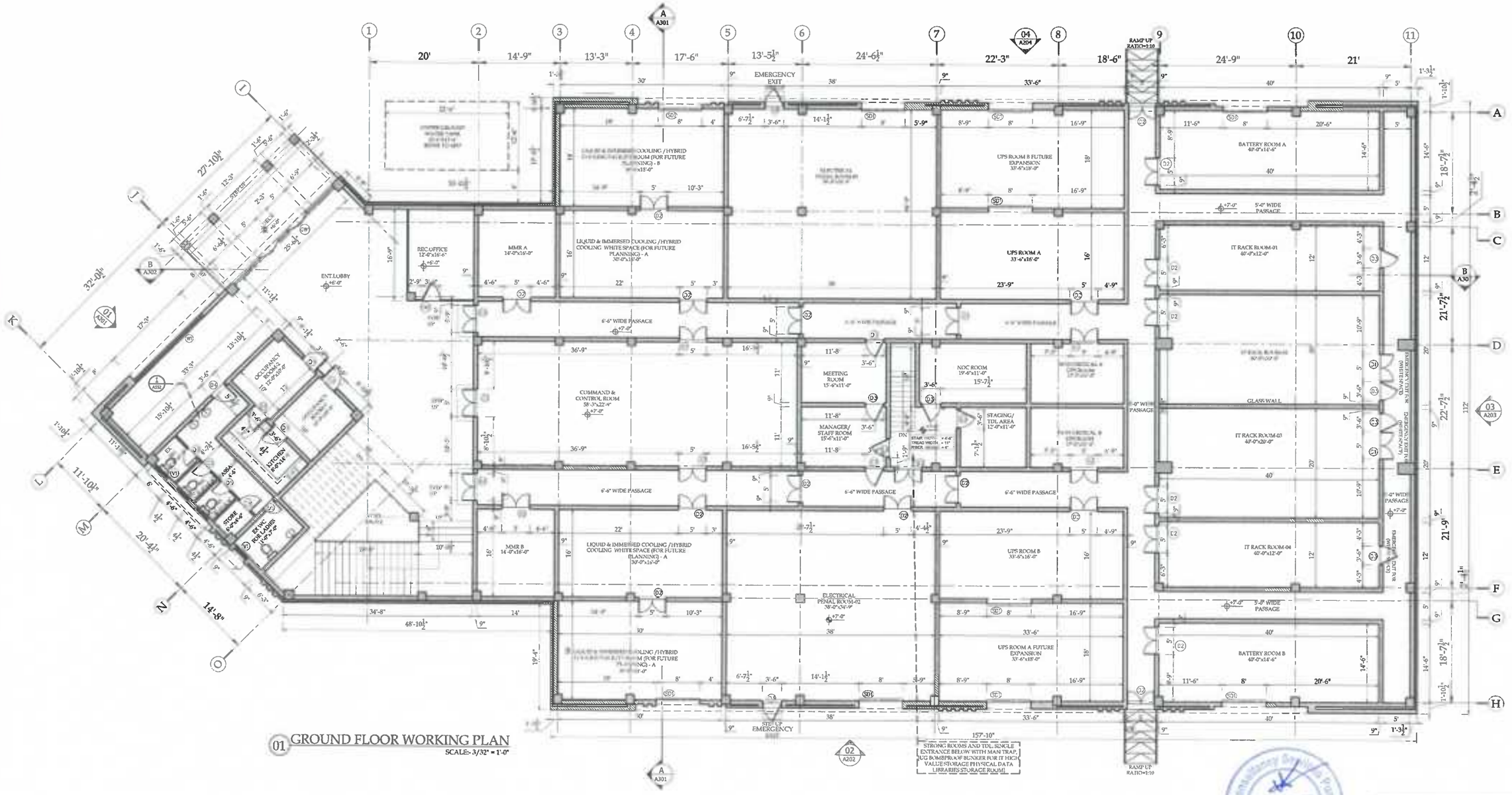
**DRAWING TITLE:** 3D VIEWS

**DRAWING NO:** PITB-MB-MUL-04-A100

**SCALE:** N.T.S

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




## 01 GROUND FLOOR WORKING PLAN

SCALE:- 3/32" = 1'-0"

| DATA CENTER AREA SCHEDULE | | |
|---|---|---|
| MAIN BUILDING | | |
| 1 | GROUND FLOOR COV. AREA | 22506 SFT |
| 2 | MUMTY FLOOR COV. AREA | 1275 SFT |
| 3 | TOTAL COVE. AREA | 23781 SFT |

**CLIENT:**

Punjab Information Technology Board (PITB) | Lahore

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**PROJECT:**

ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

**DRAWING TITLE:**

GROUND FLOOR WORKING PLAN

**DRAWING NO:**

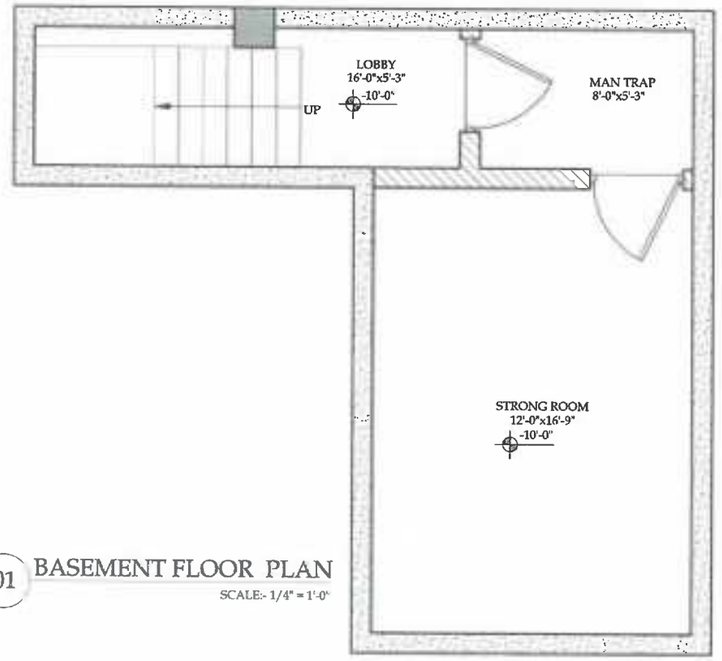
PITB-MB-MUL-04-A101

**SCALE:**

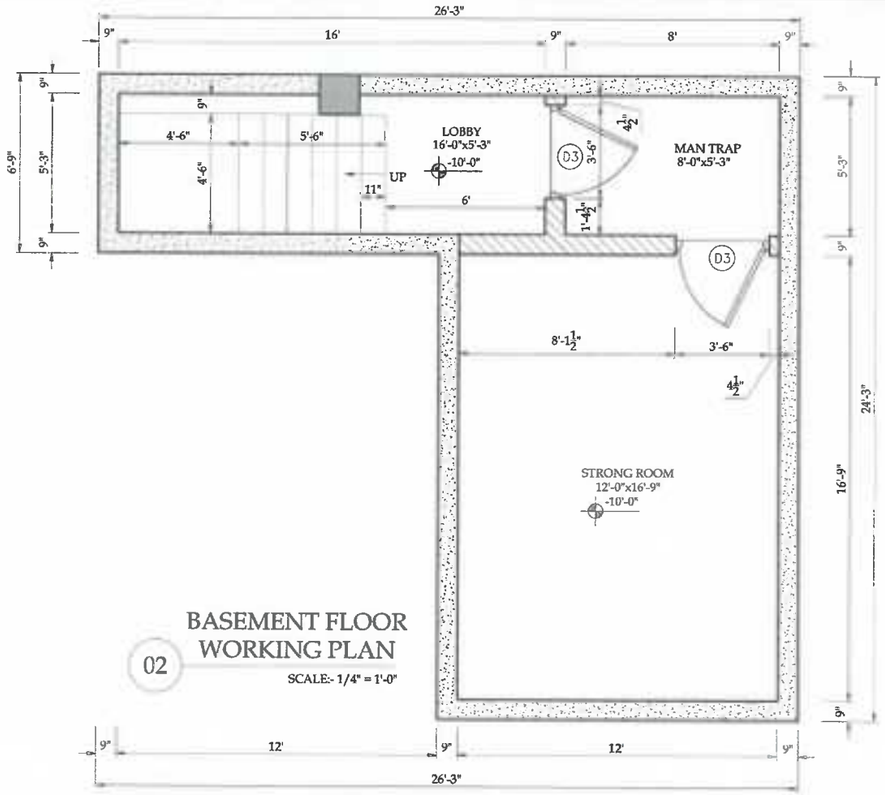
3/32" = 1'-0"

**TENDER DRAWINGS**

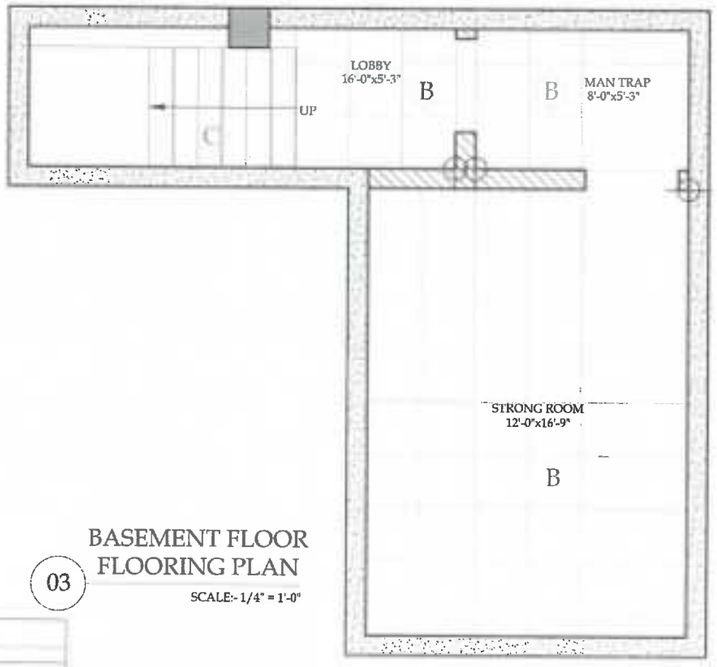
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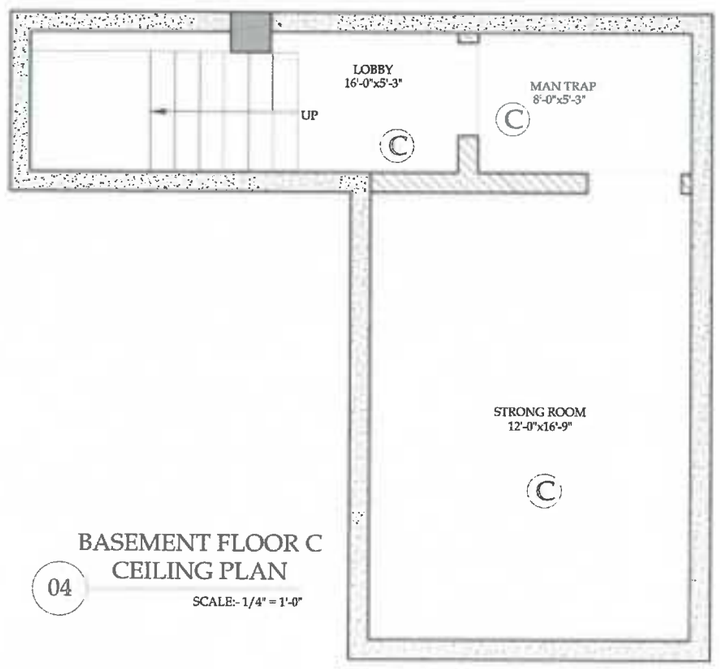

01 BASEMENT FLOOR PLAN
SCALE:- 1/4" = 1'-0"




02 BASEMENT FLOOR WORKING PLAN
SCALE:- 1/4" = 1'-0"




03 BASEMENT FLOOR FLOORING PLAN
SCALE:- 1/4" = 1'-0"




04 BASEMENT FLOOR C CEILING PLAN
SCALE:- 1/4" = 1'-0"

| FLOORING LEGEND: | |
|---|---|
| A. | 2'x4' PORCELAIN TILE |
| B. | TERRAZZO MOSAIC FLOORING 2'X2' PANEL |
| C. | POLISHED GRANITE OF APPROVED COLOR ,SIZE & PATTERN |

| CEILING LEGEND: | |
|---|---|
| A. | 2'x2' GYPSUM CEILING WITH APPROVED HANGING SYSTEM |
| B. | GYPSUM BOARD CEILING |
| C. | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |

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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
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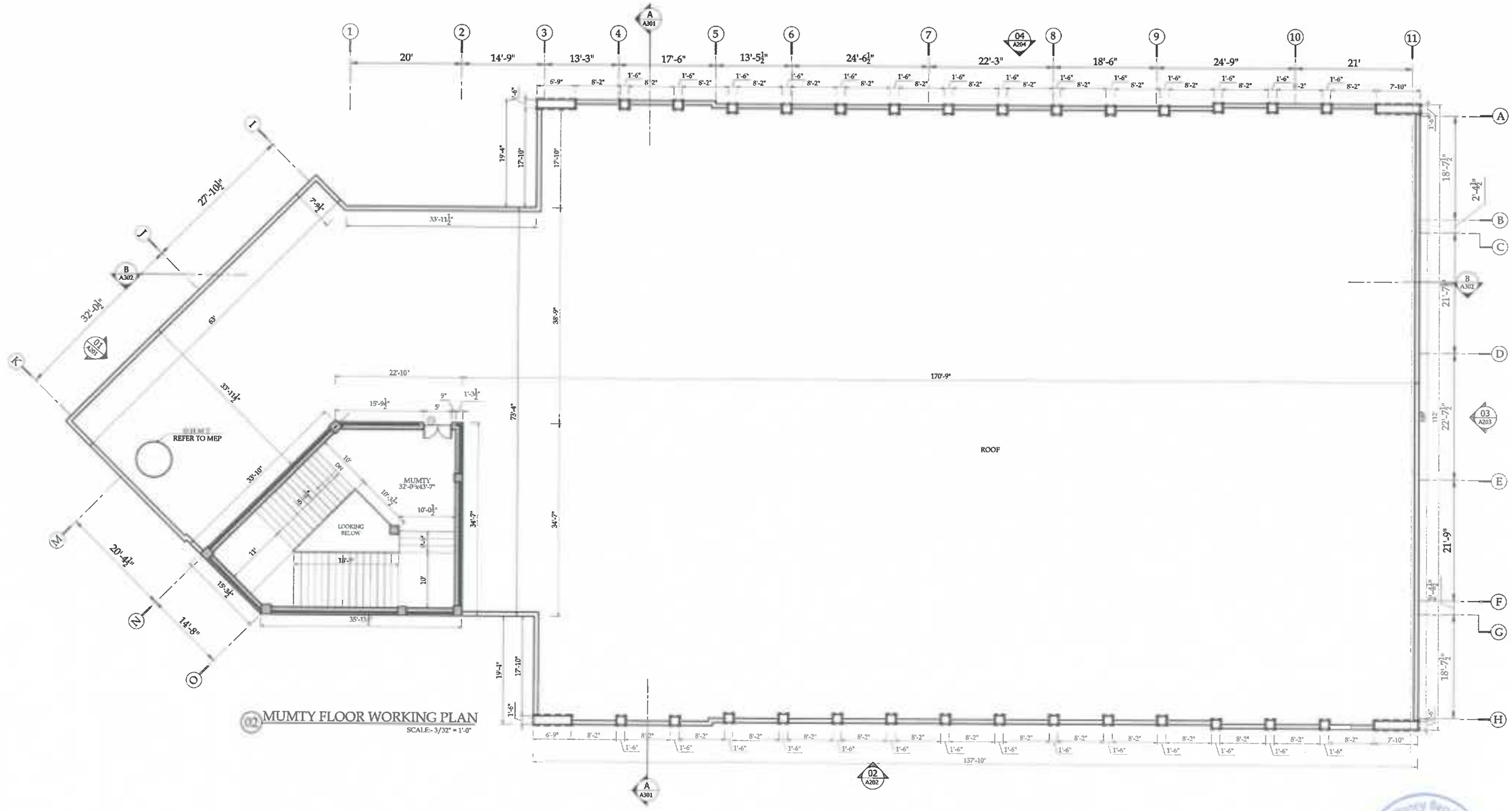
**DRAWING TITLE:**
BASEMENT STRONG ROOM DETAIL

**DRAWING NO:**
PITB-MB-MUL-04-A102

**SCALE:**
3/8" = 1'-0"

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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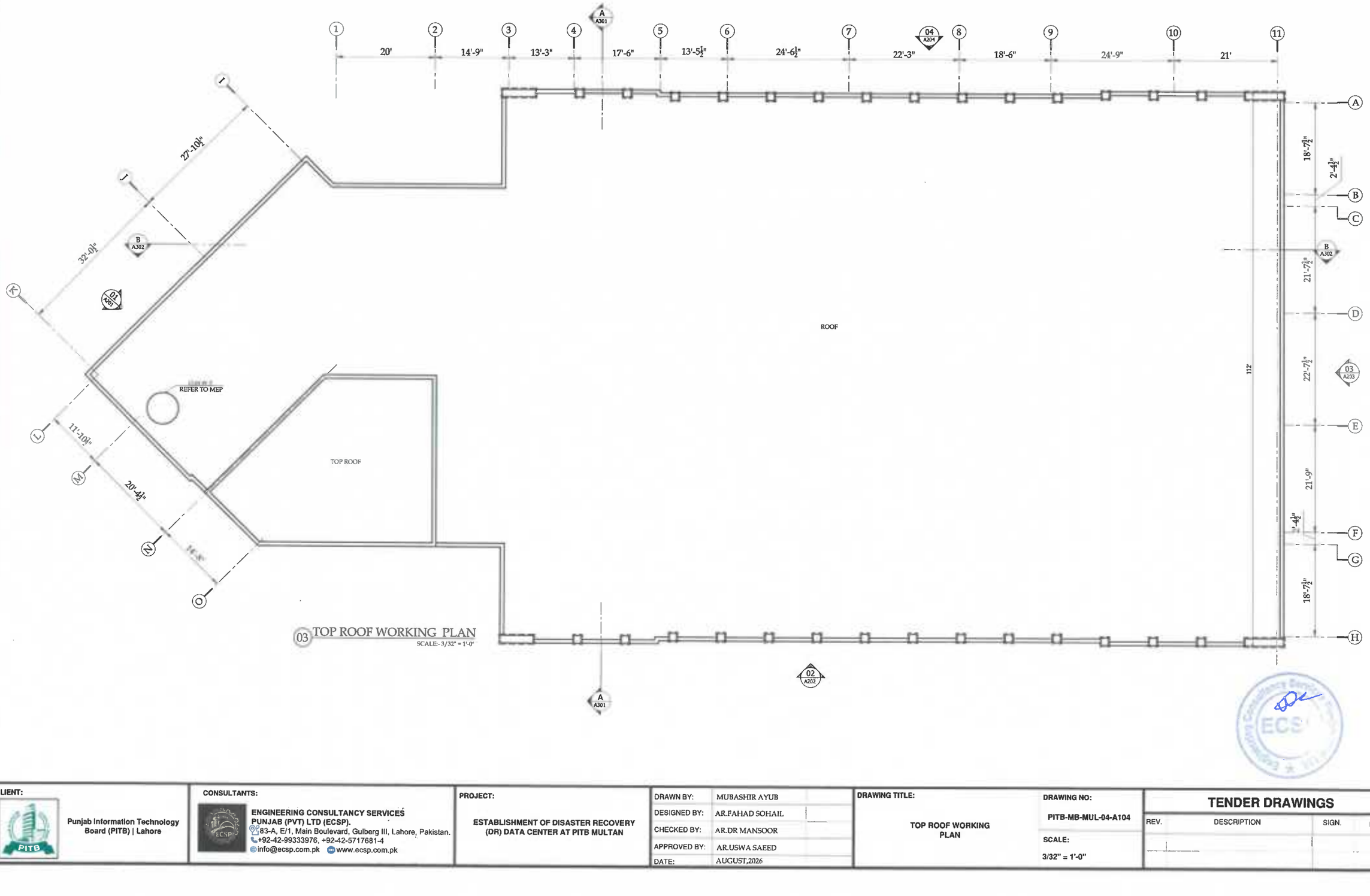

02 MUMTY FLOOR WORKING PLAN

SCALE:- 3/32" = 1'-0"

| | | | |
|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

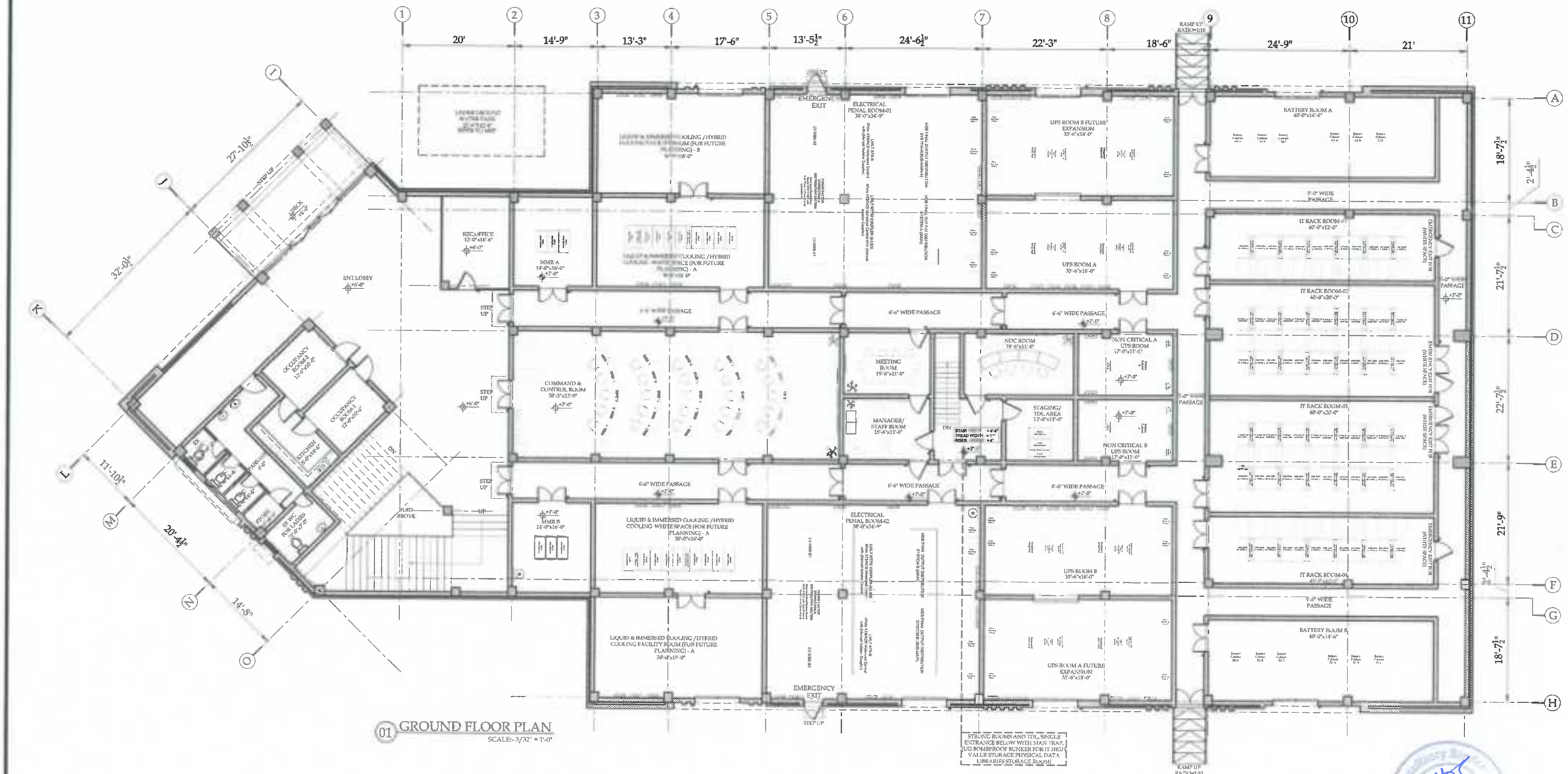
| | | |
|---|---|---|
| DRAWING TITLE: MUMTY FLOOR WORKING PLAN | DRAWING NO: PITB-MB-MUL-04-A103<br>SCALE: 3/32" = 1'-0" | TENDER DRAWINGS |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




03 TOP ROOF WORKING PLAN
SCALE:- 3/32" = 1'-0"

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** TOP ROOF WORKING PLAN<br>**DRAWING NO:** PITB-MB-MUL-04-A104<br>**SCALE:** 3/32" = 1'-0" | **TENDER DRAWINGS**<br>REV. \| DESCRIPTION \| SIGN. \| DATE |




01 GROUND FLOOR PLAN
SCALE:- 3/32" = 1'-0"

| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

**DRAWING TITLE:** GROUND FLOOR FURNITURE LAYOUT

**DRAWING NO:** PITB-MB-MUL-04-A151

**SCALE:** 3/32" = 1'-0"

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# DATA CENTER MULTAN

## MAIN BUILDING
**ROOM FINISHES SCHEDULE**

| Sr.No | ROOM NAME | FLOOR | SKIRTING/DADO | WALL | CEILING |
|---|---|---|---|---|---|
| 1 | ENT.DECK | GRANITE FLOORING | 4" HIGH GRANITE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 2 | ENT.LOBBY | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 3 | OCCUPANCY ROOM-1&2 | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 4 | KITCHEN | 2'x2' PORCELAIN TILE | - | 2'X2' PORCELAIN TILE UP TO 5'-0"/ EMULSION PAINT ON SMOOTH PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 5 | WC / EXEC.TOILET | 2'x2' PORCELAIN TILE | - | 2'X2' PORCELAIN TILE UP TO 8'-0"/ EMULSION PAINT ON SMOOTH PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 6 | REC.OFFICE | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 7 | COMMAND & CONTROL ROOM | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 8 | MMR A | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 9 | MMR B | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 10 | LIQUID & IMMERSED COOLING /HYBRID COOLING WHITE SPACE (FOR FUTURE PLANNING) - A | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 11 | LIQUID & IMMERSED COOLING /HYBRID COOLING FACILITY ROOM (FOR FUTURE PLANNING) - B | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 12 | MEETING ROOM | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 13 | MANAGER/ STAFF ROOM | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 14 | NOC ROOM | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 15 | ELECTRICAL PENAL ROOM-01&02 | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X2' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | PAINT ON SMOOTH PLASTER |
| 16 | PASSAGES | 2'x4' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |
| 17 | STAGING/ TDL AREA | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 18 | STRONG ROOM / SHIPPING & RECEIVING AREA DEDICATED FOR DCF | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 19 | NON CRITICAL A UPS ROOM | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 20 | NON CRITICAL B UPS ROOM | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 21 | UPS ROOM B FUTURE EXPANSION | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 22 | UPS ROOM A | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 23 | UPS ROOM A FUTURE EXPANSION | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 24 | UPS ROOM B | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 25 | BATTERY ROOM A | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 26 | IT RACK ROOM-01 | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 27 | IT RACK ROOM-02 | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 28 | IT RACK ROOM-03 | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 29 | IT RACK ROOM-04 | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 30 | BATTERY ROOM B | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 31 | STAIR CASE | POLISHED GRANITE OF APPROVED COLOR ,SIZE & PATTERN | 4" HIGH POLISHED GRANITE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER UP TO CEILING | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 31 | STRONG ROOM ,STAIR LOBBY & MAN TRAP | TERRAZZO/MOSAIC FLOORING (2'X2' PANEL) | - | 2'X4' PORCELAIN TILE UP TO 4'-0"/ FIRE RETARDANT PAINT ON SMOOTH C.S PLASTER UPTO CEILING | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |
| 32 | ROOF | BRICK TILE | - | WEATHER SHIELD | - |

## GUARD ROOM
**ROOM FINISHES SCHEDULE**

| | | | | | |
|---|---|---|---|---|---|
| 1 | GUARD ROOM | 2'x2' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 2 | TOILET | 2'x2' PORCELAIN TILE | 4" HIGH PORCELAIN TILE SKIRTING | 2'X2' PORCELAIN TILE UP TO 8'-0"/ EMULSION PAINT ON SMOOTH PLASTER UP TO CEILING | GYPSUM BOARD CEILING /EMULSION PAINT ON GYPSUM CEILING BULKHEAD |

## SUBSTATION
**ROOM FINISHES SCHEDULE**

| | | | | | |
|---|---|---|---|---|---|
| 1 | GEN SET SYNC-MTTM A & B ZONE | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 2 | MV SWITCH GEAR WITH -VCB-A | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 3 | MV SWITCH GEAR WITH -VCB-B | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 4 | TRANSFORMER -A1,A2 | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 5 | TRANSFORMER -B1,B2 | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 6 | 3000 kVA DG B-1 | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 7 | 3000 kVA DG B-2 | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 8 | INCOMING METERING PANEL ROOM 1,2 | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |
| 9 | OUTGOING FEEDER CONSUMER PROTECTION PANEL | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |

## FIRE FIGHTING PUMP ROOM
**ROOM FINISHES SCHEDULE**

| | | | | | |
|---|---|---|---|---|---|
| 1 | PUMP ROOM | R.C.C FLOOR | - | EMULSION PAINT ON SMOOTH C.S PLASTER | EMULSION PAINT ON SMOOTH C.S PLASTER |

ECSP

**CLIENT:**
Punjab Information Technology Board (PITB) | Lahore

**CONSULTANTS:**
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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

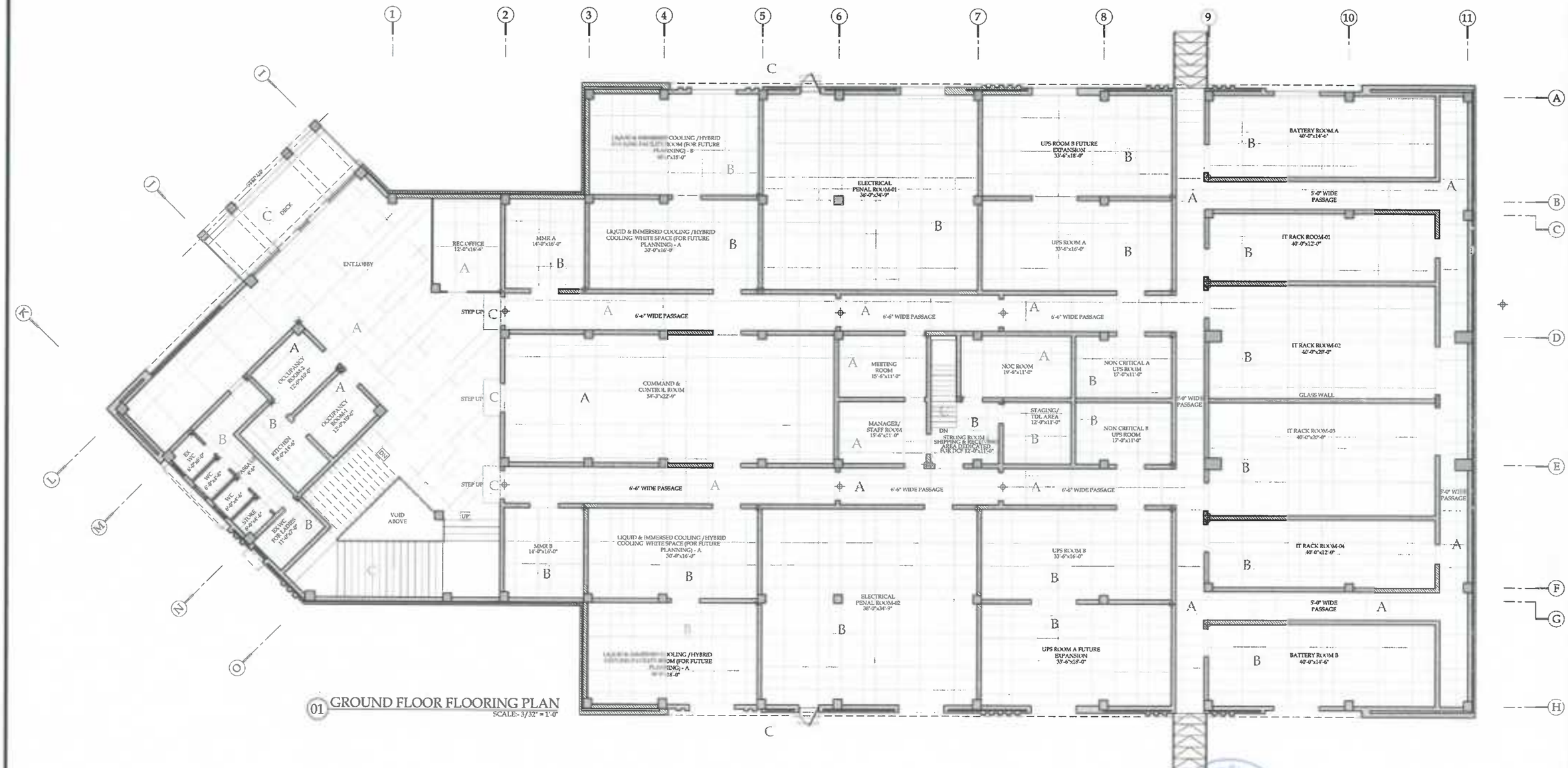
**DRAWING TITLE:**
FINISHES SCHEDULE

**DRAWING NO:** PITB-MB-MUL-04-A161

**SCALE:** N.T.S

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|




01 GROUND FLOOR FLOORING PLAN
SCALE:- 3/32" = 1'-0"

FLOORING LEGEND:

| | |
|---|---|
| A. | 2'x4' PORCELAIN TILE |
| B. | TERRAZZO MOSAIC FLOORING (2'X2' PANEL) |
| C. | POLISHED GRANITE OF APPROVED COLOR ,SIZE & PATTERN |

**CLIENT:**
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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

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| DRAWN BY: | MUBASHIR AYUB |
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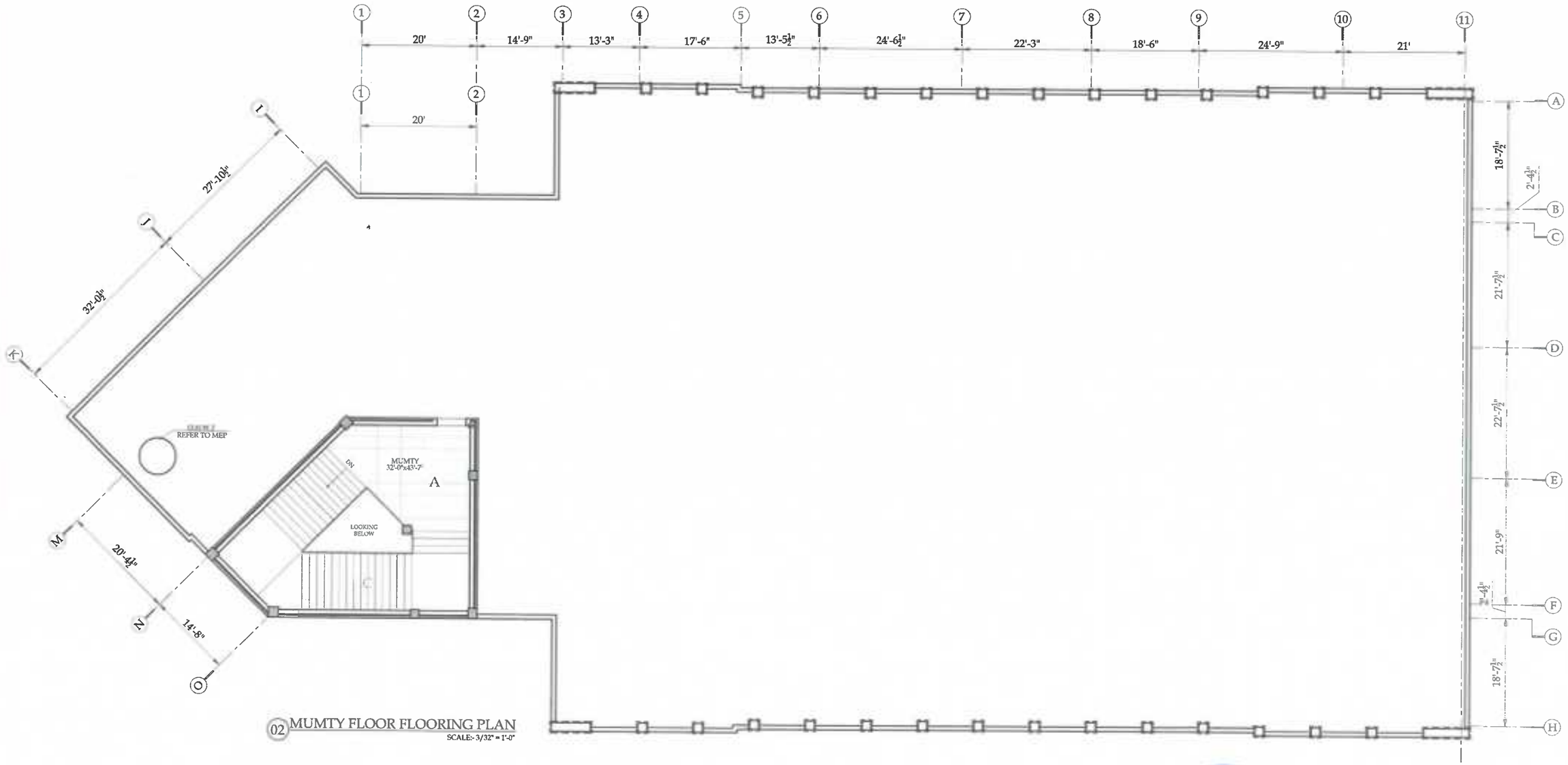
**DRAWING TITLE:**
GROUND FLOOR FLOORING PLAN

**DRAWING NO:**
PITB-MB-MUL-04-A181

**SCALE:**
3/32" = 1'-0"

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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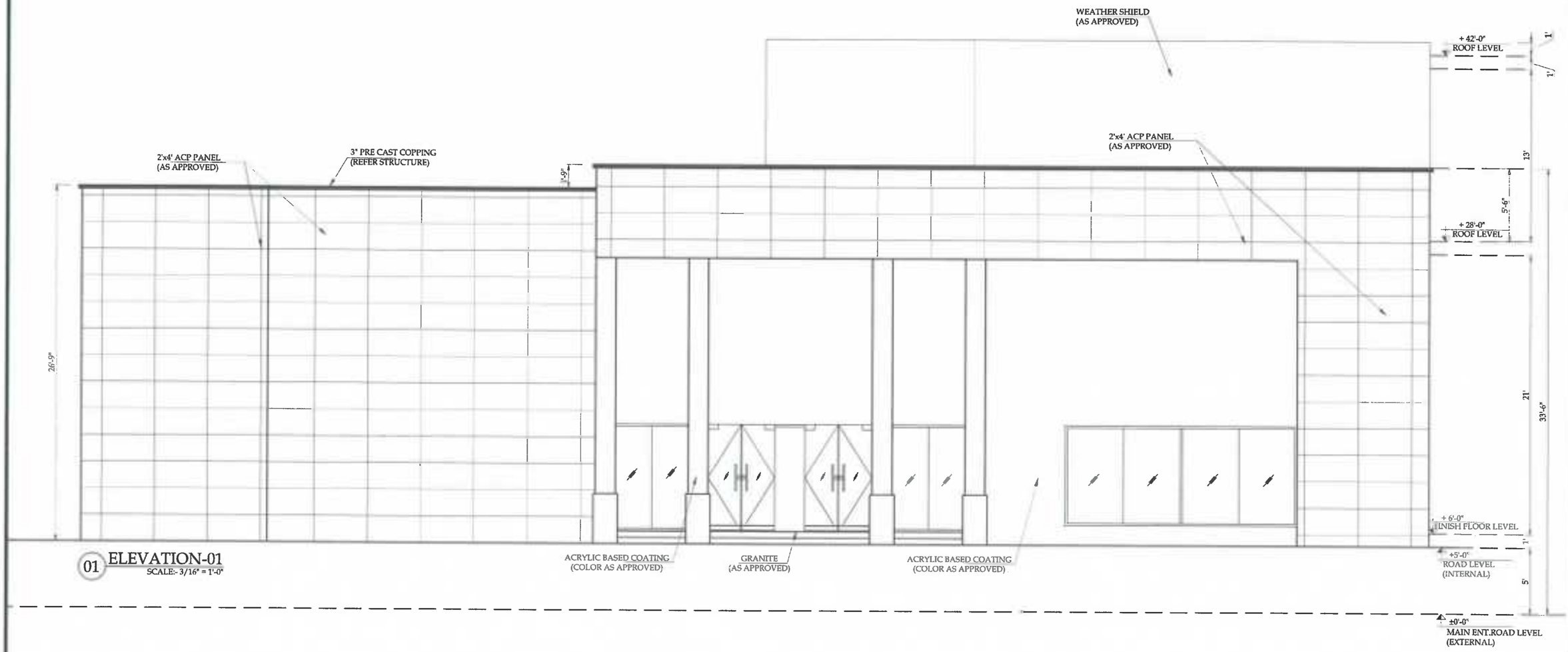

02 MUMTY FLOOR FLOORING PLAN
SCALE:- 3/32" = 1'-0"

| FLOORING LEGEND: | |
|---|---|
| A. | 2'x4' PORCELAIN TILE |
| B. | MOSAIC FLOORING 2'X2' PANEL |
| C. | POLISHED GRANITE OF APPROVED COLOR ,SIZE & PATTERN |

| | | | | | |
|---|---|---|---|---|---|
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**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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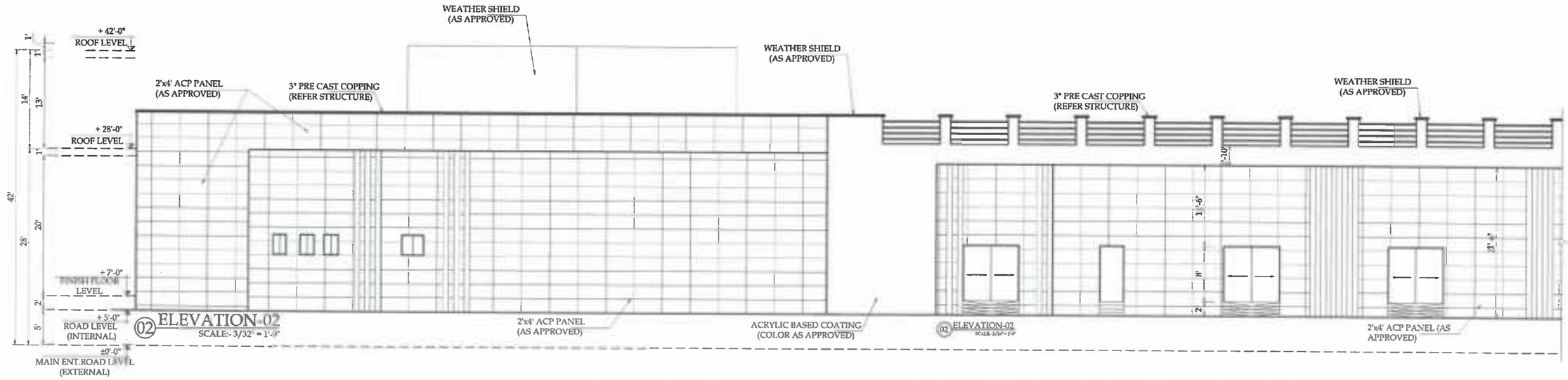



01 ELEVATION-01
SCALE:- 3/16" = 1'-0"

ECSP

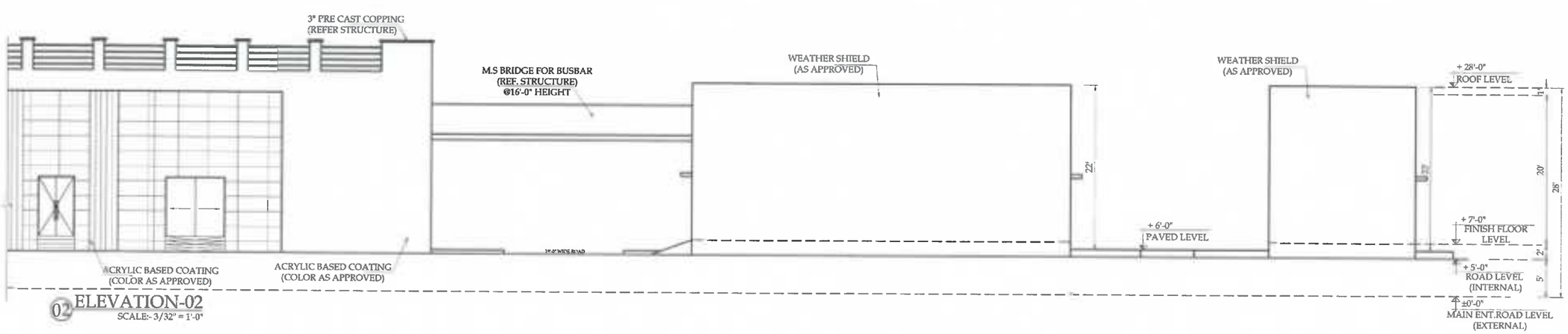
| | | | |
|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

| | | |
|---|---|---|
| DRAWING TITLE: ELEVATION-01 | DRAWING NO: PITB-MB-MUL-04-A201 | TENDER DRAWINGS |
| | SCALE: 3/16" = 1'-0" | REV. \| DESCRIPTION \| SIGN. \| DATE |




02 ELEVATION-02
SCALE:- 3/32" = 1'-0"

02 ELEVATION-02
SCALE- 3/16" = 1'-0"

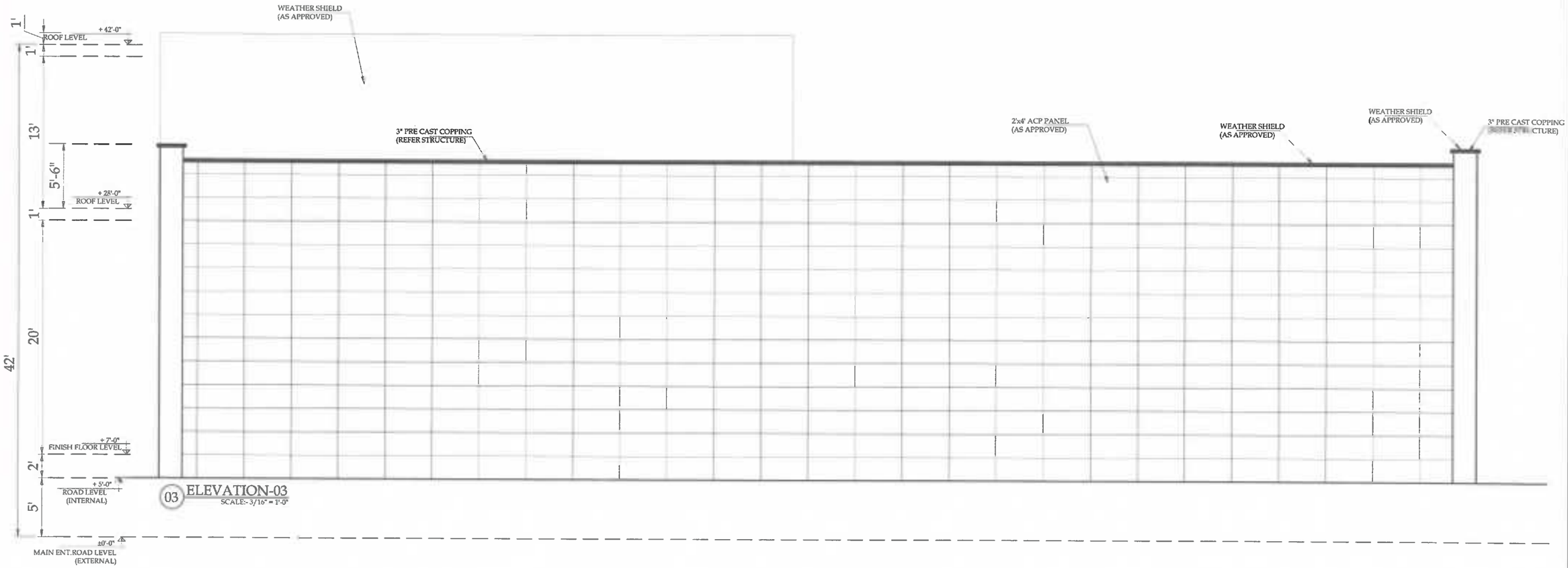



02 ELEVATION-02
SCALE:- 3/32" = 1'-0"

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|---|---|---|---|---|---|
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**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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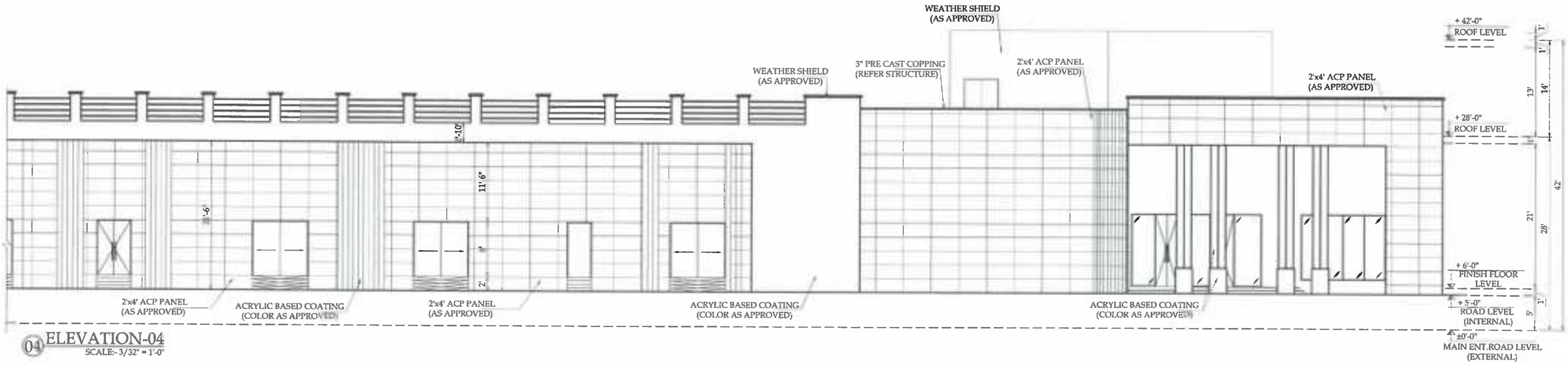



03 ELEVATION-03
SCALE:- 3/16" = 1'-0"

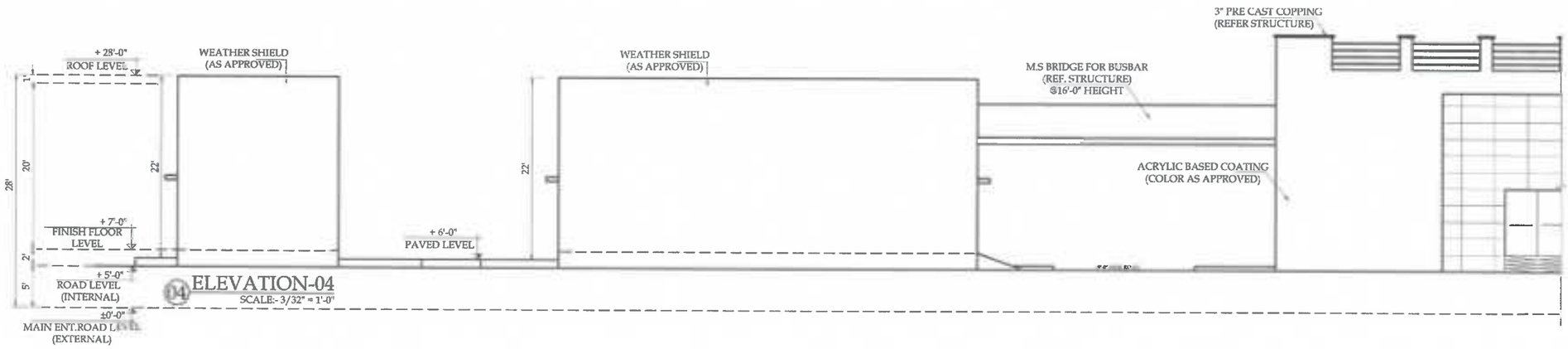
| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** ELEVATION-03 | **DRAWING NO:** PITB-MB-MUL-04-A203<br>**SCALE:** 3/16" = 1'-0" |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




04 ELEVATION-04
SCALE:- 3/32" = 1'-0"

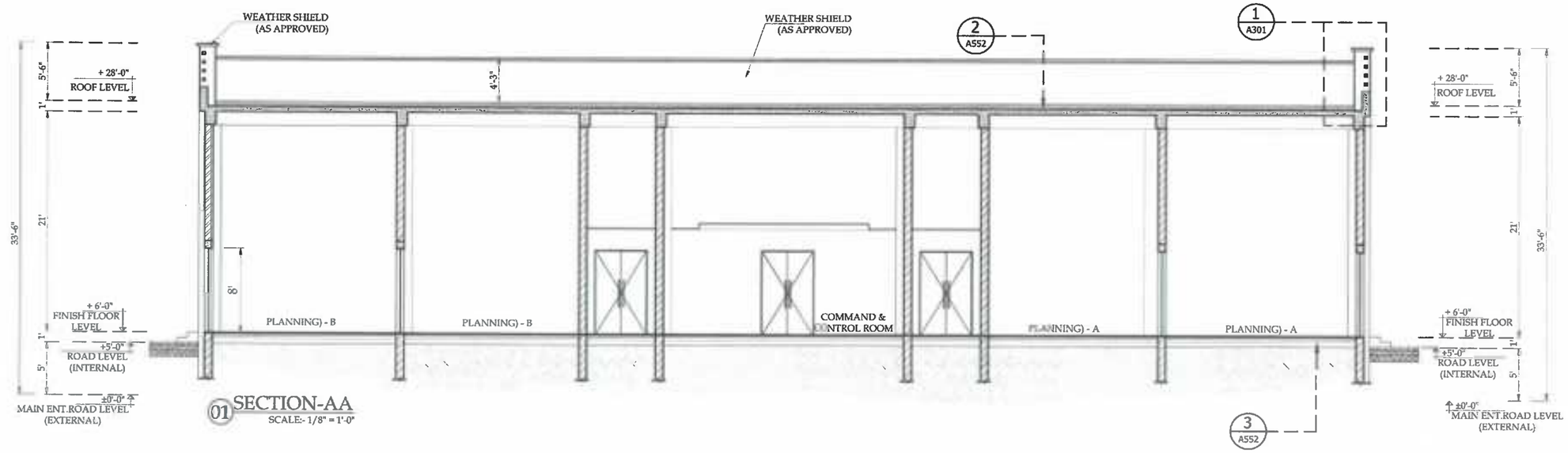



04 ELEVATION-04
SCALE:- 3/32" = 1'-0"

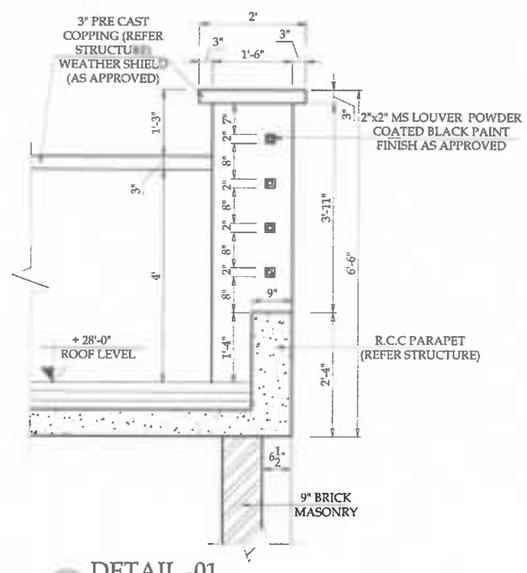
| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** ELEVATION-04 | **DRAWING NO:** PITB-MB-MUL-04-A204<br>**SCALE:** 3/32" = 1'-0" |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |



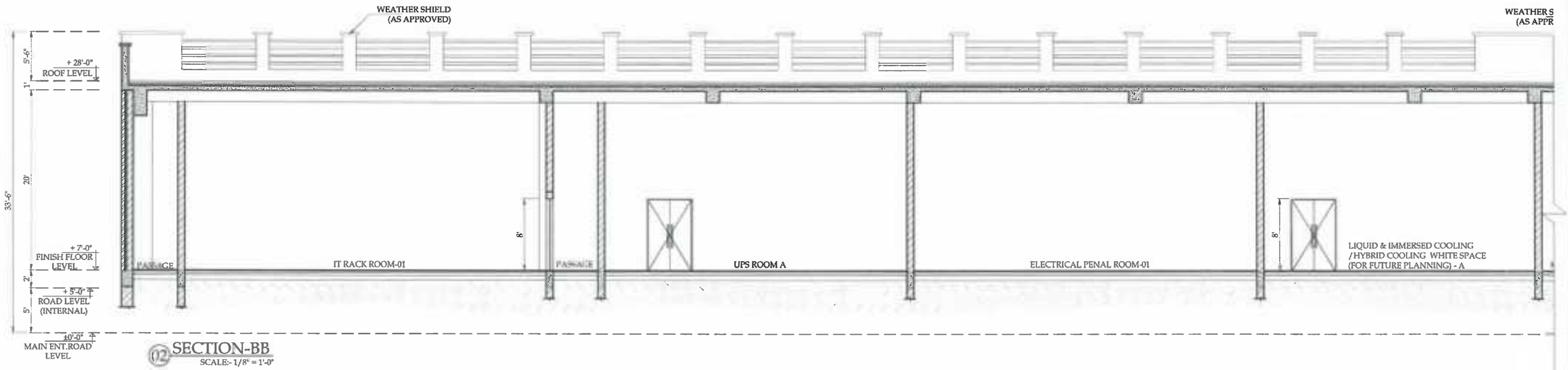

01 SECTION-AA
SCALE:- 1/8" = 1'-0"



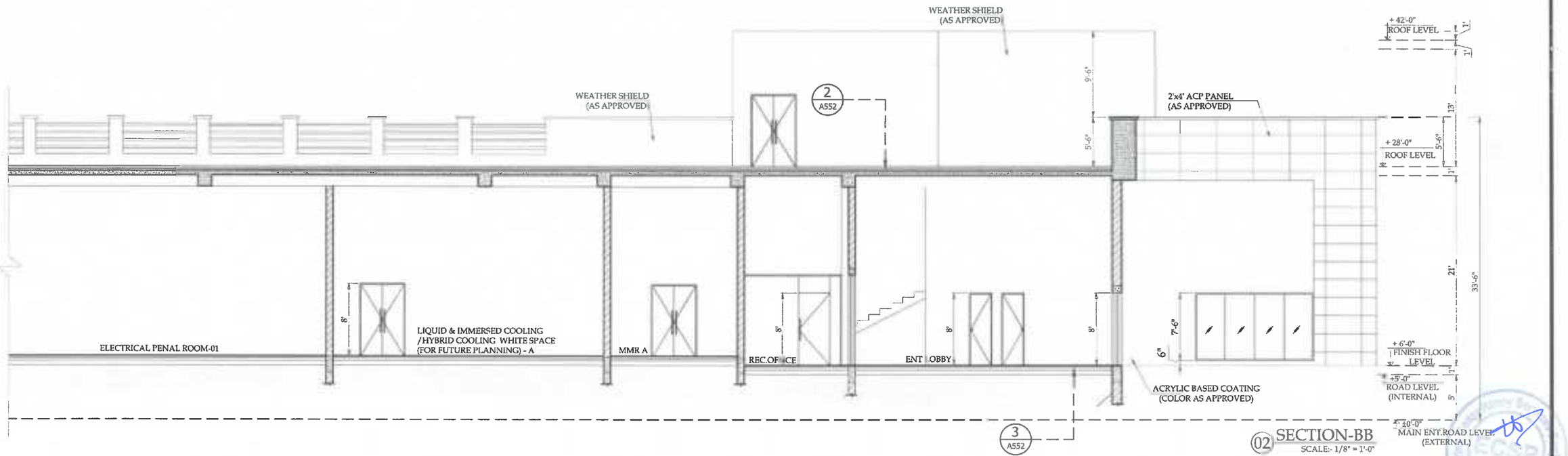

01 DETAIL -01
SCALE:- 1/2" = 1'-0"

| | | | |
|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

| | | |
|---|---|---|
| DRAWING TITLE: SECTION-AA | DRAWING NO: PITB-MB-MUL-04-A301 | TENDER DRAWINGS |
| | SCALE: 1/8" = 1'-0" | REV. DESCRIPTION SIGN. DATE |

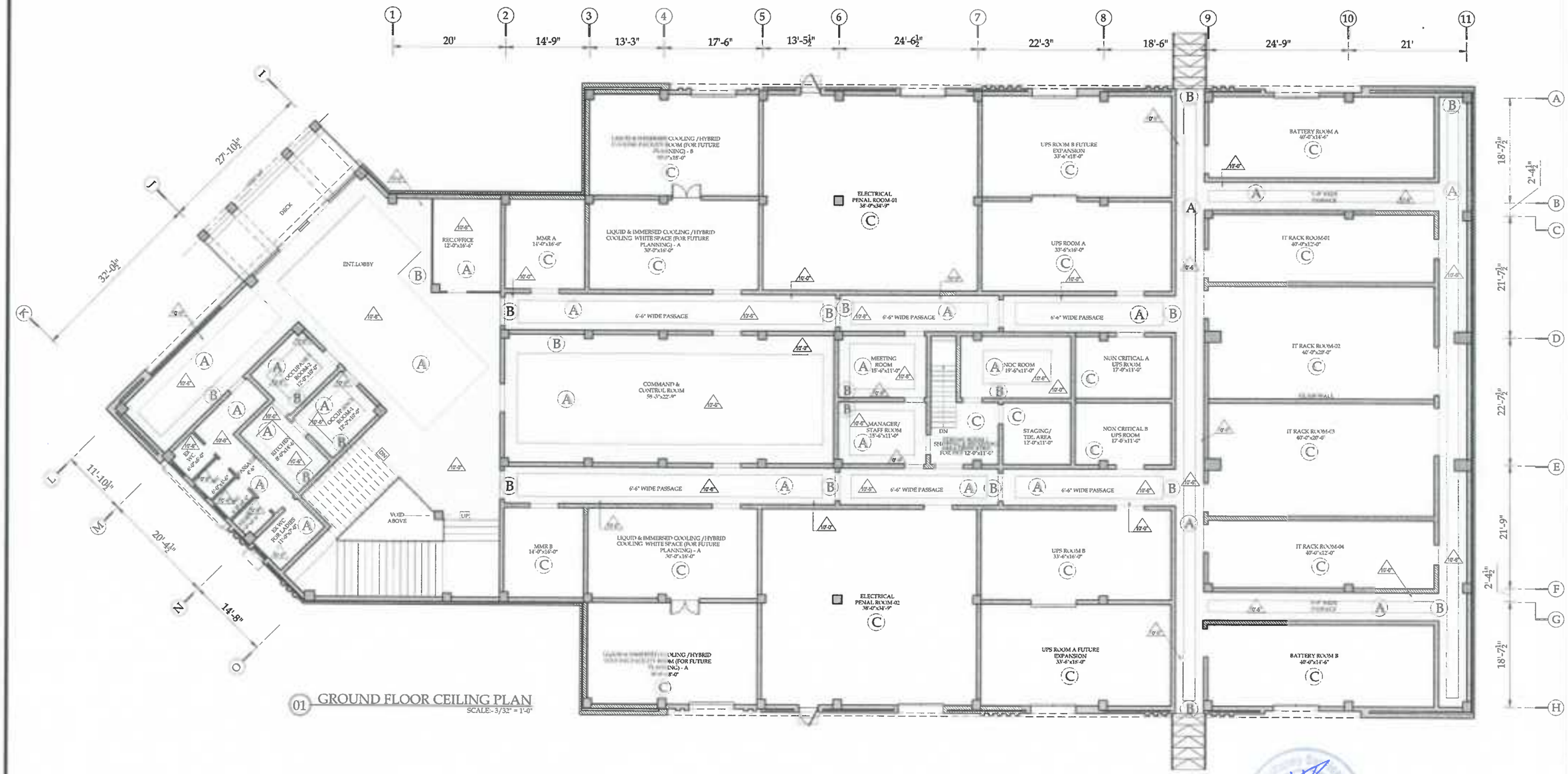



02 SECTION-BB
SCALE:- 1/8" = 1'-0"




02 SECTION-BB
SCALE:- 1/8" = 1'-0"

| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |
| **DRAWING TITLE:** SECTION-BB | **DRAWING NO:** PITB-MB-MUL-04-A302<br>**SCALE:** 1/8" = 1'-0" | **TENDER DRAWINGS** | REV. DESCRIPTION SIGN. DATE |



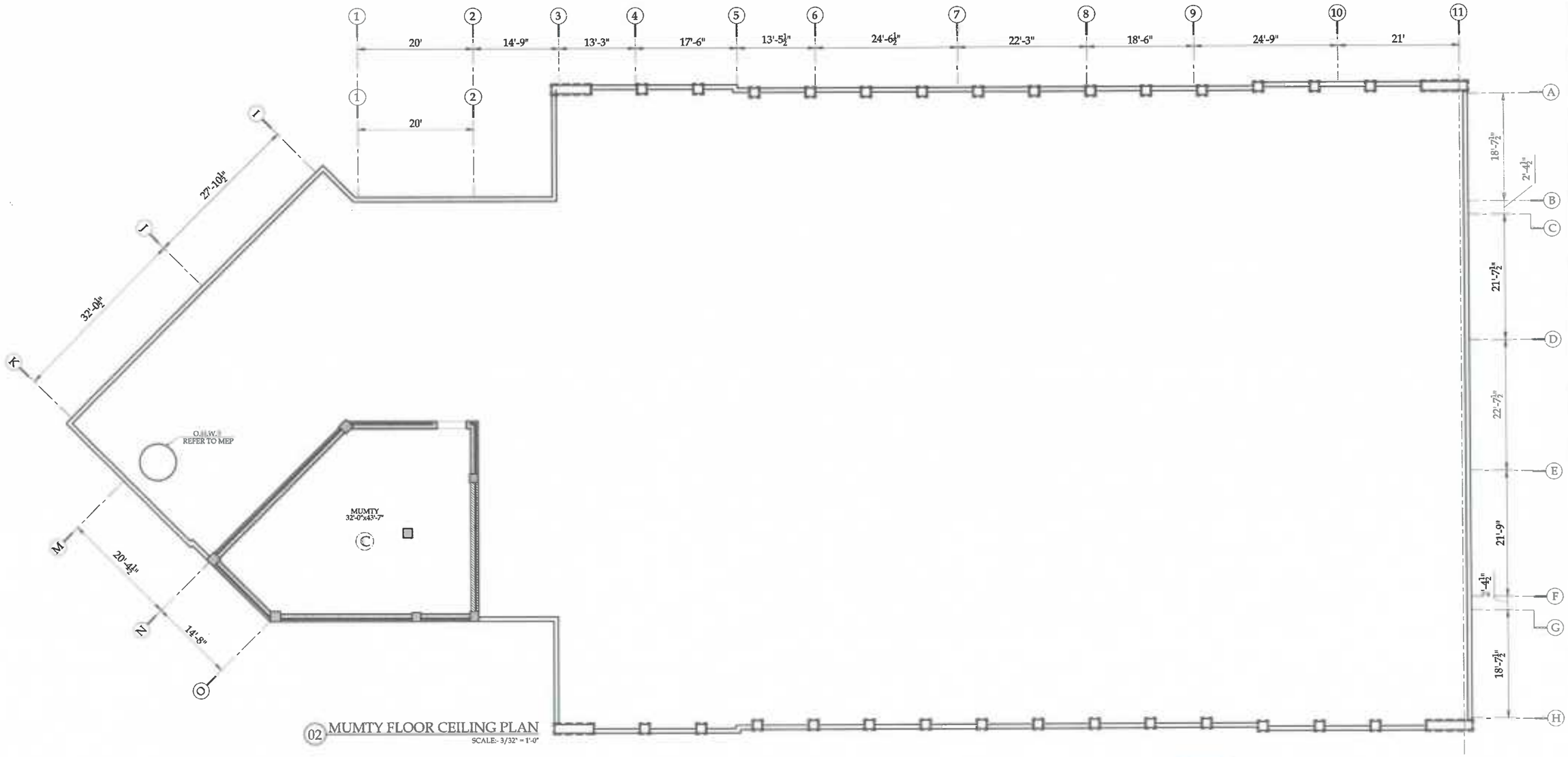

01 GROUND FLOOR CEILING PLAN
SCALE:- 3/32" = 1'-0"

## CEILING LEGEND:

A. 2'x2' GYPSUM CEILING WITH APPROVED HANGING SYSTEM
B. GYPSUM BOARD CEILING
C. FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER

| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |
| **DRAWING TITLE:** GROUND FLOOR CEILING PLAN | **DRAWING NO:** PITB-MB-MUL-04-A401<br>**SCALE:** 3/32" = 1'-0" | **TENDER DRAWINGS** | |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




02 MUMTY FLOOR CEILING PLAN
SCALE:- 3/32" = 1'-0"

## CEILING LEGEND:

| | |
|---|---|
| A. | 2'x2' GYPSUM CEILING WITH APPROVED HANGING SYSTEM |
| B. | GYPSUM BOARD CEILING |
| C. | FIRE RETARDANT PAINT ON SMOOTH S.C PLASTER |

**CLIENT:**
Punjab Information Technology Board (PITB) | Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

**DRAWING TITLE:**
MUMTY FLOOR CEILING PLAN

**DRAWING NO:**
PITB-MB-MUL-04-A402

**SCALE:**
3/32" = 1'-0"

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# DOOR WINDOW SCHEDULE MAIN BUILDING

| TYPE | WIDE | HIGH | SILL | DESCRIPTION |
|---|---|---|---|---|
| GW1 | 25'-6" | 8'-0" | 1/4" | GLASS DOOR (TEMPERED 12mm) |
| GW2 | 3'-6" | 8'-0" | 1/4" | GLASS DOOR (TEMPERED 12mm) |
| SD1 | 8'-0" | 8'-0" | 1/4" | FIRE-RATED ACCESS-CONTROLLED AUTOMATIC SLIDING FIRE RATED DOOR (90-120 MIN) |
| D1 | 8'-6" | 8'-0" | 1/4" | FIRE RATED DOOR (90-120 MIN) |
| D2 | 5'-0" | 8'-0" | 1/4" | FIRE RATED DOOR (90-120 MIN) |
| D3 | 3'-6" | 8'-0" | 1/4" | FIRE RATED DOOR (90-120 MIN) |
| D4 | 3'-6" | 8'-0" | 1/4" | SOLID FLUSH DOOR |
| D5 | 2'-6" | 8'-0" | 1/4" | WPC DOOR |
| W1 | 17'-3" | 7'-6" | 0'-6" | ALUMINUM GLASS WINDOW (SINGLE GLAZED) TEMPERED 6mm |
| V1 | 3'-0" | 3'-0" | 5'-0" | ALUMINUM GLASS WINDOW (SINGLE GLAZED) TEMPERED 5mm |

**NOTE:**

ACCESS CONTROL HARDWARE, INCLUDING ELECTROMAGNETIC LOCKS / ELECTRIC STRIKES, CARD READERS, EXIT DEVICES, DOOR POSITION SWITCHES, REQUEST-TO-EXIT DEVICES AND ASSOCIATED ACCESSORIES, SHALL BE COORDINATED WITH THE ARCHITECTURAL DOOR, FRAME AND HARDWARE REQUIREMENTS.

CLIENT:
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

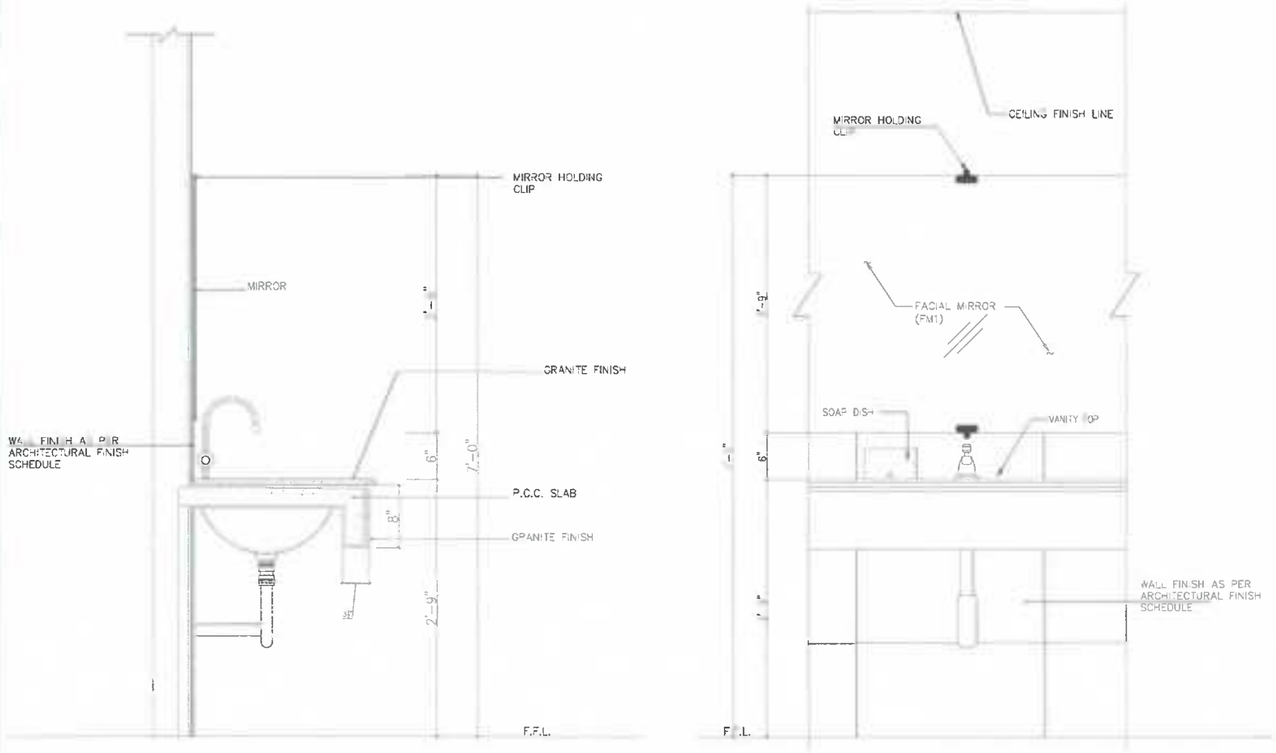
DRAWING TITLE:
DOOR & WINDOW SCHEDULE

DRAWING NO:
PITB-MB-MUL-04-A551

SCALE:
N.T.S

**TENDER DRAWINGS**

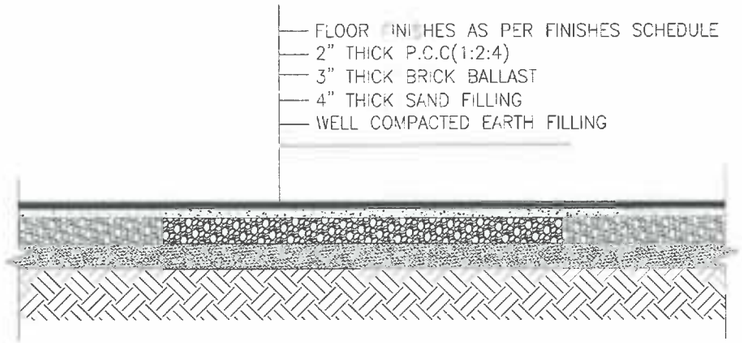
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|




SECTION

ELEVATION

**1 VANITY TOP DETAIL**
SCALE : NTS




**3 GROUND FLOOR FINISH DETAIL**
SCALE : NTS



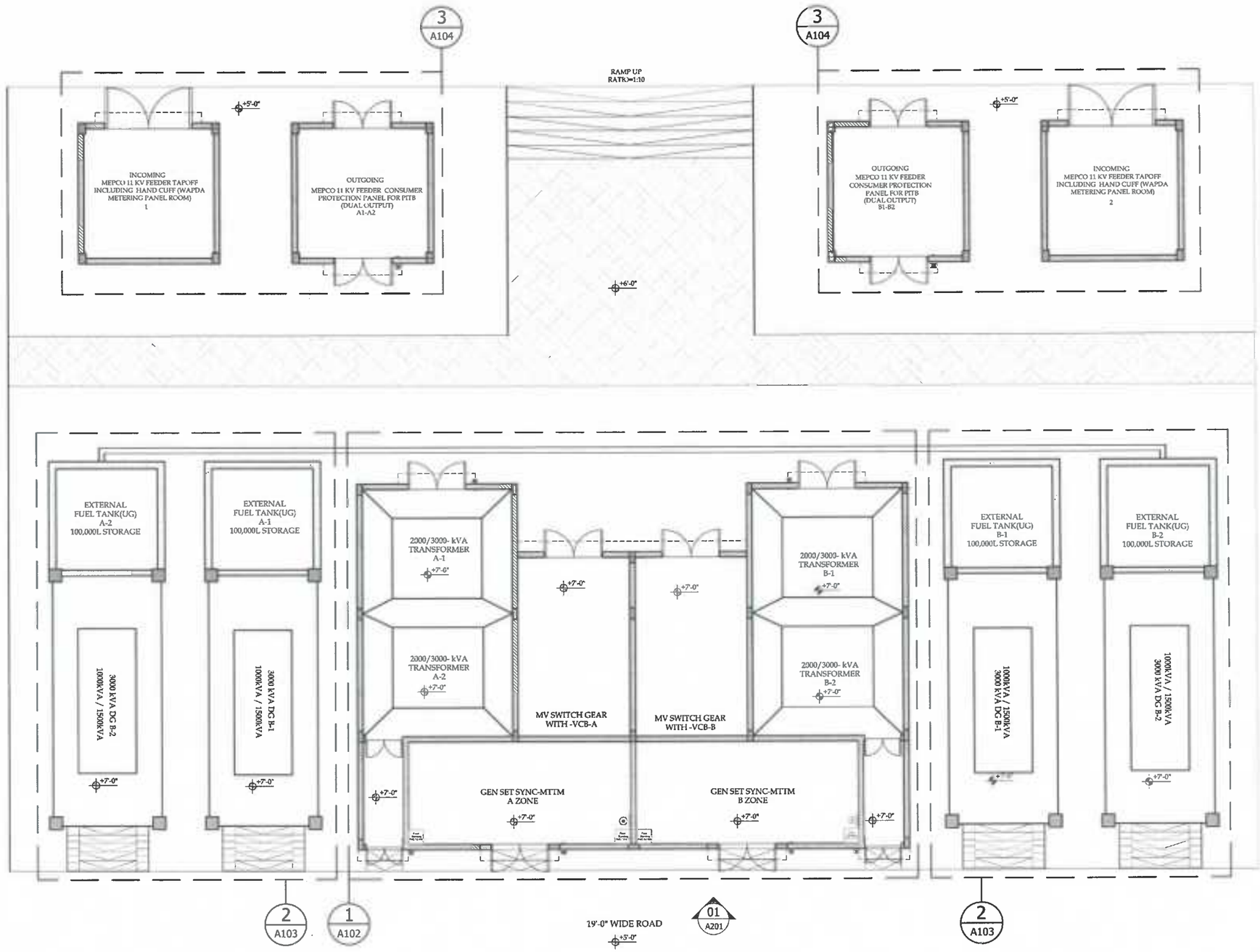

**2 ROOF FINISH DETAIL**
SCALE : NTS

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** FINISHES SCHEDULE | **DRAWING NO:** PITB-MB-MUL-04-A552<br>**SCALE:** N.T.S |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| --- | | | |

# PITB
# ELECTRICAL
# SUBSTATION



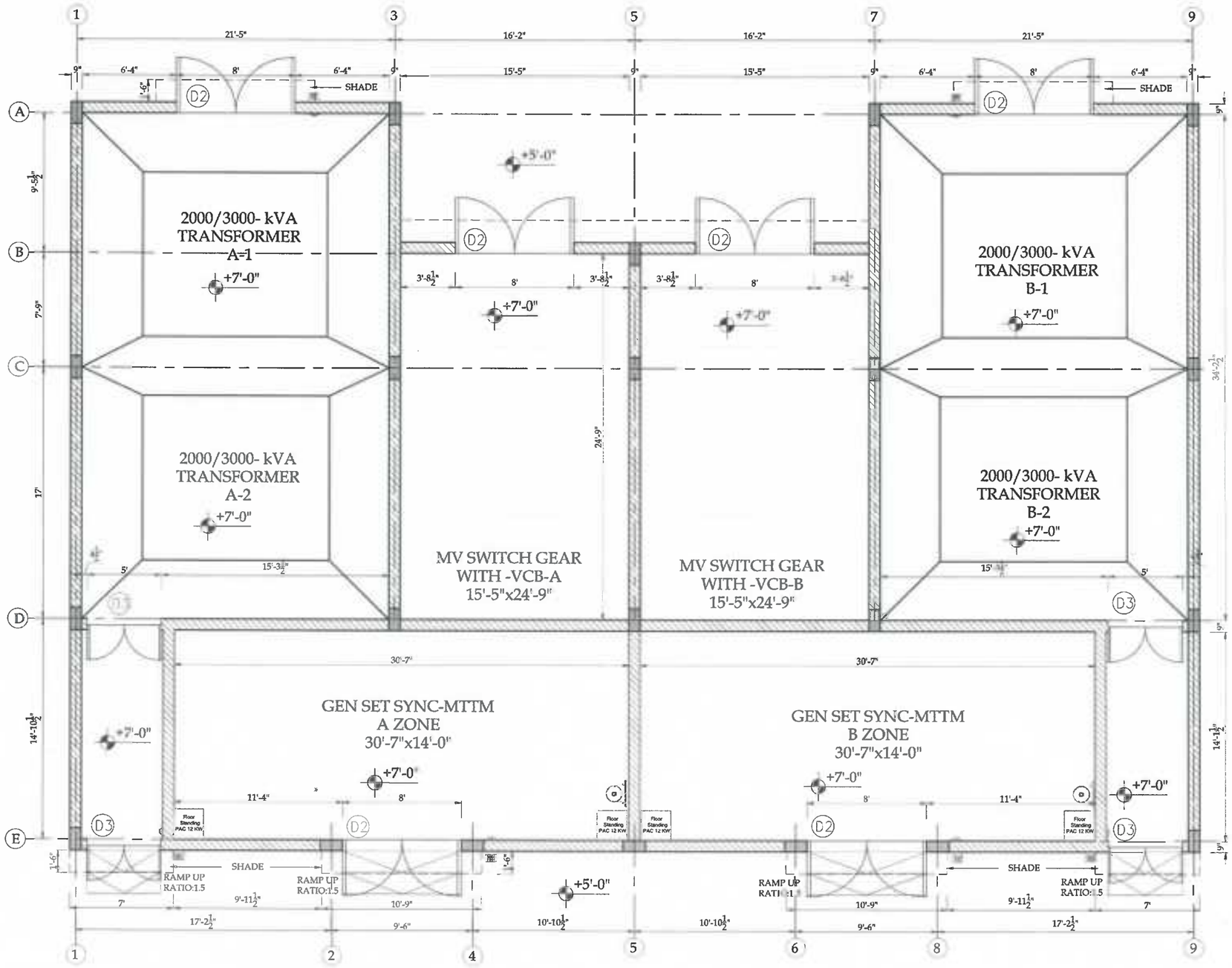

01 GROUND FLOOR WORKING PLAN

SCALE:- 3/32" = 1'-0"

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** ELECTRICAL SUBSTATION GROUND FLOOR WORKING PLAN | **DRAWING NO:** PITB-ESS-MUL-04-A101<br>**SCALE:** 3/32" = 1'-0" |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |



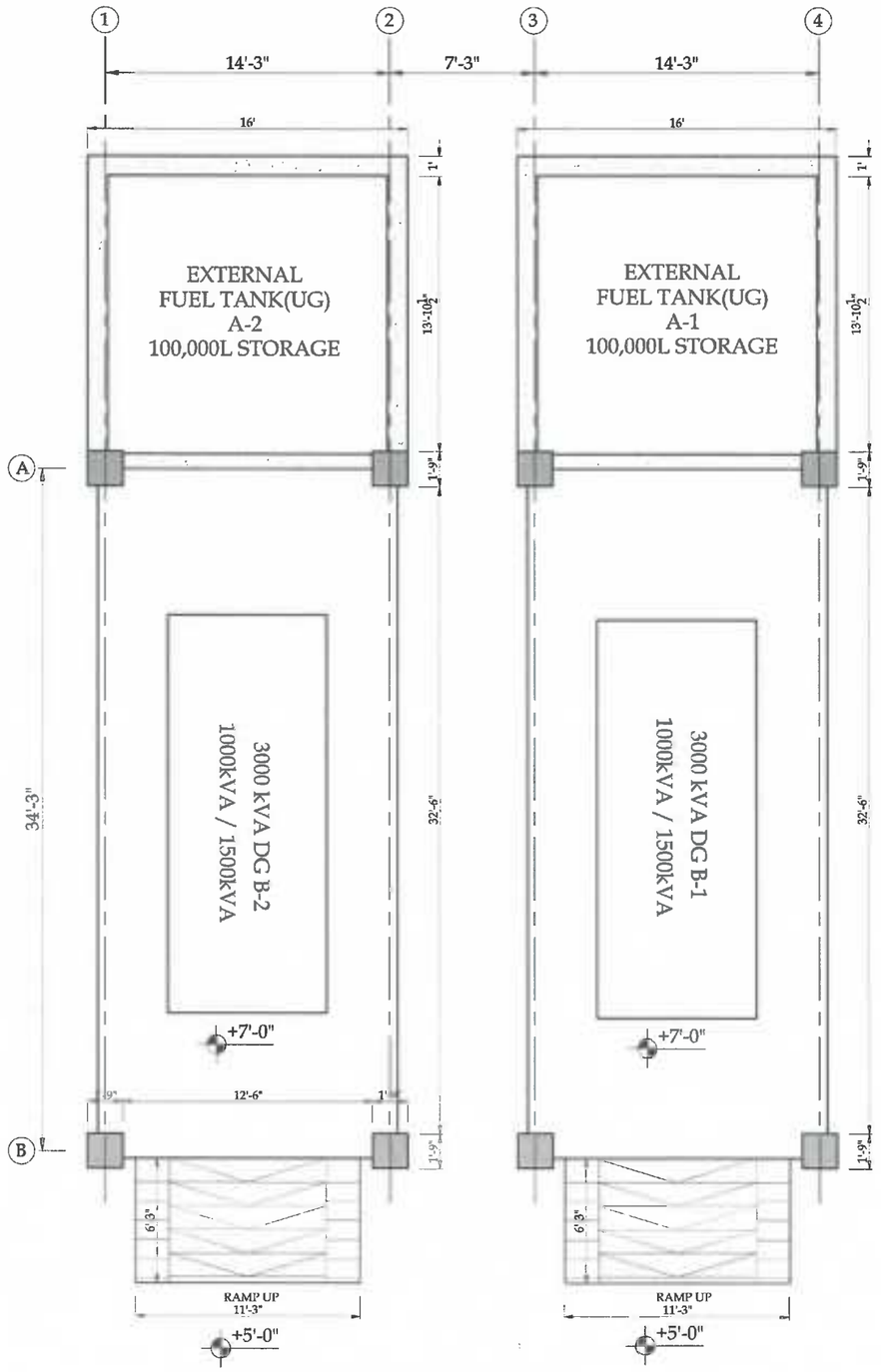

## GROUND FLOOR WORKING PLAN
## GEN SET SYNC-MTTM ROOM

01 SCALE:- 3/16" = 1'-0"

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** GENT SET SYNC-MTTM ROOM GROUND FLOOR WORKING PLAN | **DRAWING NO:** PITB-ESS-MUL-04-A102<br>**SCALE:** 3/16" = 1'-0" |

**TENDER DRAWINGS**

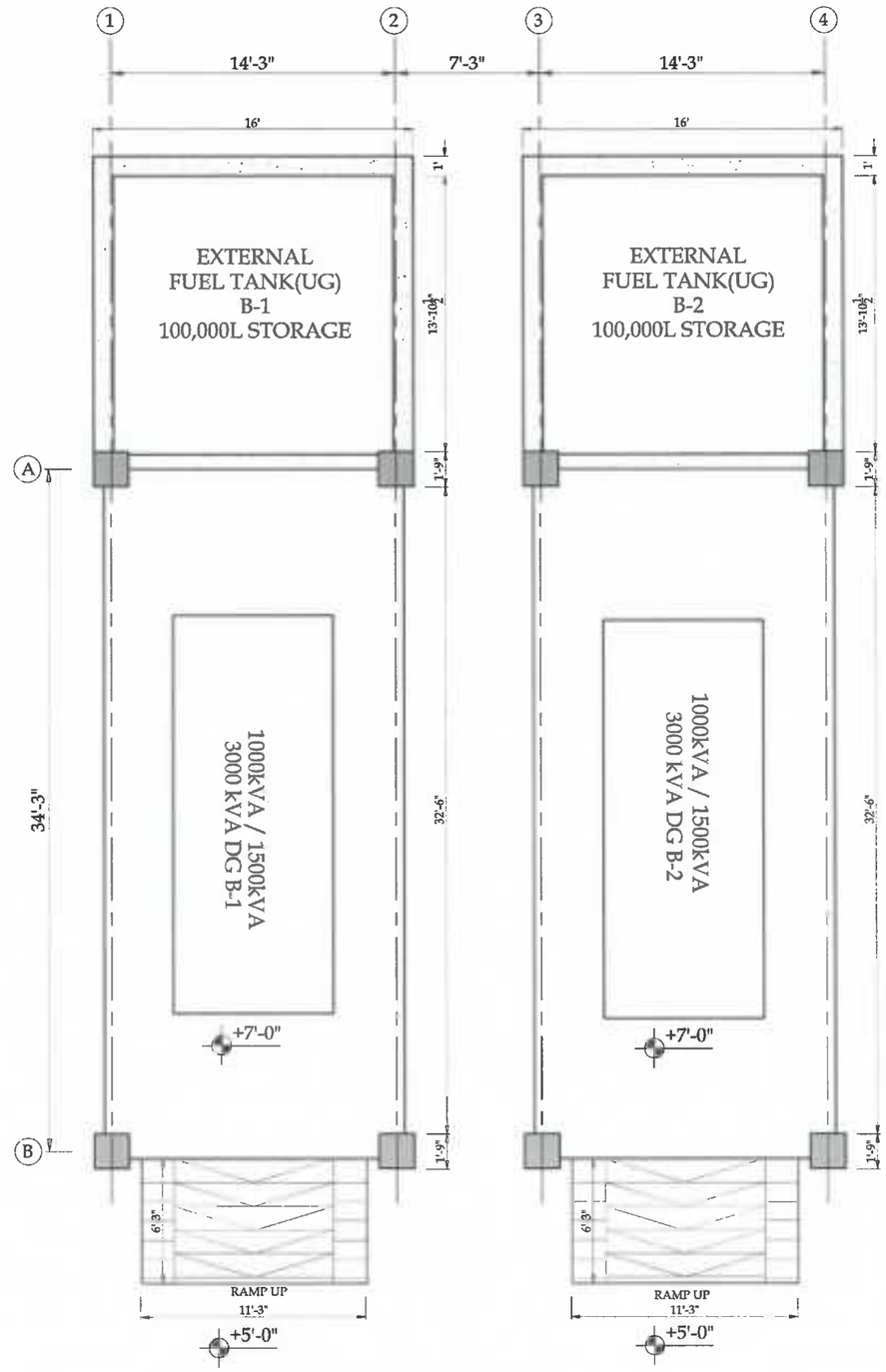
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




GROUND FLOOR WORKING PLAN
(EXTERNAL FUEL TANK AREA)

01

SCALE:- 3/16" = 1'-0"




GROUND FLOOR WORKING PLAN
(EXTERNAL FUEL TANK AREA)

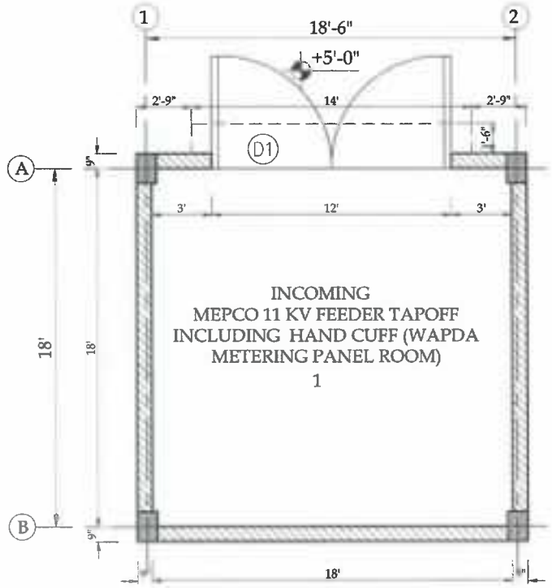
02

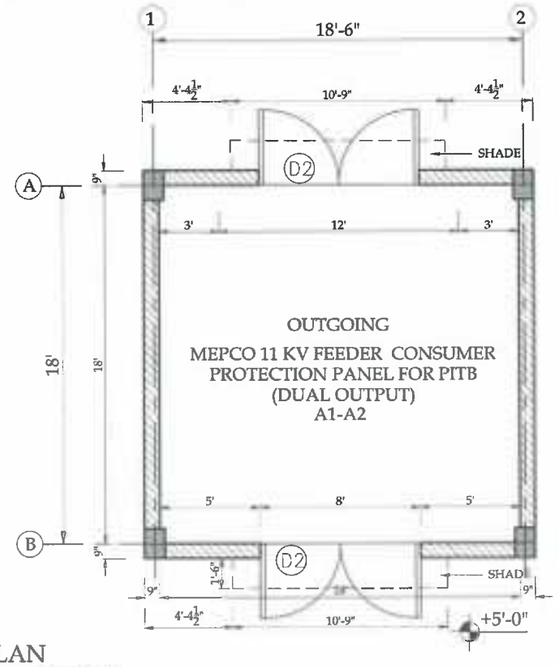
SCALE:- 3/16" = 1'-0"

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** EXTERNAL FUEL TANK GROUND FLOOR GROUND FLOOR WORKING PLAN | **DRAWING NO:** PITB-ESS-MUL-04-A103<br>**SCALE:** 3/16" = 1'-0" |

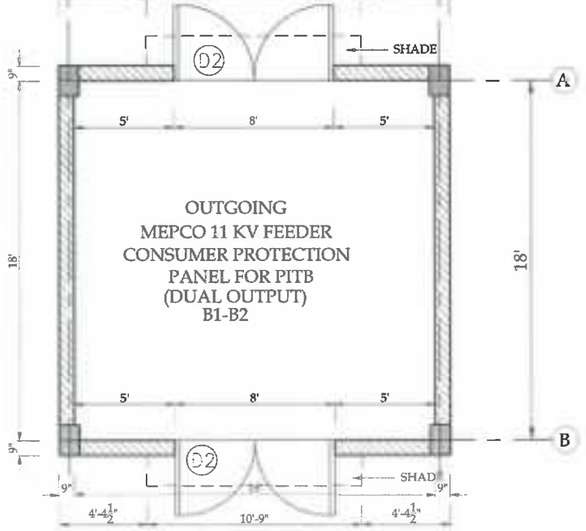
**TENDER DRAWINGS**

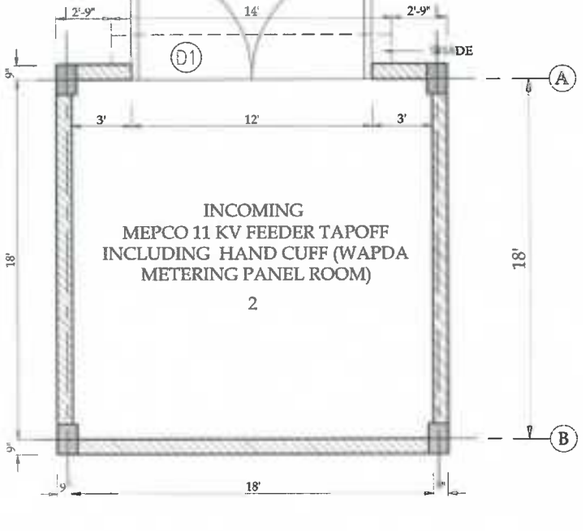
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




GROUND FLOOR WORKING PLAN
01 (TYP. INCOMING / OUTGOING PANEL ROOM)
SCALE:- 3/16" = 1'-0"



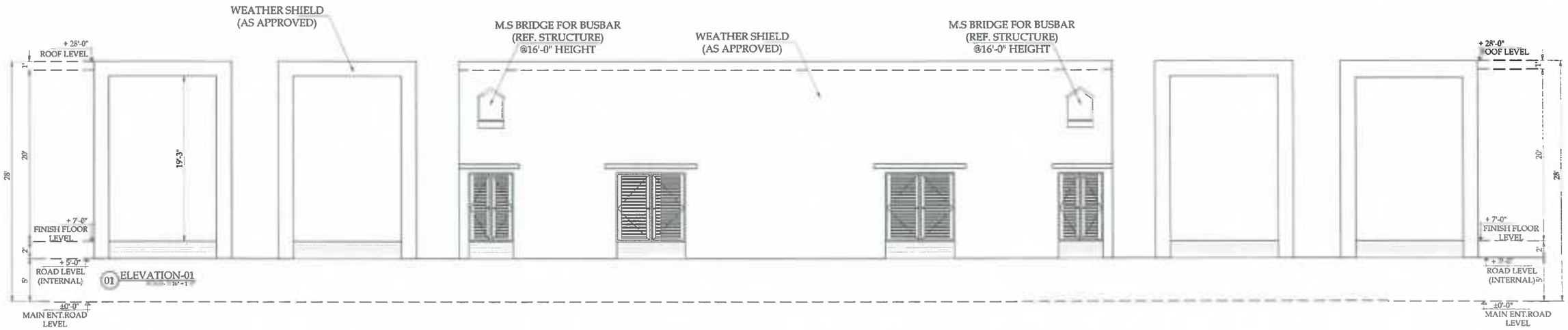




GROUND FLOOR WORKING PLAN
02 (TYP. INCOMING / OUTGOING PANEL ROOM)
SCALE:- 3/16" = 1'-0"

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** INCOMING & OUTGOING METERING PANEL ROOM GROUND FLOOR WORKING PLAN | **DRAWING NO:** PITB-ESS-MUL-04-A104<br>**SCALE:** 3/16" = 1'-0" |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | **DRAWING TITLE:** SUBSTATION ELEVATION-01 | **DRAWING NO:** PITB-ESS-MUL-04-A201<br>**SCALE:** 3/16" = 1'-0" |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# DOOR WINDOW SCHEDULE SUBSTATION

| TYPE | WIDE | HIGH | SILL | DESCRIPTION |
|---|---|---|---|---|
| D1 | 12'-0" | 8'-0" | 1/4" | MS LOUVERS DOOR |
| D2 | 8'-0" | 8'-0" | 1/4" | MS LOUVERS DOOR |
| D3 | 5'-0" | 8'-0" | 1/4" | MS LOUVERS DOOR |

CLIENT:
Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | MUBASHIR AYUB |
| DESIGNED BY: | AR.FAHAD SOHAIL |
| CHECKED BY: | AR.DR MANSOOR |
| APPROVED BY: | AR.USWA SAEED |
| DATE: | AUGUST,2026 |

DRAWING TITLE:
SUBSTATION
DOOR SCHEDULE

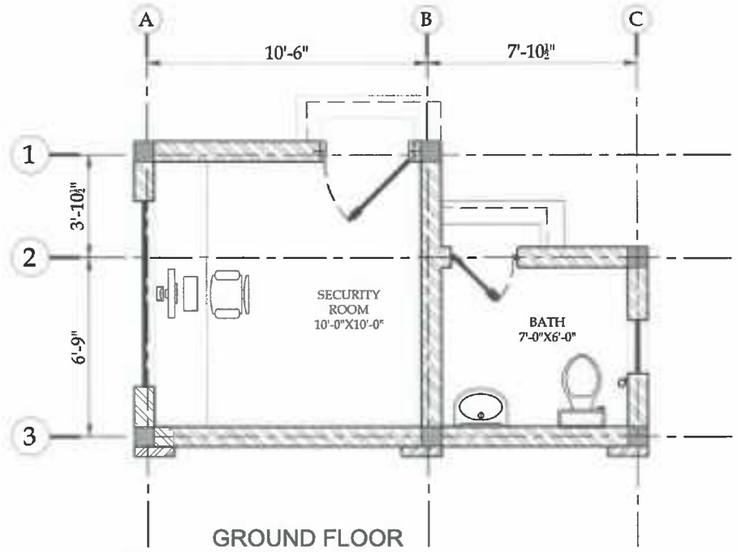
DRAWING NO:
PITB-ESS-MUL-04-A151

SCALE:
N.T.S

**TENDER DRAWINGS**

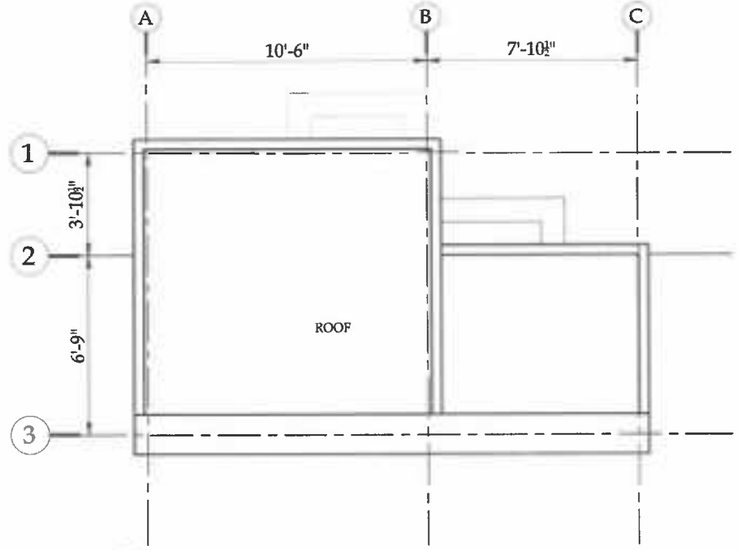
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|

**PITB**
**GUARD ROOM**



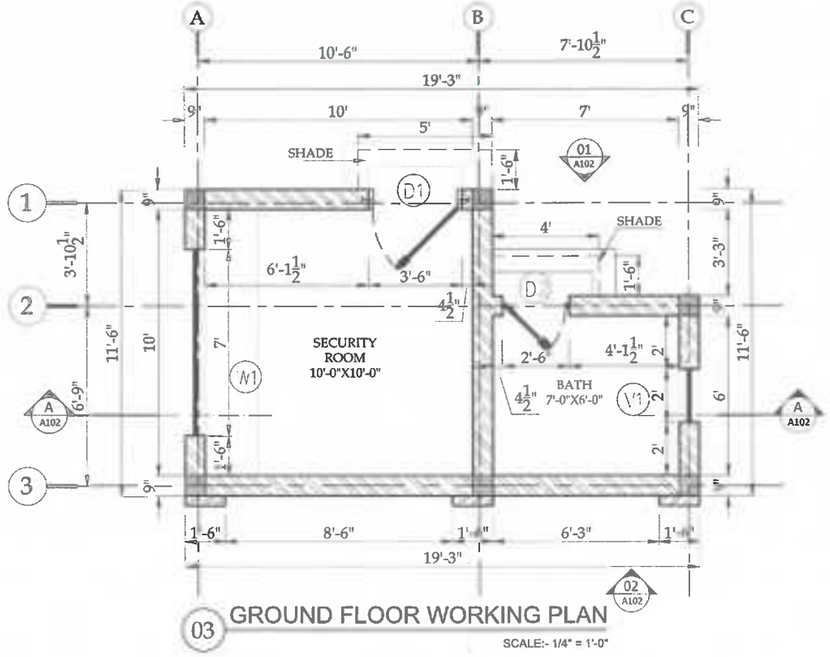

01 GROUND FLOOR FURNITURE LAYOUT PLAN

SCALE:- 1/4" = 1'-0"



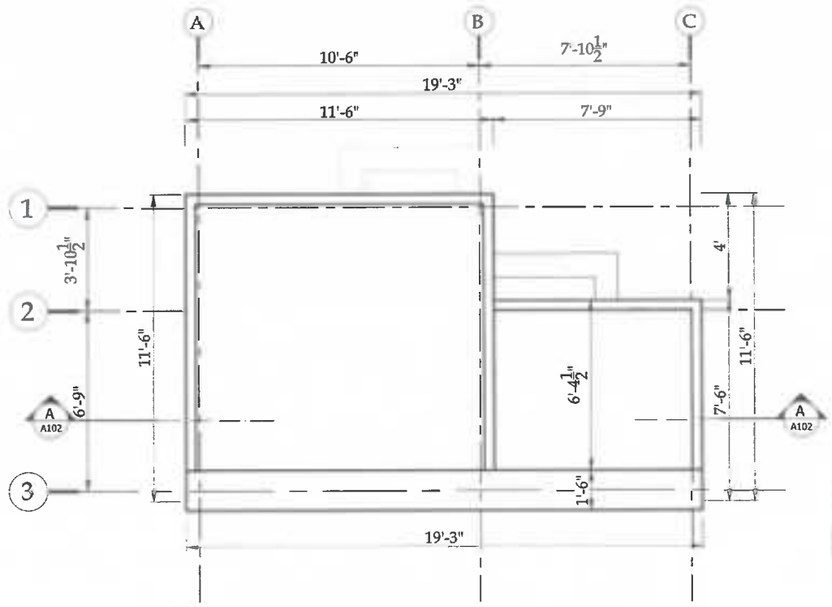

02 ROOF PLAN

SCALE:- 1/4" = 1'-0"




03 GROUND FLOOR WORKING PLAN

SCALE:- 1/4" = 1'-0"




04 ROOF WORKING PLAN

SCALE:- 1/4" = 1'-0"

| | | | |
|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 |

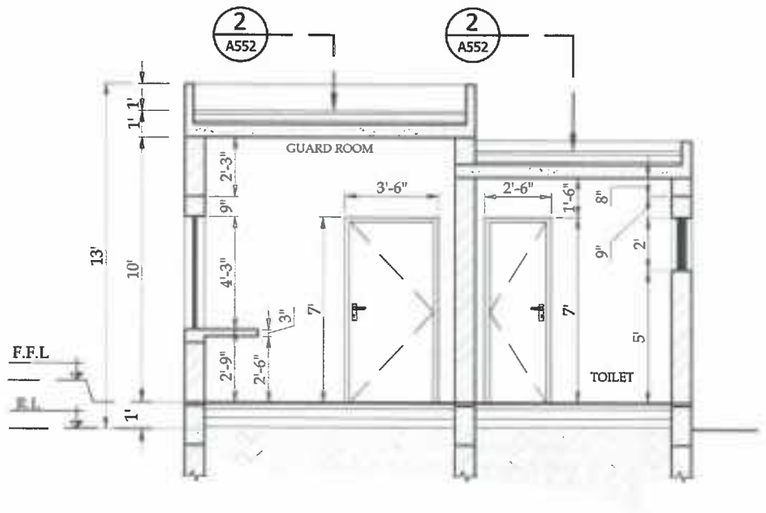
DRAWING TITLE: GUARD ROOM DETAIL-1

DRAWING NO: PITB-ED-MUL-04-A101

SCALE: 1/4" = 1'-0"

**TENDER DRAWINGS**

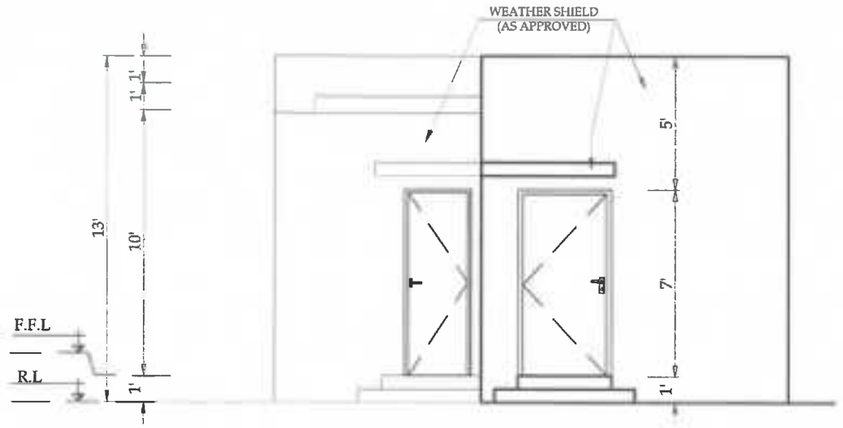
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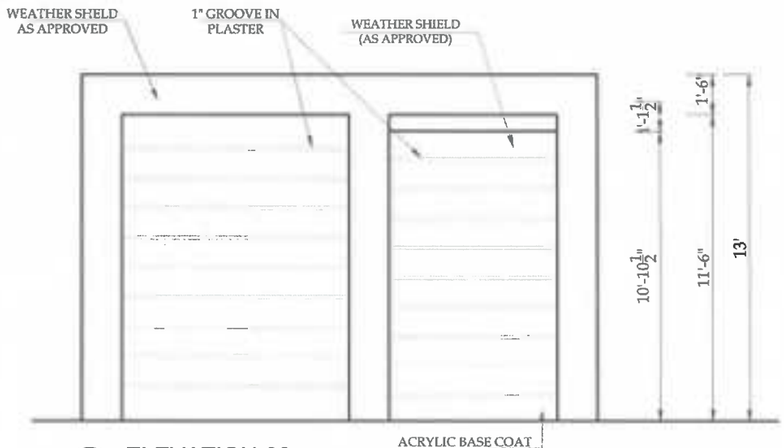

01 SECTION-AA
SCALE:- 1/4" = 1'-0"

## DOOR WINDOW SCHEDULE GUARD ROOM

| TYPE | WIDE | HIGH | SILL | DESCRIPTION |
|---|---|---|---|---|
| D1 | 3'-6" | 8'-0" | 1/4" | SOLID FLUSH DOOR WITH KICK PLATE |
| D2 | 2'-6" | 8'-0" | 1/4" | SOLID FLUSH DOOR WITH KICK PLATE |
| W1 | 7'-0" | 4'-3" | 2'-9" | ALUMINUM GLASS WINDOW (SINGLE GLAZED) 6mm |
| V1 | 2'-0" | 2'-0" | 5'-0" | ALUMINUM GLASS WINDOW (SINGLE GLAZED) 5mm |
| | | | | |




01 ELEVATION-01
SCALE:- 1/4" = 1'-0"




02 ELEVATION-02
SCALE:- 1/4" = 1'-0"

| | | | |
|---|---|---|---|
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**DRAWING TITLE:** GUARD ROOM DETAIL-2

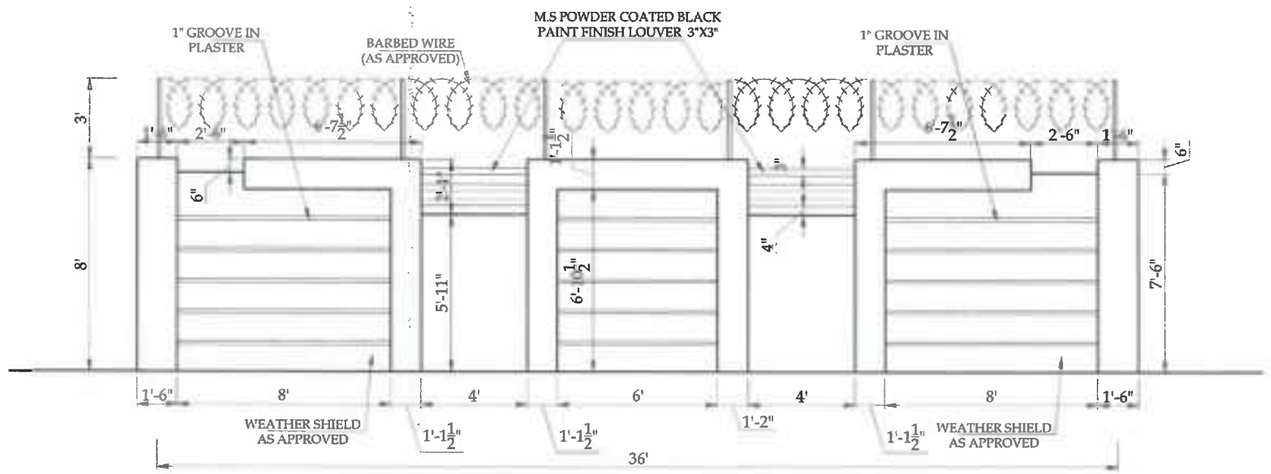
**DRAWING NO:** PITB-ED-MUL-04-A102

**SCALE:** 1/4" = 1'-0"

**TENDER DRAWINGS**

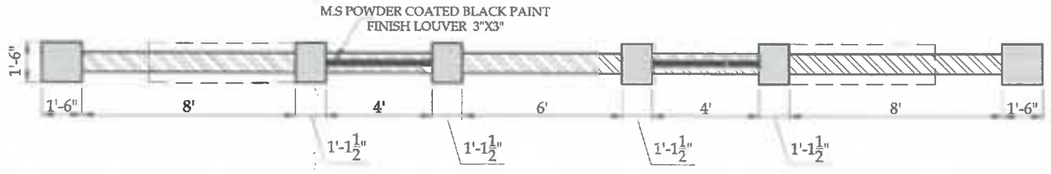
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# PITB
# BOUNDARY WALL
# MAIN GATE



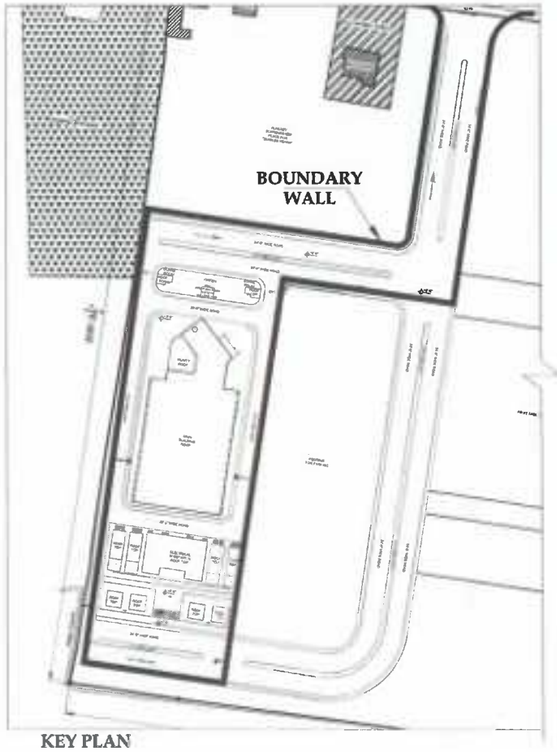

02 TYP. BOUNDARY WALL ELEVATION

SCALE:- 1/4" = 1'-0"



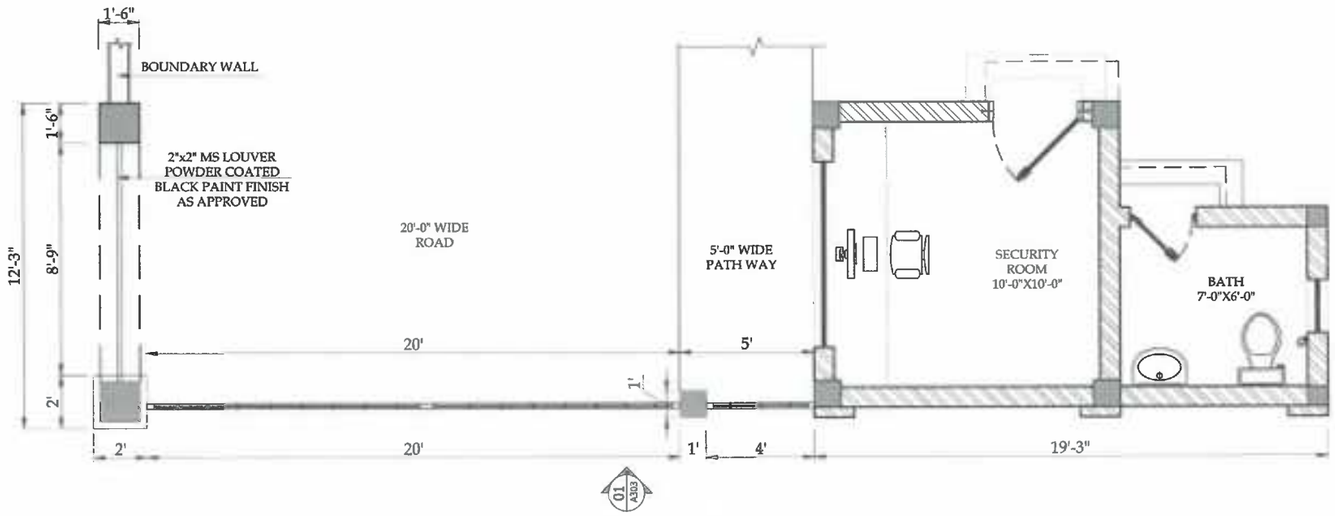

01 TYP. BOUNDARY WALL PLAN

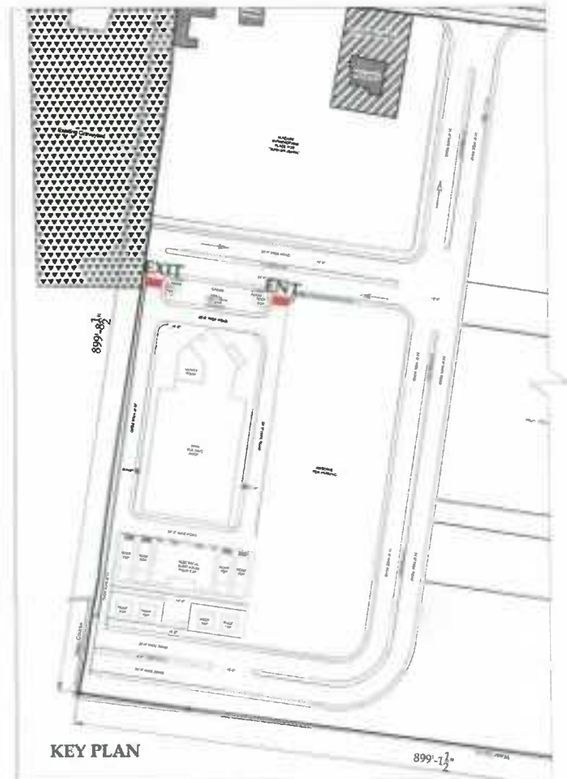
SCALE:- 1/4" = 1'-0"




KEY PLAN

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUBASHIR AYUB<br>DESIGNED BY: AR.FAHAD SOHAIL<br>CHECKED BY: AR.DR MANSOOR<br>APPROVED BY: AR.USWA SAEED<br>DATE: AUGUST,2026 | DRAWING TITLE: TYP.BOUNDARY WALL PLAN & ELEVATION | DRAWING NO: PITB-ED-MUL-04-A101<br>SCALE: 1/4" = 1'-0" | TENDER DRAWINGS | REV. DESCRIPTION SIGN. DATE |

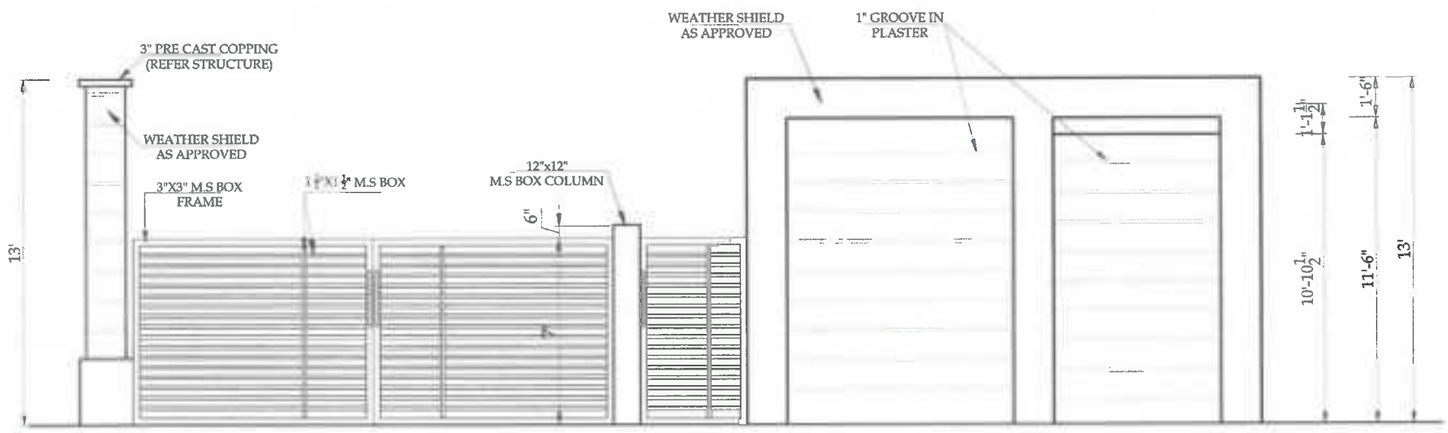



KEY PLAN

## 01 MAIN GATE PLAN

SCALE:- 1/4" = 1'-0"




## 01 MAIN GATE ELEVATION

SCALE:- 1/4" = 1'-0"

| | | | |
|---|---|---|---|
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| DRAWING TITLE: MAIN GATE PLAN & ELEVATION | DRAWING NO: PITB-ED-MUL-04-A102<br>SCALE: 1/4" = 1'-0" | TENDER DRAWINGS | REV. DESCRIPTION SIGN. DATE |

# DATA CENTER AT PITB MULTAN

## STRUCTURAL TENDER DRAWINGS

CLIENT:

**PUNJAB (PVT) LTD (ECSP).**
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
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**PUNJAB INFORMATION TECHNOLOGY**

# LIST OF DRAWINGS

| S. NO. | TITLE OF DRAWING | DRAWING NO. |
|---|---|---|
| **GENERAL DRAWINGS** | | |
| 01 | LIST OF DRAWINGS | STR-00 |
| 02 | MASTER PLAN | STR-01 |
| 03 | GENERAL NOTES & GENERAL DETAILS | STR-02 |
| **DATA CENTER** | | |
| 03 | COLUMN LAYOUT PLAN | STR-01 |
| 04 | FOUNDATION LAYOUT PLAN | STR-02 |
| 05 | FOUNDATIONS SCHEDULE, COLUMN ELEVATION AND SECTIONAL DETAILS | STR-03 |
| 06 | PLINTH BEAM LAYOUT PLAN | STR-04 |
| 07 | PLINTH BEAMS AND STAIR PEDESTAL SECTIONAL DETAILS | STR-05 |
| 08 | FIRST FLOOR SLAB REINFORCEMENT PLAN AND BRACING BEAMS FRAMING PLAN | STR-06 |
| 09 | FIRST FLOOR SLAB BEAMS AND BRACING BEAMS SECTIONAL DETAILS | STR-07 |
| 10 | ROOF SLAB REINFORCEMENT PLAN AND BEAMS FRAMING PLAN | STR-08 |
| 11 | ROOF SLAB BEAMS SECTIONAL DETAILS | STR-09 |
| 12 | MUMTY SLAB REINFORCEMENT PLAN AND BEAMS SECTIONAL DETAILS | STR-10 |
| 13 | TYPICAL O.H.W.T SECTION | STR-11 |
| 14 | UNDERGROUND WATER TANK FOR RAIN WATER COLLECTION | STR-12 |
| 15 | UNDERGROUND WATER TANK FOR FIRE FIGHTING SYSTEM | STR-13 |
| 16 | TYPICAL SECTION OF STRONG ROOM | STR-14 |
| **ELECTRICAL SUBSTATION** | | |
| 17 | INCOMING / OUTGOING PANEL ROOM LAYOUT PLAN | STR-01 |
| 18 | INCOMING / OUTGOING PANEL ROOM FOUNDATION & BEAM DETAILS | STR-02 |
| 19 | GEN SET SYNC-MTTM ROOM FOUNDATION LAYOUT PLAN | STR-03 |
| 20 | INCOMING / OUTGOING PANEL ROOM FOUNDATION & BEAM DETAILS | STR-04 |
| 21 | GEN SET SYNC-MTTM ROOM PLINTH BEAM LAYOUT PLAN | STR-05 |
| 22 | GEN SET SYNC-MTTM ROOM BRACING BEAM LAYOUT PLAN | STR-06 |
| 23 | GEN SET SYNC-MTTM ROOM ROOF FRAMING & REINFORCEMENT PLAN | STR-07 |
| 22 | FUEL TANK (UG) FOUNDATION & PLINTH BEAM LAYOUT | STR-08 |
| 25 | FUEL TANK (UG) FOUNDATION & COLUMN SECTIONAL DETAILS | STR-09 |
| 26 | FUEL TANK DETAILS | STR-10 |
| 27 | FUEL TANK (UG) BEAM & SLAB REINFORCEMENT LAYOUT PLAN & SECTION DETAIL | STR-11 |
| **MAIN GATE AND GUARD ROOM** | | |
| 28 | FOUNDATION LAYOUT PLAN | STR-01 |
| 29 | FOUNDATION SECTIONAL DETAILS | STR-02 |
| 30 | COLUMN / PLINTH BEAMS LAYOUT PLAN & SECTIONAL DETAILS | STR-03 |
| 31 | ROOF BEAMS & SLAB DETAILS | STR-04 |
| **BOUNDARY WALL** | | |
| 32 | FOUNDATION, COLUMNS & PLINTH BEAMS LAYOUT PLAN | STR-01 |
| 33 | SECTIONAL DETAILS | STR-02 |

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

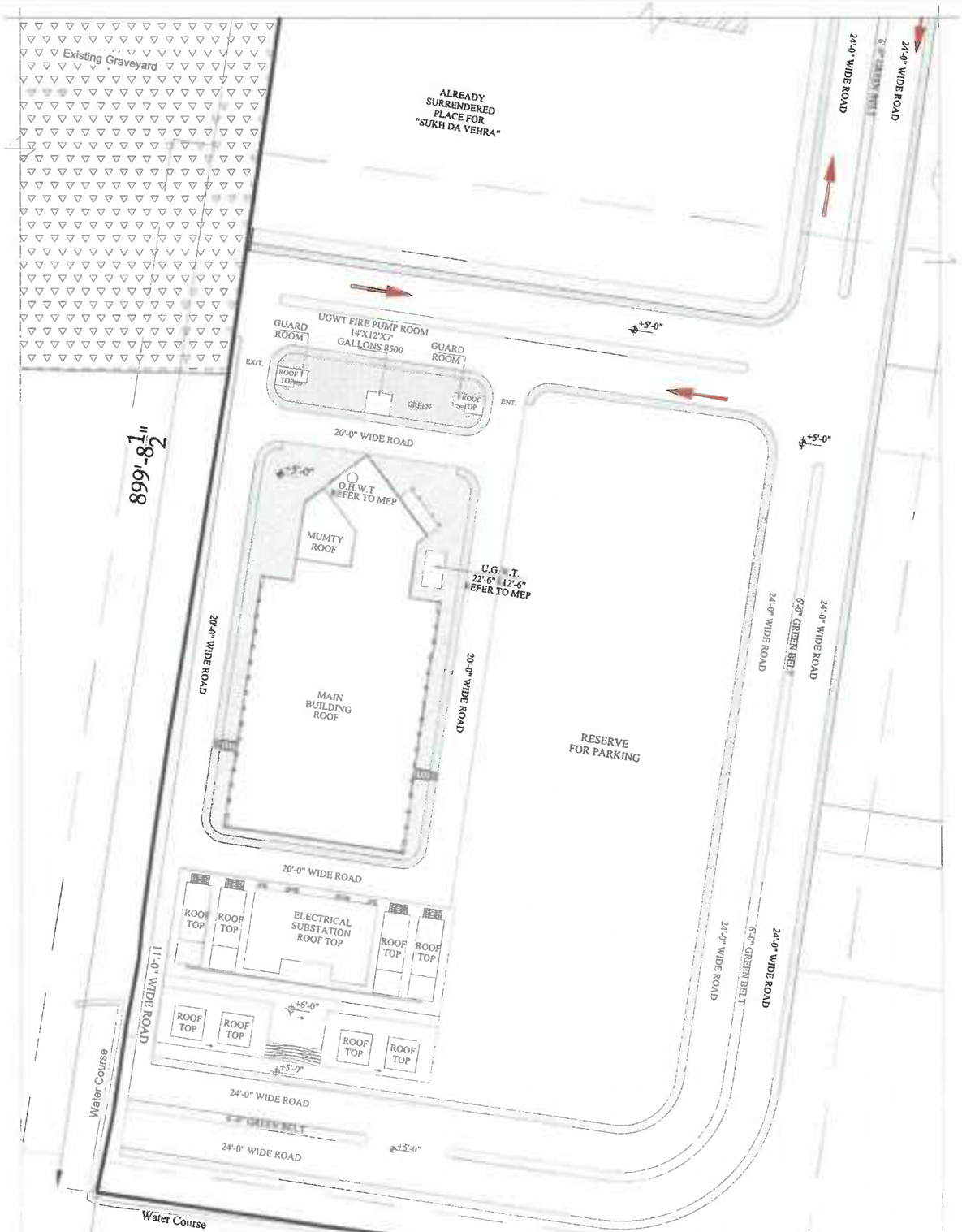
| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
DATA CENTER
LIST OF DRAWINGS

**DRAWING NO:** STR- 00

**SCALE:** N.T.S

**SHEET:** A3




**TENDER DRAWING**

| | | | |
|---|---|---|---|
| **CLIENT:** | Punjab Information Technology Board (PITB) Lahore | **PROJECT:** | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN |
| **CONSULTANTS:** | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | **DRAWN BY:** | M.ADNAN |
| | | **DESIGNED BY:** | M.HASNAIN |
| | | **CHECKED BY:** | ALI RAZA / QASIM SULTAN |
| | | **APPROVED BY:** | SABIR HUSSAIN |
| | | **DATE:** | AUGUST, 2026 |
| **DRAWING TITLE:** | **DATA CENTER**<br>**MASTER PLAN** | **DRAWING NO:** | STR-01 |
| | | **SCALE:** | N.T.S |
| | | **SHEET:** | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

## 1-GENERAL

1- READ ALL DRAWINGS IN CONJUNCTION WITH ARCHITECTURAL, PLUMBING/SEWERAGE, MECHANICAL, ELECTRICAL AND ANY OTHER RELEVANT DRAWINGS.

2- NOTES GIVEN IN THIS DRAWING ARE APPLICABLE TO ALL DRAWINGS UNLESS MENTIONED OTHERWISE. NOTES WRITTEN ON A DRAWING, SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS-REFERRED.

3- ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE SPECIFICATIONS OF THE CONTRACT DOCUMENTS. IN ABSENCE OF ANY SPECIFICATIONS , ALL MATERIALS, TESTS AND WORKMANSHIP SHALL CONFORM TO RELEVANT ASTM, ACI/B.S CODES AND

4- SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

5- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE STRUCTURES DURING CONSTRUCTION. HE SHALL ALSO VERIFY ALL DIMENSIONS AND LEVELS BEFORE EXECUTION OF WORK. ANY DISCREPANCY, ERROR OR OMISSION, IF FOUND, SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR CORRECTION AND APPROVAL.

6- THE CONTRACTOR SHALL COORDINATE WITH ARCHITECTURAL AND ALL OTHER DICIPLINE DRAWINGS FOR SIZES AND LOCATION OF ALL STRUCTURAL MEMBERS, FLOORS, WALLS, OPENINGS, FLOOR FINISHES, PIPES ETC.

7- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXECUTION OF DEWATERING SYSTEM WHERE SO REQUIRED DURING CONSTRUCTION. HE SHALL SUBMIT HIS METHODOLOGY FOR APPROVAL OF ENGINEER BEFORE ANY ACTIVITY.

8- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES, 21 DAYS

9- IN ADVANCE FOR APPROVAL, TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

10- TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.

11- ALL LEVELS AND DIMENSIONS ARE IN MILIMETER UNLESS OTHERWISE NOTED.

12- DO NOT SCALE THE DRAWINGS WRITTEN DIMENSIONS, GIVEN ON THE DRAWING, SHALL GOVERN.

ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST APPLICABLE ACI/AISC/BRITISH SPECIFICATIONS.

BACKFILLING AROUND FOUNDATION SHOULD BE DONE SIMULTANEOUSLY ON BOTH SIDES TO AVOID ANY LATERAL DISPLACEMENT. BACKFILLING UNDER FLOORS AND AROUND FOUNDATIONS SHALL BE DONE IN LAYERS NOT EXCEEDING 6 INCH. IN THICKNESS AND COMPACTED UPTO 95% MODIFIED PROCTOR DENSITY.

## 2-EXCAVATION

1- EXCAVATION SHALL BE MADE TO THE LINES AND LEVELS SHOWN ON THE DRAWINGS. THE ENGINEER MAY CHANGE THE EXTENT OR THE LEVELS OF EXCAVATION DURING THE PROGRESS OF WORKS.

2- THE CONTRACTOR MAY USE STABLE SLOPES OTHER THAN THOSE SHOWN ON THE DRAWINGS WITH THE PRIOR APPROVAL OF THE ENGINEER.

3- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE EXCAVATED AREA AND SHALL KEEP THE AREA IN A SOUND AND DRY CONDITION.

4- THE TERMITE CONTROL TREATMENT SHALL BE APPLIED AFTER EXCAVATION OF FOUNDATIONS ON BEDS AND SIDE SLOPES BEFORE CONCRETING OPERATION.

5- PART OF EXCAVATED MATERIAL, AS DIRECTED BY THE ENGINEER, SHALL BE PLACED IN STOCK PILES FOR BACKFILLING. ALL OTHER MATERIAL SHALL BE DISPOSED OF IN

6- APPROVED DISPOSAL AREA AS DIRECTED BY THE ENGINEER.

7- ANY OVER EXCAVATED AREAS OR DOUBTFUL PATCHES, AS DIRECTED BY THE ENGINEER

8- SHALL BE FILLED WITH LEAN CONCRETE.

## 3-FOUNDATIONS

01- THE DESIGN OF FOUNDATION IS BASED ON ASSUMED BEARING CAPACITY OF 0.75 TSF. THE FOUNDATION DESIGN MAY BE REVISED AS PER ACTUAL BEARING CAPACITY BASED ON GEOTECHNICAL INVESTIGATION REPORT.

02- THE EXCAVATED BED OF FOUNDATION SHOULD BE THOROUGHLY COMPACTED PRIOR TO LAYING BLINDING CONCRETE IN FOUNDATION. IT IS RECOMMENDED TO REMOVE AND REPLACE LOOSE/FILL MATERIAL UP TO ITS EXTENTS (BASED ON OUR INVESTIGATIONS, THE DEPTH OF ENGINEERING FILL MAY VARY FROM 0.0M TO 0.5M DEPTH) BELOW THE BASE OF THE PROPOSED FOUNDATION LEVEL WITH ENGINEERING FILL MATERIAL. THE ENGINEERING FILL MATERIAL SHOULD BE AT LEAST A-3 OR BETTER MATERIAL AS PER AASHTO SOIL CLASSIFICATION. ENGINEERING FILL MATERIAL PLACED BENEATH FOOTINGS SHOULD BE PLACED IN HORIZONTAL LAYERS HAVING COMPACTED THICKNESS OF NOT GREATER THAN 6 INCH AND UNIFORMLY COMPACTED TO ACHIEVE AT LEAST 95% OF MAXIMUM MNODIFIED PROCTOR DENSITY. MOREOVER, THE SUBSURFACE STRATUM SHOULD BE PROOF ROLLED PRIOR TO THE PLACEMENT OF ENGINEERING FILL MATERIAL.

03- THE FOUNDATION BED SOIL SHOULD BE PROTECTED FROM INGRESS OF WATER FROM ANY SOURCE BY PROVIDING ADEQUATE SURFACE DRAINAGE SYSTEM AND ENSURING LEAK PROOF JOINTINGS OF SEWERAGE AND WATER SUPPLY LINES. EXCESSIVE AND UNCONTROLLED WATERING FOR CURING AND COMPACTION OF BACKFILL MATERIAL SHOULD BE AVOIDED.

## 4-REINFORCED CONCRETE

01- STRUCTURAL DESIGN IS BASED ON THE NATIONAL BUILDING CODE OF PAKISTAN AND AMERICAN CONCRETE INSTITUTE CODE OF REINFORCED CONCRETE,ACI 318.

02- ALL STRUCTURAL CONCRETE SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE (ACI) REQUIREMENTS.

03- THE MINIMUM WORK COMPRESSIVE CYLINDER STRENGTH OF LEAN/BLINDING CONCRETE SHALL BE 1000 psi AT 28 DAYS.

04- THE MINIMUM COMPRESSIVE CONCRETE CYLINDER STRENGTH OF STRUCTURAL CONCRETE FOR MAIN BUILDING COLUMNS IS 4000 psi & FOR ALL OTHER STRUCTURAL MEMBERS SHALL BE 3000 psi AT 28 DAYS

05- NO CONCRETING SHALL BE CARRIED OUT UNTIL PERMISSION IS GIVEN IN WRITING.

## 5-REINFORCING STEEL

1- ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM-A615 GRADE 60 HAVING A MINIMUM YIELD STRENGTH OF 60,000 psi.

2- WHEREVER POSSIBLE FULL LENGTH OF REINFORCING BARS SHALL BE USED TO AVOID UNNECESSARY LAPS AND WASTAGE.

3- CLEAR COVER TO REINFORCEMENT SHALL BE:

| SRTUCT.ELEMENT | COVER (INCH) |
|---|---|
| FOOTINGS/RAFT | 2" |
| BEAMS (BOTTOM) | 1.5" |
| BEAMS (SIDES) | 1" |
| COLUMNS | 1.5" |
| SLABS | 0.75" |
| WALLS (INNER FACE) | 1" |
| WALLS (OUTER FACE IN CONTACT WITH EARTH) | 2" |

4- DEVELOPMENT LENGTH

| Bar Size fc' (PSI) | # | DEVELOPMENT LENGTH 'ln' (Fy=60,000 PSI) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 03 | 04 | 05 | 06 | 07 | 08 |
| 3000 | | 25 | 33 | 42 | 50 | 73 | 83 |
| 4000 | | 22 | 29 | 36 | 43 | 63 | 72 |

5- SPLICE LENGTH

| Bar Size fc' (PSI) | # | SPLICE LENGTH 'ln' (Fy=60,000 PSI) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 03 | 04 | 05 | 06 | 07 | 08 |
| 3000 | | 32 | 43 | 54 | 64 | 94 | 107 |
| 4000 | | 28 | 37 | 47 | 56 | 82 | 93 |

EXCEPT AS OTHERWISE SHOWN ON THE DRAWING, WHENEVER REINFORCING BARS OF DIFFERENT SIZES ARE TO BE LAP SPLICED IN COMPRESSION SPLICE LENGTH SHALL BE THE LARGER OF DEVELOPMENT LENGTH OF LARGER BAR, OR SPLICE LENGTH OF SMALLER BAR.

6- ALL REINFORCING STEEL SHALL BE ACCURATELY LOCATED IN THE FORMS AND HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACEMENT OF CONCRETE, BY MEANS OF WIRE AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

7- DISTRIBUTION REINFORCEMENT NOT SHOWN SHALL BE PROVIDED AS #3@12" c/c.

## 6-CONCRETE CONSTRUCTION

1- ALL STRUCTURAL SURFACES, AGAINST WHICH EARTH IS TO BE FILLED, SHALL BE COATED WITH TWO COATS OF HOT BITUMEN OF 10/20 GRADE AT THE RATE OF 0.4 lb/ft²/coat.

2- THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE PLACED UNTIL WRITTEN PERMISSION IS GIVEN BY THE ENGINEER.

3- DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BRICKS, etc. SHOULD BE AVOIDED ON SLAB PANELS.

4- BEFORE CASTING OF ANY STRUCTURAL MEMBER, THE CONTRACTOR SHALL ENSURE THAT ALL EMBEDDED ITEMS FOR ELECTRICAL, MECHANICAL, HVAC, PLUMBING, STRUCTURAL STEEL AND OTHER WORKS ARE PROPERLY LOCATED AND FIRMLY SECURED IN PLACE.

## 7-CONSTRUCTION JOINTS

1- JOINTS, NOT SHOWN ON THE DRAWINGS, SHALL BE SO MADE AND LOCATED AS TO APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED WITHIN THE MIDDLE THIRD OF THE LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR SPANS OF SLABS, BEAMS AND JOISTS. IN WALLS AND COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOOR, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.

2- JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS JOINTS.

3- BEAMS, GIRDERS AND HAUNCHES SHALL BE PLACED MONOLITHICALLY AS PART OF SLAB SYSTEM UNLESS OTHERWISE SHOWN IN DESIGN DRAWINGS OR SPECIFICATIONS.

## 8-SHORING AND BRACING

1- SHORE AND BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH AND SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS, WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING AND BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT SPECIFICATIONS.

2- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE ADJACENT EXISTING STRUCTURES AND SHALL PROVIDE ADEQUATE SHORING AND BRACING DURING EXCAVATION AND CONSTRUCTION, WHEREVER AND WHENEVER REQUIRED TO THE SATISFACTION OF THE ENGINEER.

## 9-BRICK WORK

1- ALL BRICK WORK SHALL CONFORM TO SPECIFICATIONS GIVEN IN THE CONTRACT DOCUMENT.

2- ALL BRICKS SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 0.12in.

3- ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 0.12in IN 10ft.

4- ALL BRICK MASONRY FOR WALLS SHALL BE REINFORCED WITH MIILD STEEL FLAT/REINFORCEMENT AS SHOWN ON THE DRAWINGS.

5- TESTING OF COMPRESSIVE STRENGTH OF MASONRY SHALL BE DONE, IF SO DIRECTED BY THE ENGINEER, IN ACCORDANCE WITH ASTM E447 OR PAKISTAN STANDARD-208.

6- THE AVERAGE COMPRESSIVE STRENGTH OF TWELVE BRICKS SHALL BE NOT LESS THAN 2000 psi AND SHALL BE NOT LESS THAN 1500 psi FOR ANY INDIVIDUAL BRICK.

7- BRICK SHALL BE LAID "FROG" UPWARD WITH MORTAR JOINT AND IN ENGLISH AND FLEMISH BOND OR AS DIRECTED BY THE ENGINEER.

8- ALL BRICK MASONRY WORK FOR SUBSTRUCTURE SHALL BE CARRIED OUT BY USING 1:5 CEMENT SAND MORTAR.

9- ALL BRICK MASONRY WORK FOR SUPERSTRUCTURE SHALL BE CARRIED OUT BY USING 1:4 CEMENT SAND MORTAR.

10- ALL BRICK MASONRY WORK FOR BOUNDARY WALL SHALL BE CARRIED OUT BY USING 1:3 CEMENT SAND MORTAR.

11- ALL BRICK MASONRY WALLS SHALL BE PLASTERED WITH 1:4 CEMENT SAND MORTAR.

## 10-ELECTRICAL CONDUITS

1- CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS AND WITHIN THE MIDDLE HALF OF THE THICKNESS IN SLABS.

SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6 in.

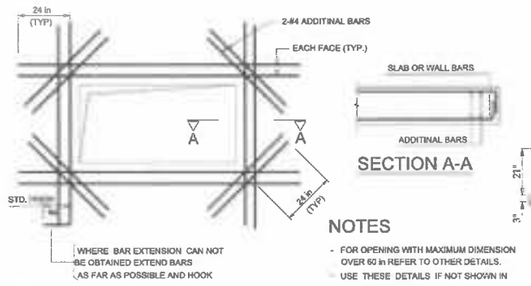
## 11- STRUCTURAL STEEL

1- FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE PERFORMED IN ACCORDANCE WITH AISC SPECIFICATIONS.

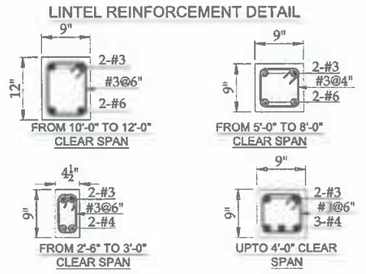
2- ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-36 OR EQUIVALENT AS APPROVED BY THE ENGINEER.

3- ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.

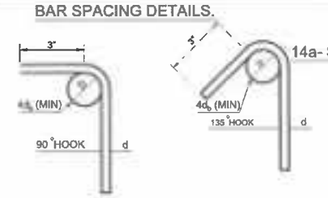
### 12- REINFORCEMENT DETAIL AT OPENING IN SLAB/SLEEVES.




### LINTEL REINFORCEMENT DETAIL

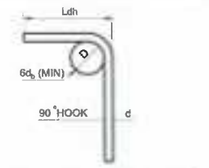



### 14- STIRRUPS, HOOKS, SPLICES AND REINFORCEMENT BAR SPACING DETAILS.

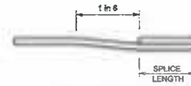



STIRRUPS AND TIE HOOKS

14a- STANDARD HOOK FOR BEAM & COLUMN BARS




HOOKS FOR DEFORMED BARS IN TENSION

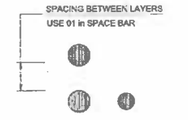



BEAM SPLICE (TYP.)

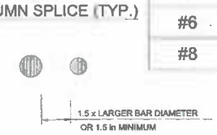



COLUMN SPLICE (TYP.)

| BAR NO. | Ldh |
|---|---|
| #4 | 8" |
| #6 | 12" |
| #8 | 16" |



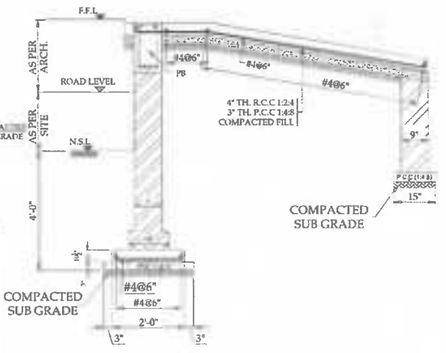

BAR SPACING IN BEAM



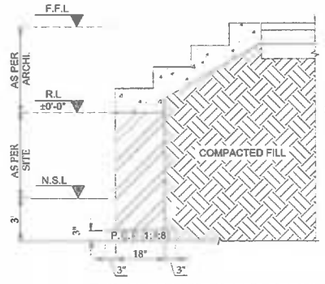

VERTICAL BAR SPACING IN COLUMNS




TYP. CONCRETE PAD DETAIL




TYP. ENTRANCE RAMP DETAIL




TYP. ENTRANCE STEPS DETAIL

**TENDER DRAWING**

| REV | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

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83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

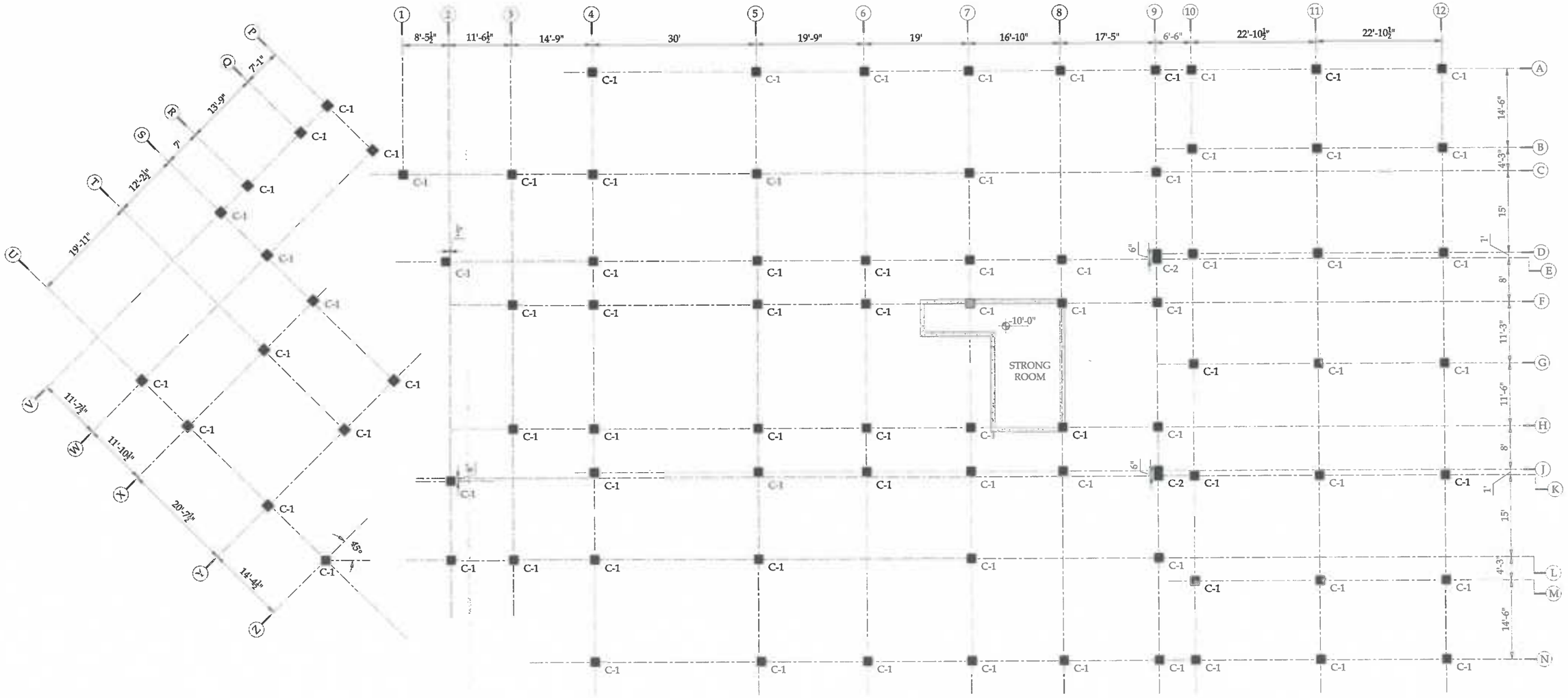
DRAWING TITLE: DATA CENTER
GENERAL NOTES & GENERAL DETAILS

DRAWING NO: STR-02

SCALE: N.T.S

SHEET: A3

# DATA CENTER



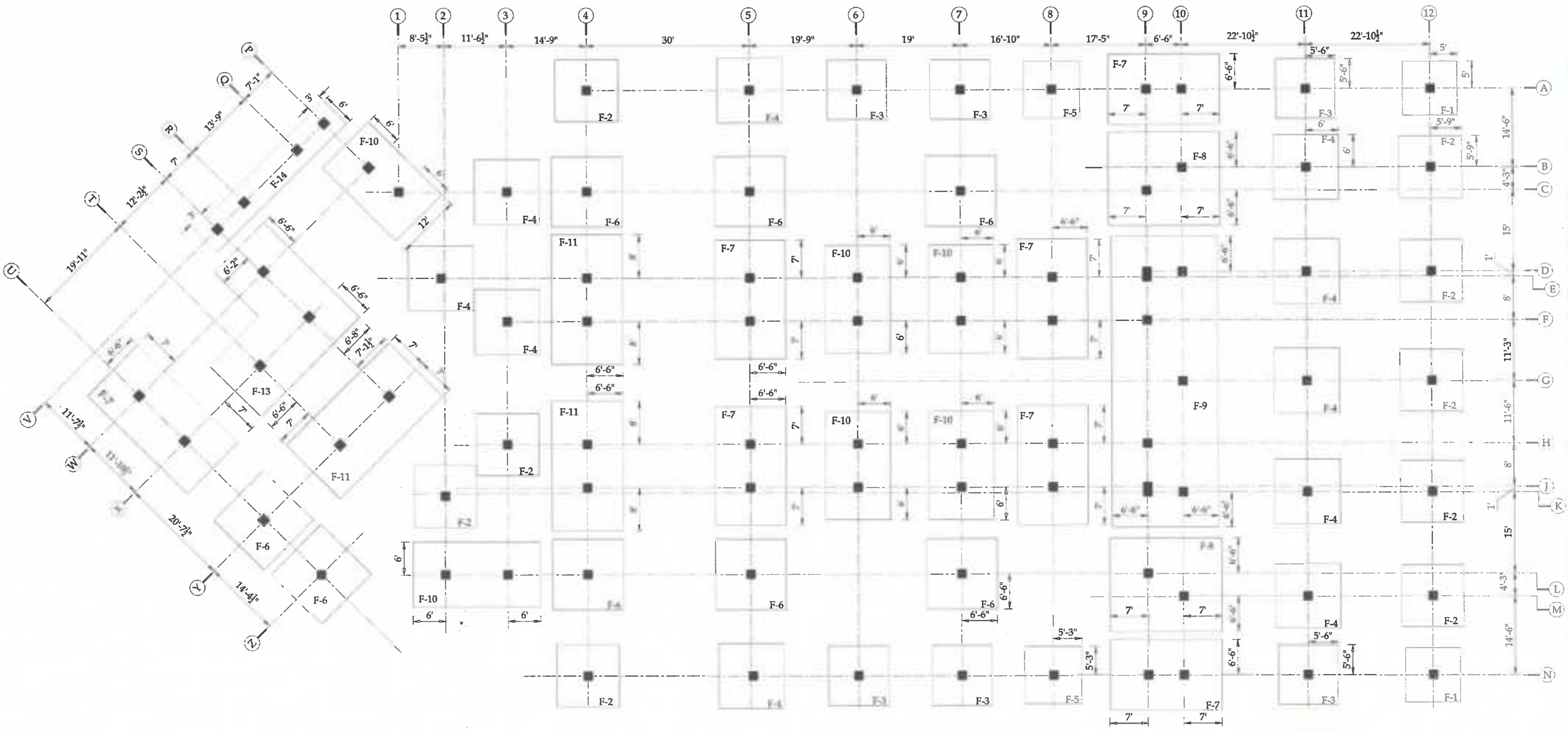

# COLUMN LAYOUT PLAN

SCALE:- 1/16" = 1'-0"

TENDER DRAWING

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
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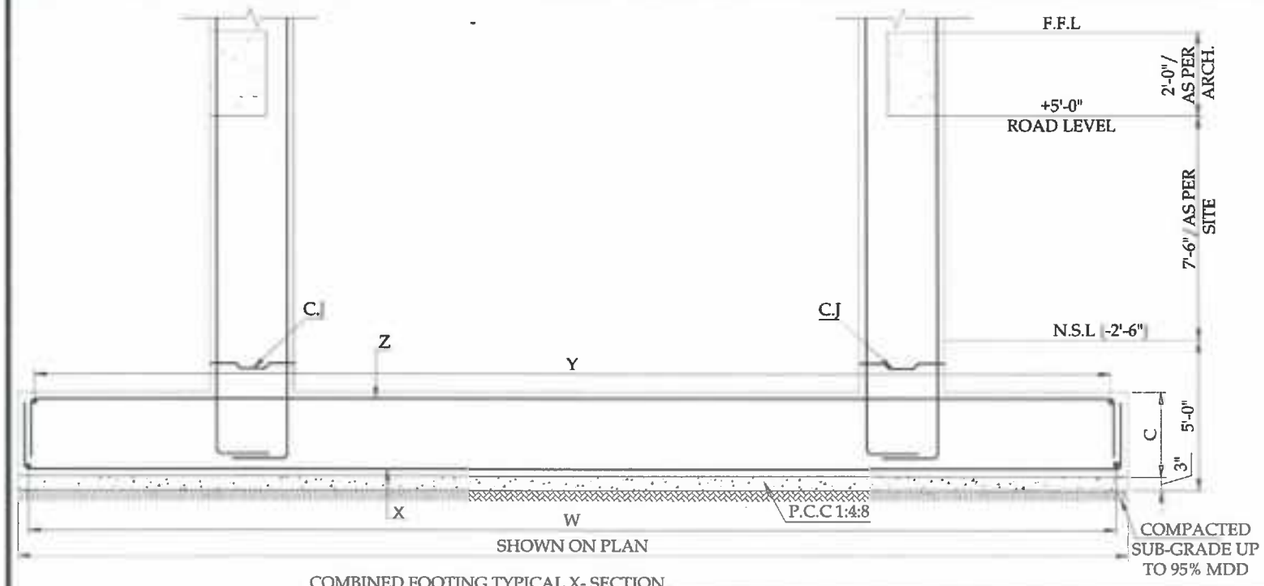

# FOUNDATION LAYOUT PLAN

SCALE:- 1/16" = 1'-0"

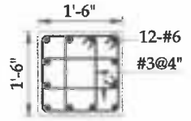
**TENDER DRAWING**

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| **CLIENT:** | **CONSULTANTS:** | **PROJECT:** | DRAWN BY: M.ADNAN |
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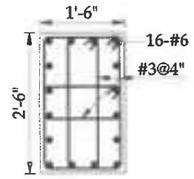
| DRAWING TITLE: | DRAWING NO: | REV. | DESCRIPTION | SIGN. | DATE |
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| **DATA CENTER**<br>FOUNDATION LAYOUT PLAN | STR-03<br>SCALE: N.T.S<br>SHEET: A3 | | | | |



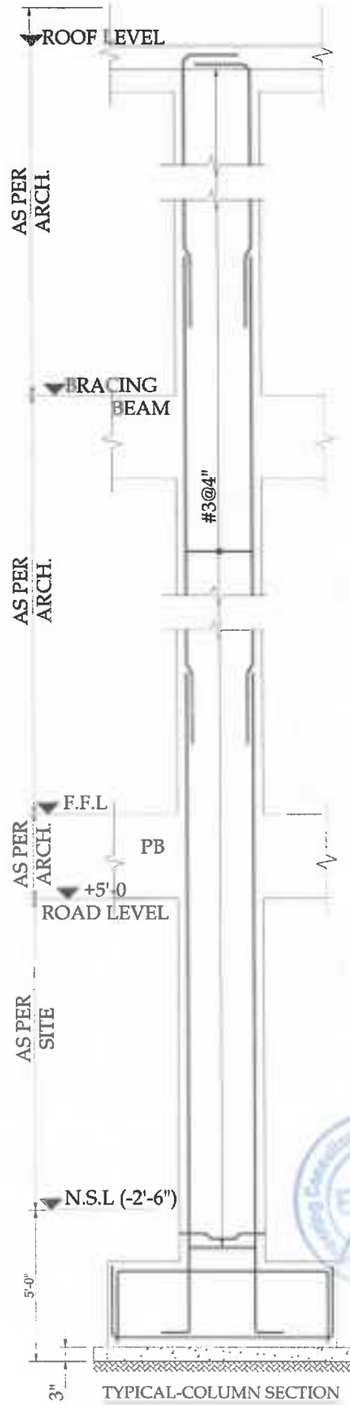

COMBINED FOOTING TYPICAL X- SECTION




COLUMN C-1




COLUMN C-2




TYPICAL-COLUMN SECTION




ISOLATED FOOTING TYPICAL X- SECTION

## SCHEDULE OF FOUNDATIONS

| FOOTING NOS. | FOOTING SIZE | | THICKNESS | BOTTOM STEEL | | TOP STEEL | |
|---|---|---|---|---|---|---|---|
| | A | B | C | W | X | Y | Z |
| F1 | 10'-0" | 10'-0" | 21" | #4@5" | #4@5" | -- | -- |
| F2 | 11'-6" | 11'-6" | 21" | #4@5" | #4@5" | -- | -- |
| F3 | 11'-0" | 11'-0" | 21" | #4@5" | #4@5" | -- | -- |
| F4 | 12'-0" | 12'-0" | 21 | #4@5" | #4@5" | -- | -- |
| F5 | 10'-6" | 10'-6" | 21" | #4@5" | #4@5" | -- | -- |
| F6 | 13'-0" | 13'-0" | 21" | #4@5" | #4@5" | -- | -- |
| F7 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |
| F8 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |
| F9 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |
| F10 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |
| F11 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |
| F12 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |
| F13 | AS SHOWN ON PLAN | | 21" | #6@6" | #6@6" | #4@5" | #4@5" |

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

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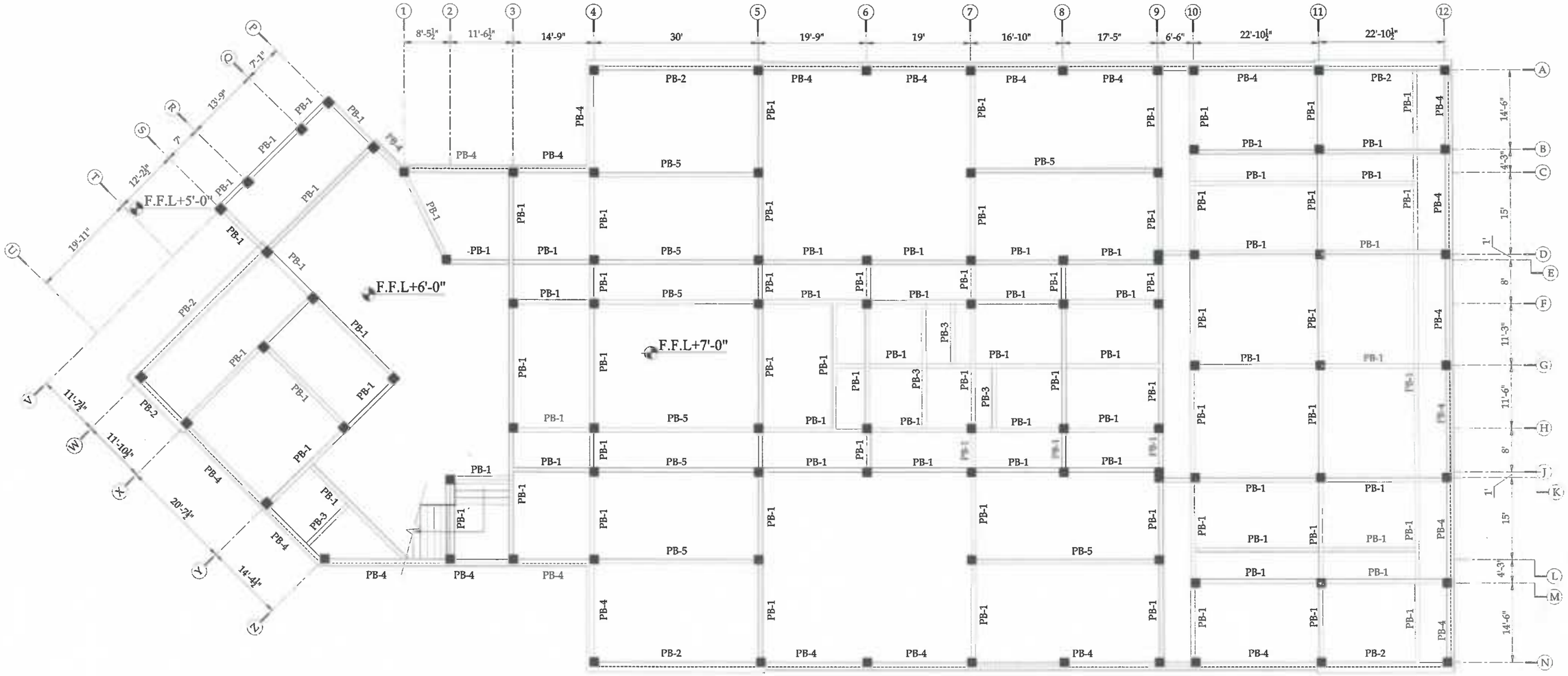

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info@ecsp.com.pk www.ecsp.com.pk


PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

DRAWING TITLE:
**DATA CENTER**
FOUNDATIONS SCHEDULE, TYP. COLUMN ELEVATION AND SECTIONAL DETAILS

DRAWING NO: STR-04
SCALE: N.T.S
SHEET: A3




# PLINTH BEAM LAYOUT PLAN

SCALE:- 1/16" = 1'-0"

TENDER DRAWING

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

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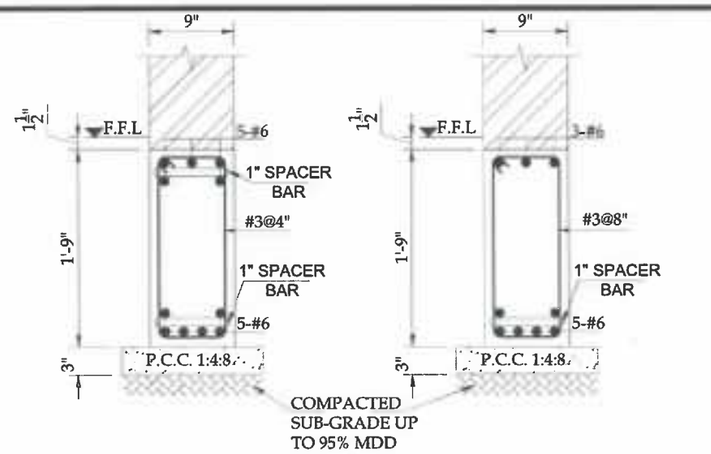
**PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:** DATA CENTER — PLINTH BEAM LAYOUT PLAN

**DRAWING NO:** STR-05

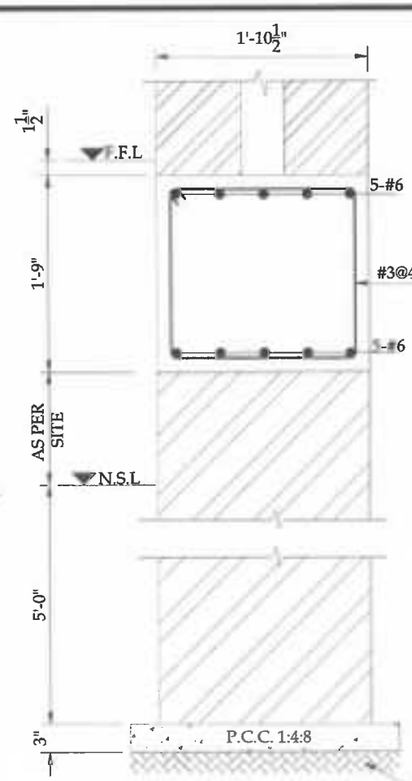
**SCALE:** N.T.S **SHEET:** A3



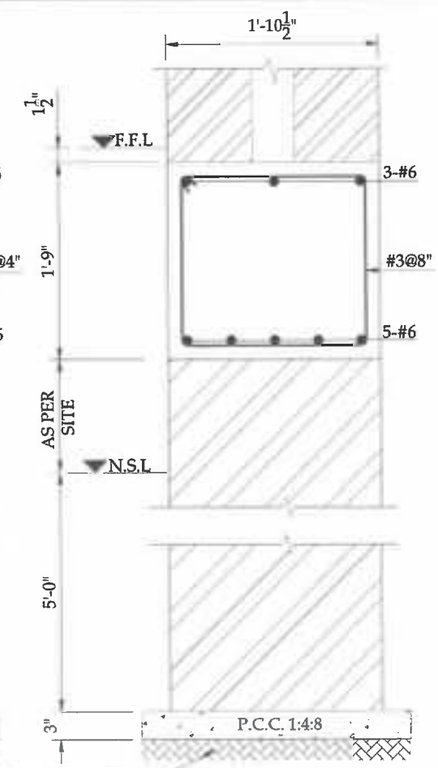

PLINTH BEAM PB-1
END SECTION



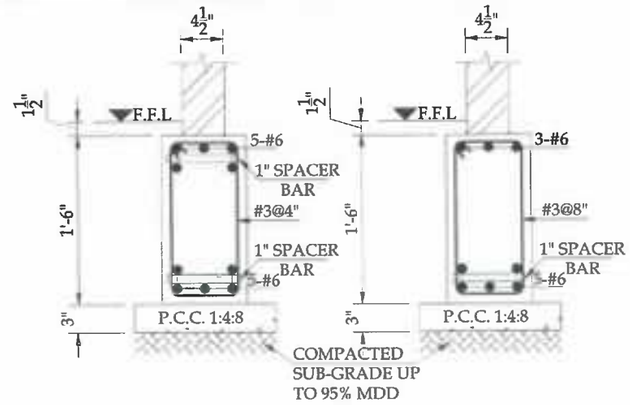

PLINTH BEAM PB-1
MID SECTION




PLINTH BEAM PB-2
END SECTION

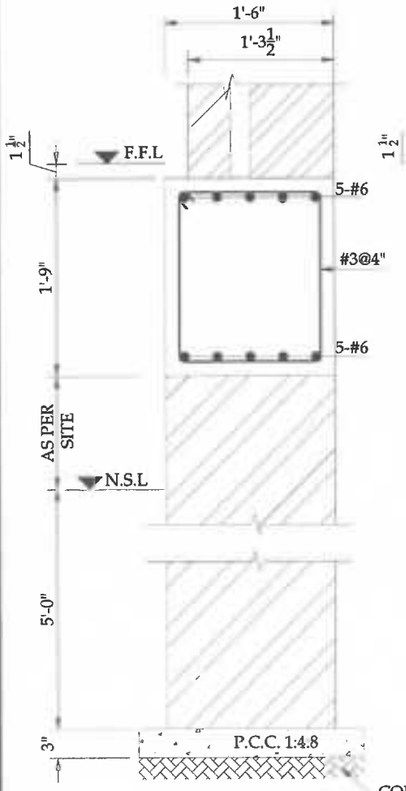



PLINTH BEAM PB-2
MID SECTION

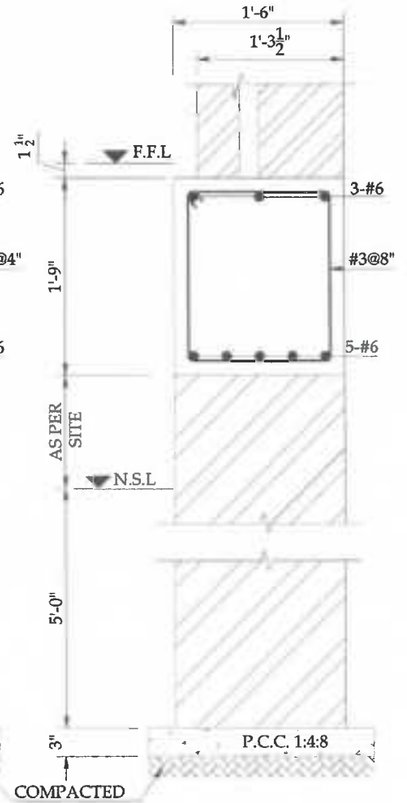



PLINTH BEAM PB-3
END SECTION

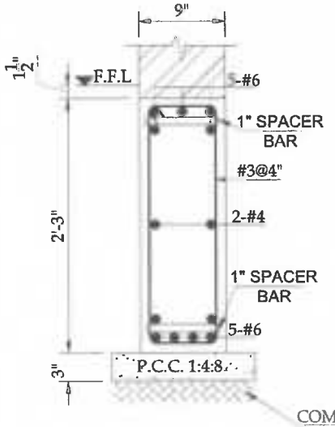
PLINTH BEAM PB-3
MID SECTION



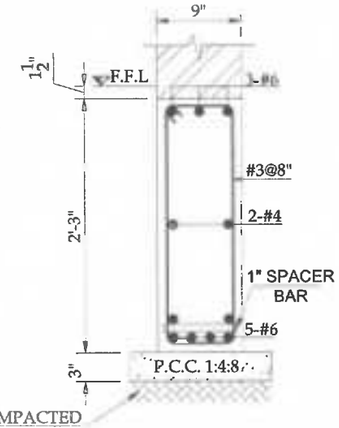

PLINTH BEAM PB-4
END SECTION



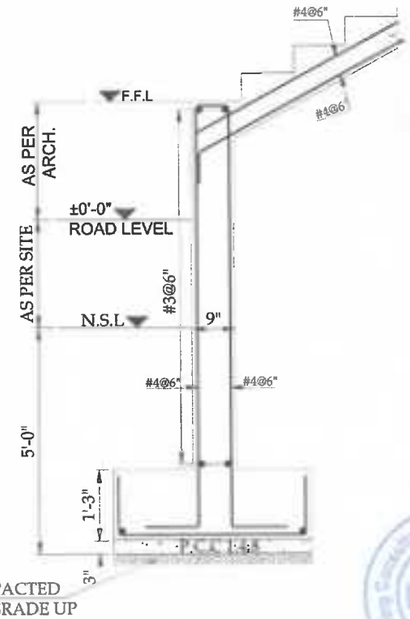

PLINTH BEAM PB-4
MID SECTION




PLINTH BEAM PB-5
END SECTION




PLINTH BEAM PB-5
MID SECTION




STAIR PEDESTAL

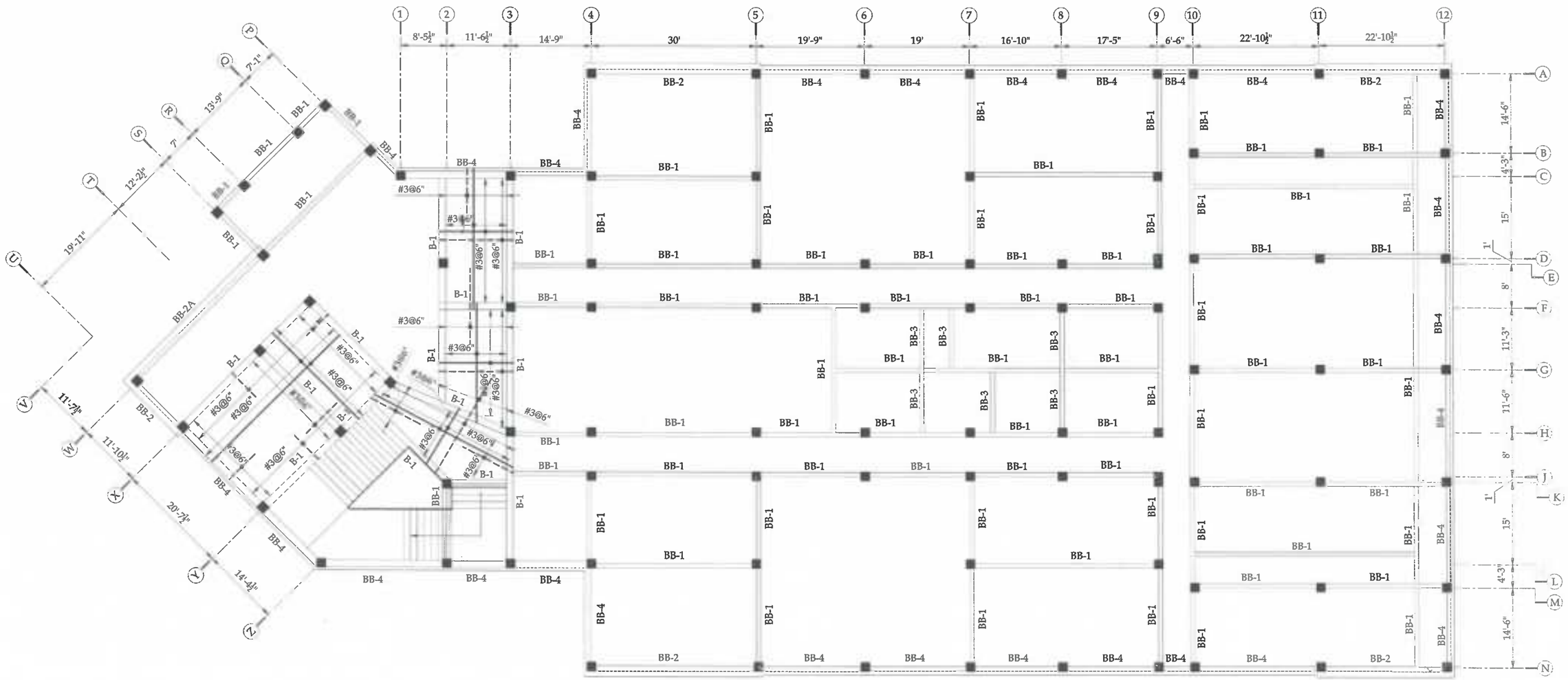
TENDER DRAWING

| | | | |
|---|---|---|---|
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DRAWING TITLE: **DATA CENTER**
PLINTH BEAMS AND STAIR PEDESTAL SECTIONAL DETAILS

DRAWING NO: STR-06
SCALE: N.T.S
SHEET: A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




# FIRST FLOOR SLAB REINFORCEMENT PLAN & BRACING BEAM FRAMING PLAN

SLAB THICKNESS = 6" U.N.O

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
Punjab Information Technology Board (PITB) Lahore

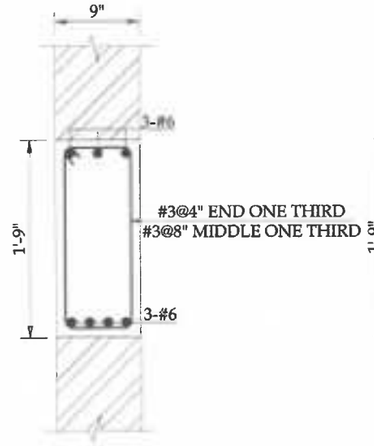
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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

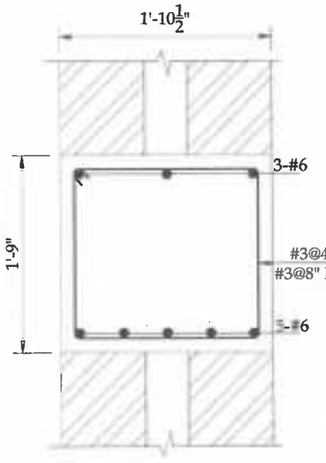
| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**DATA CENTER**
FIRST FLOOR SLAB REINFORCEMENT PLAN AND BRACING BEAMS FRAMING PLAN

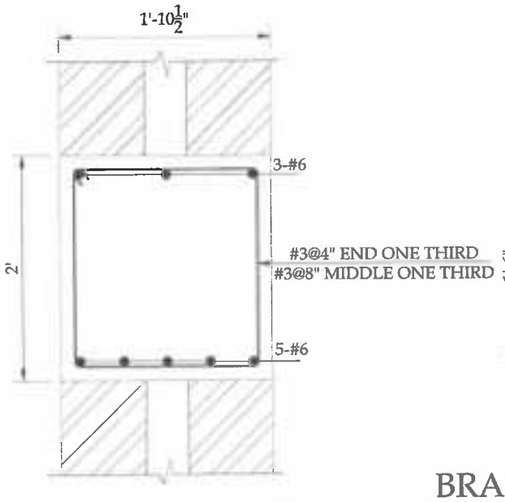
**DRAWING NO:** STR-07
**SCALE:** N.T.S
**SHEET:** A3



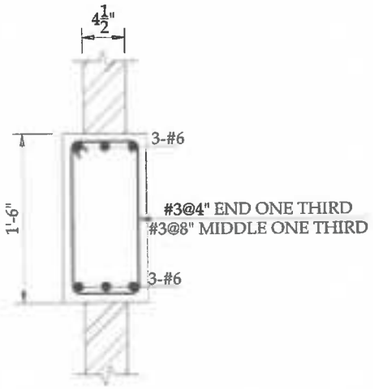

BRACING BEAM BB-1



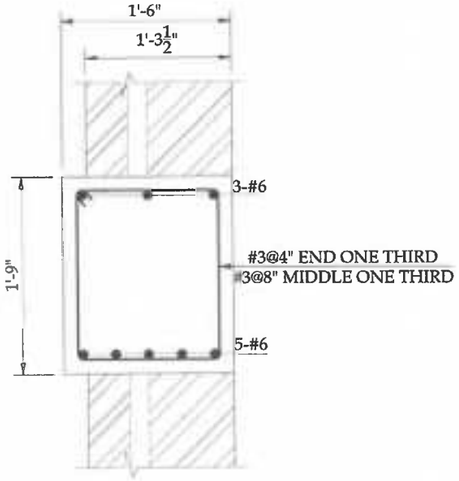

BRACING BEAM BB-2



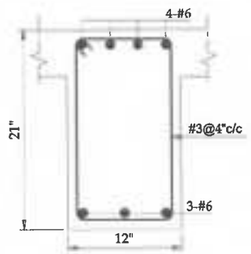

BRACING BEAM BB-2A



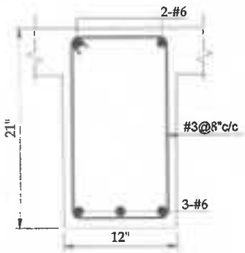

BRACING BEAM BB-3




BRACING BEAM BB-4




BEAM B-1
END SECTION

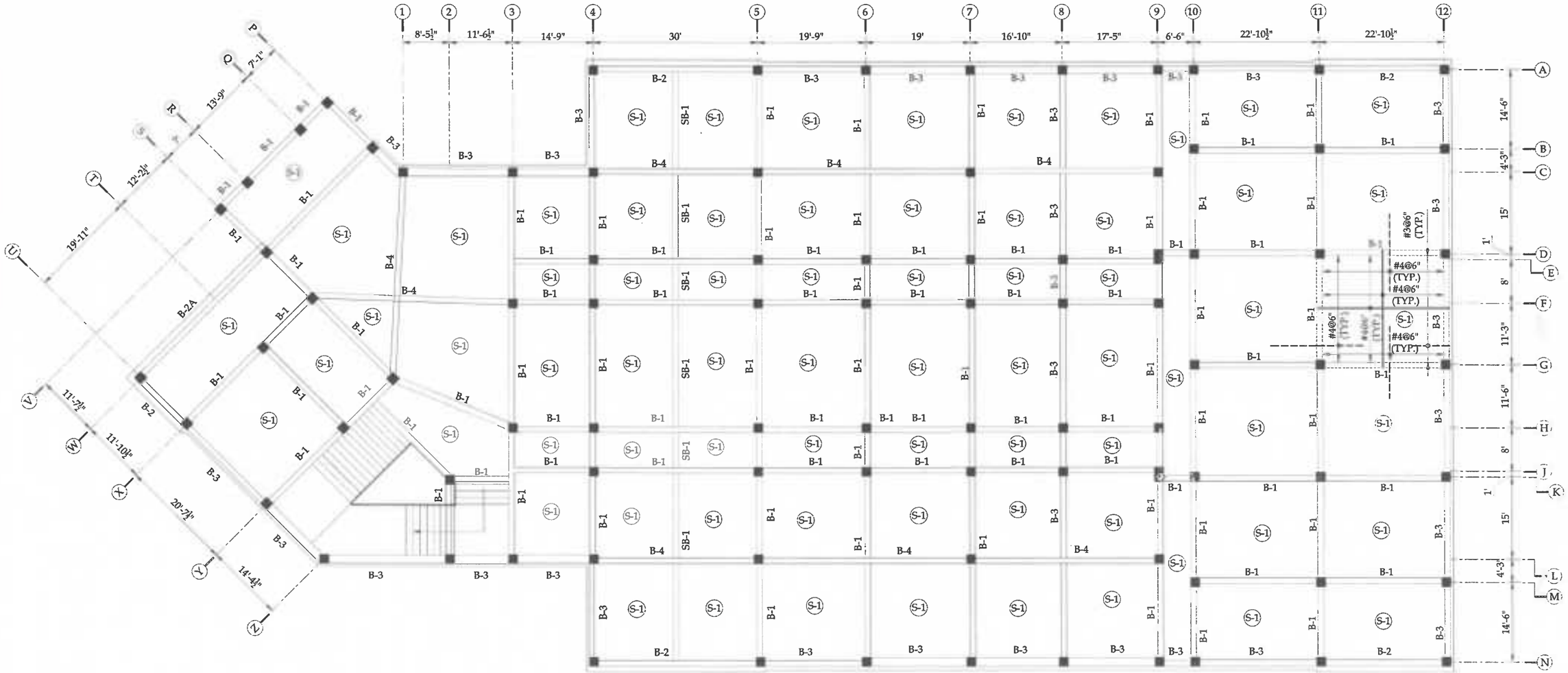



BEAM B-1
MID SECTION

TENDER DRAWING

| | | | |
|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | | |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| PROJECT: | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| DRAWING TITLE: | DATA CENTER<br>FIRST FLOOR SLAB BEAMS AND BRACING BEAMS SECTIONAL DETAILS | DRAWING NO: | STR-08 |
| | | SCALE: | N.T.S |
| | | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN | DATE |
|---|---|---|---|
| | | | |




# ROOF SLAB REINFORCEMENT PLAN & BEAMS FRAMING PLAN

SLAB THICKNESS = 6" U.N.O

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

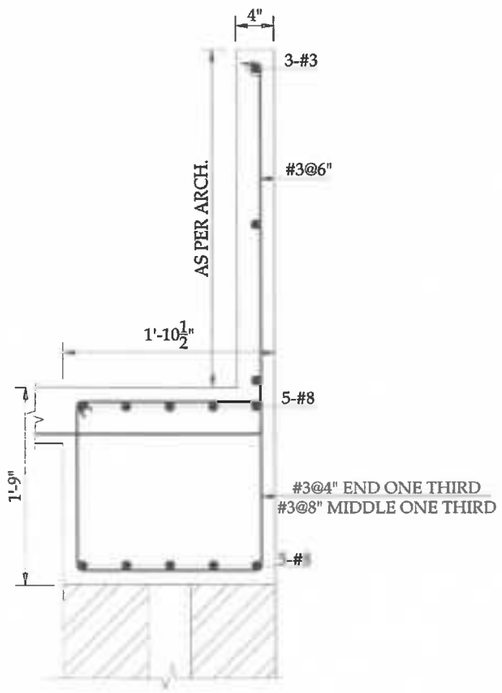
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|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**DATA CENTER**
ROOF SLAB REINFORCEMENT PLAN AND BEAMS FRAMING PLAN

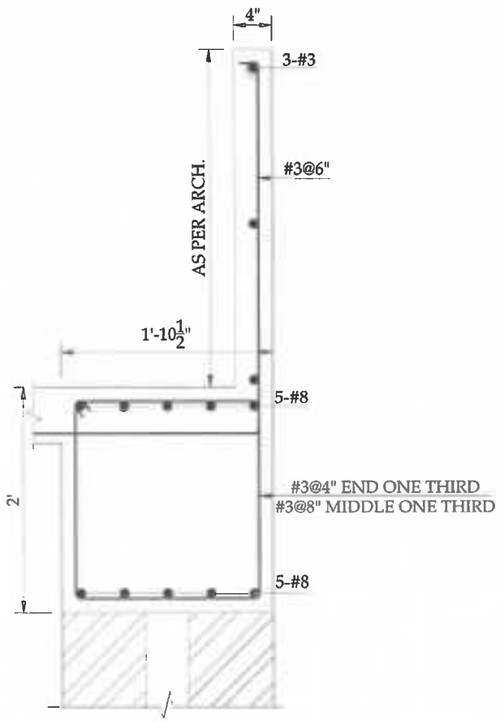
**DRAWING NO:** STR-09

**SCALE:** N.T.S

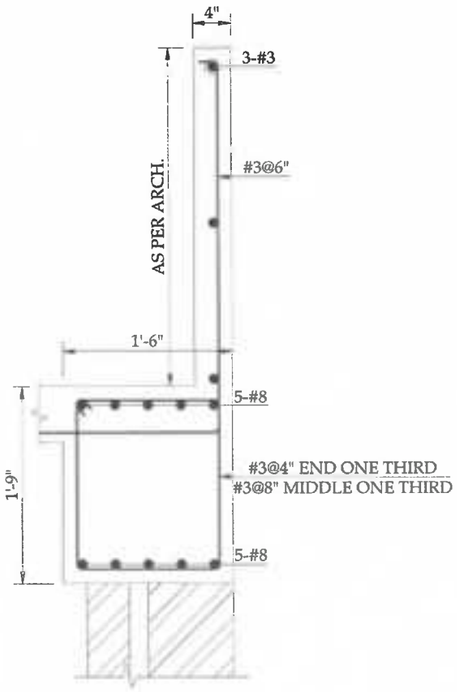
**SHEET:** A3




BEAM B-2



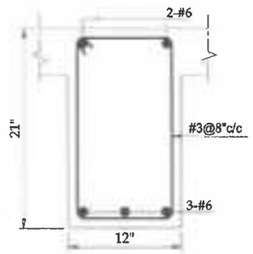

BEAM B-2A



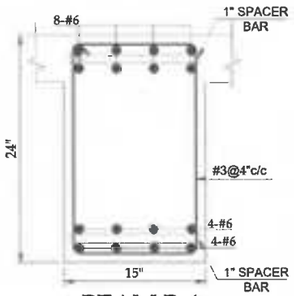

BEAM B-3



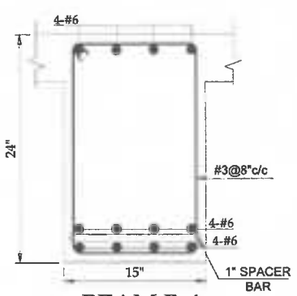

BEAM B-1
END SECTION



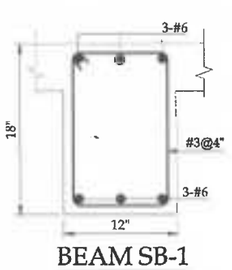

BEAM B-1
MID SECTION




BEAM B-4
END SECTION




BEAM B-4
MID SECTION




BEAM SB-1

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
Punjab Information Technology Board (PITB) Lahore

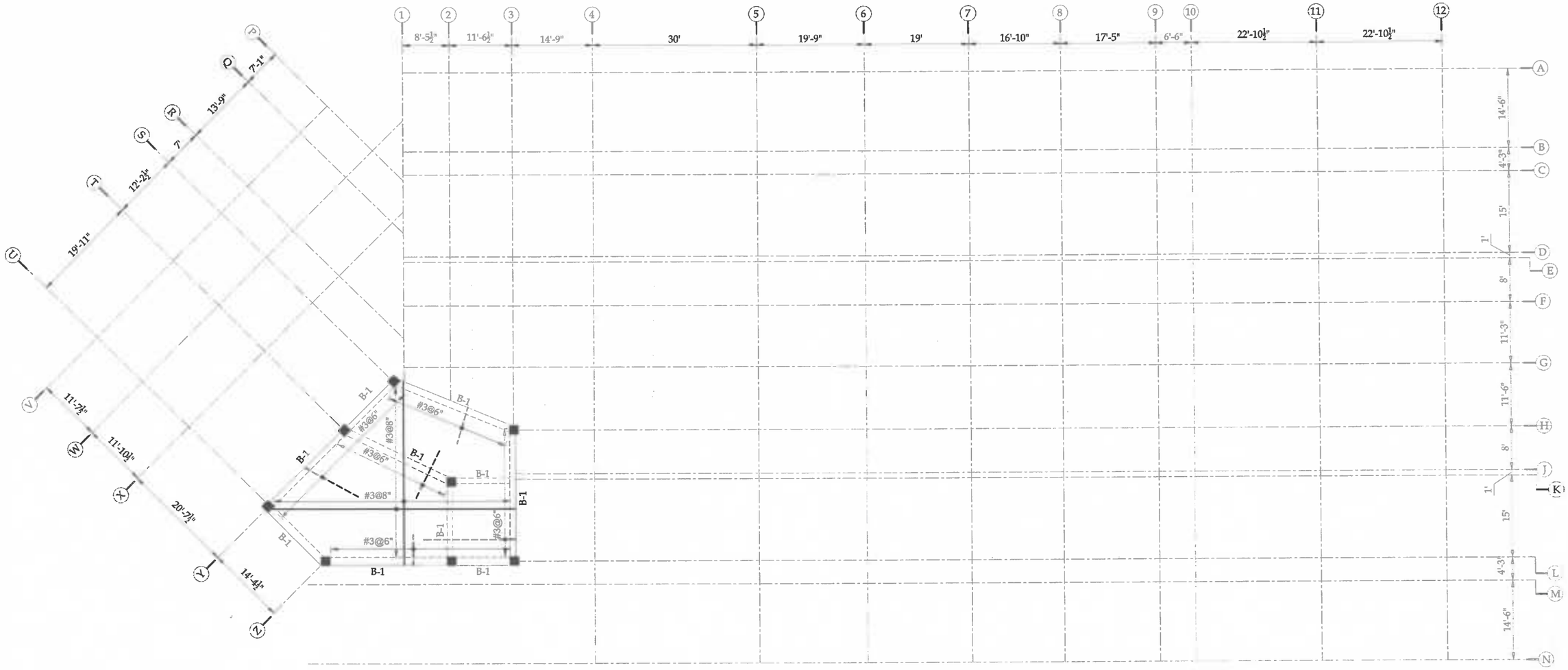
**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

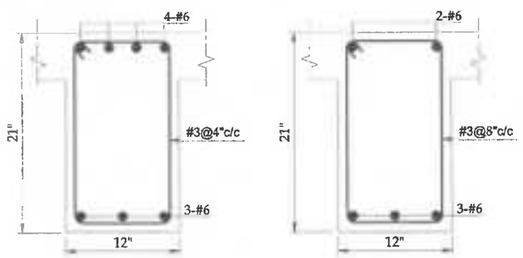
**DRAWING TITLE:**
**DATA CENTER**
ROOF SLAB BEAMS SECTIONAL DETAILS

**DRAWING NO:** STR-10
**SCALE:** N.T.S
**SHEET:** A3




# MUMTY SLAB REINFORCEMENT PLAN

SLAB THICKNESS = 6" U.N.O




BEAM B-1
END SECTION

BEAM B-1
MID SECTION

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

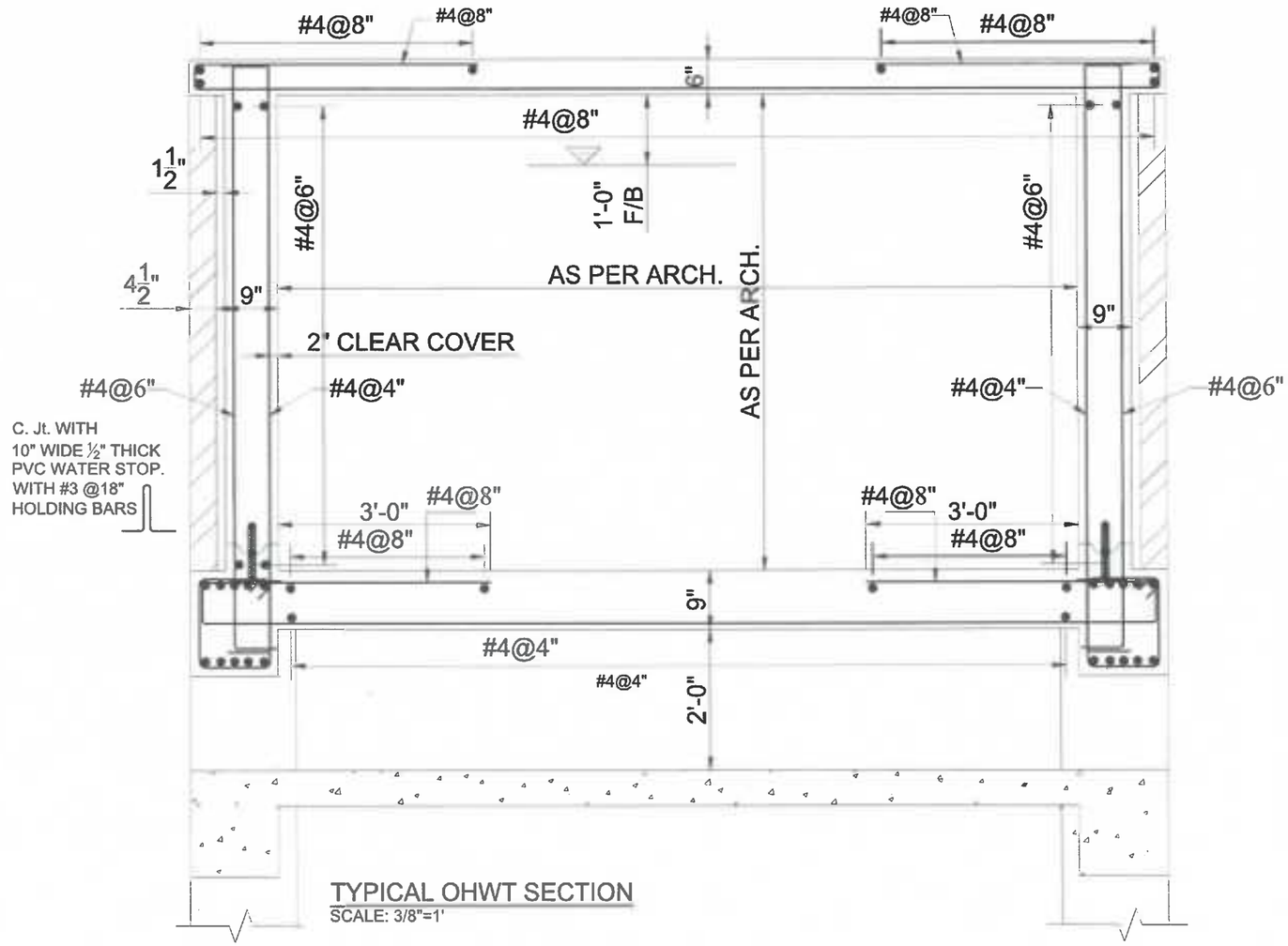
| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**DATA CENTER**
MUMTY SLAB REINFORCEMENT PLAN AND BEAMS SECTIONAL DETAILS

**DRAWING NO:** STR-11

**SCALE:** N.T.S

**SHEET:** A3

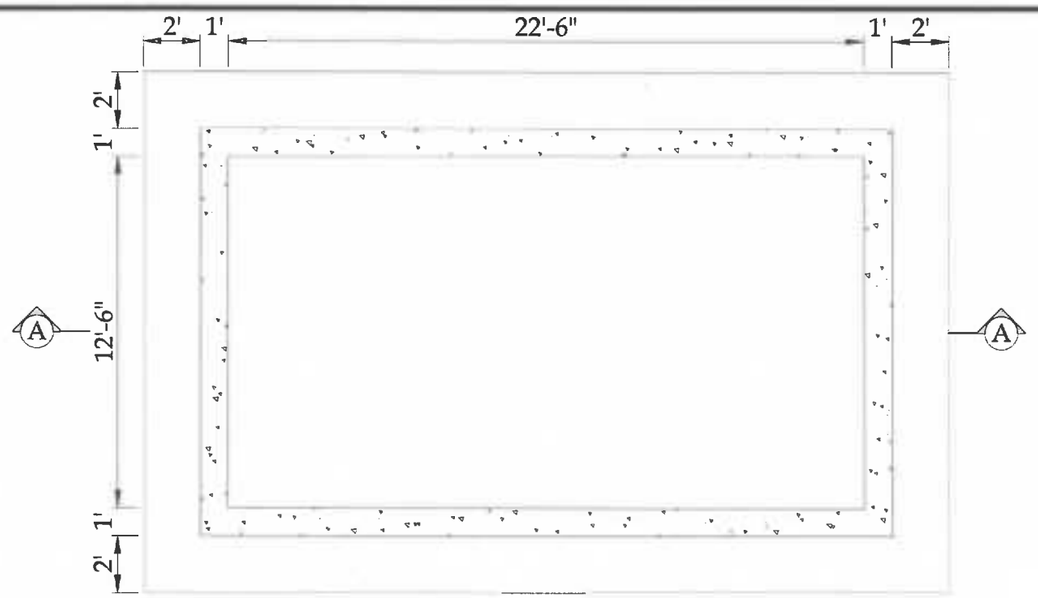



TYPICAL OHWT SECTION
SCALE: 3/8"=1'

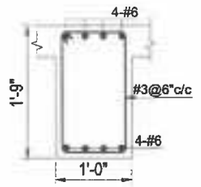
**TENDER DRAWING**

| | | | |
|---|---|---|---|
| **CLIENT:** | Punjab Information Technology Board (PITB) Lahore | | |
| **CONSULTANTS:** | **ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| **PROJECT:** | **ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN** | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| **DRAWING TITLE:** | **DATA CENTER**<br>TYPICAL O.H.W.T SECTION | **DRAWING NO:** | STR-12 |
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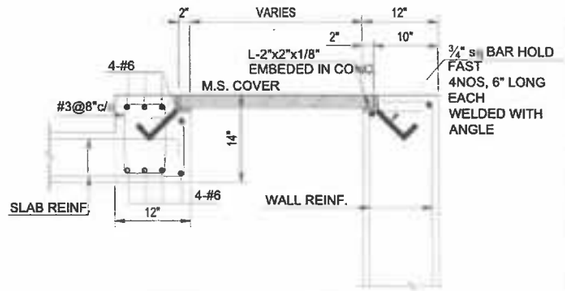
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FOUNDATION PLAN

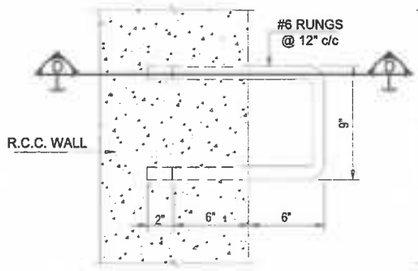



BEAM B-1



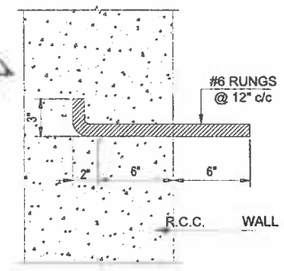

TYP. MANHOLE DETAIL

SCALE 3/4" = 1'-0"



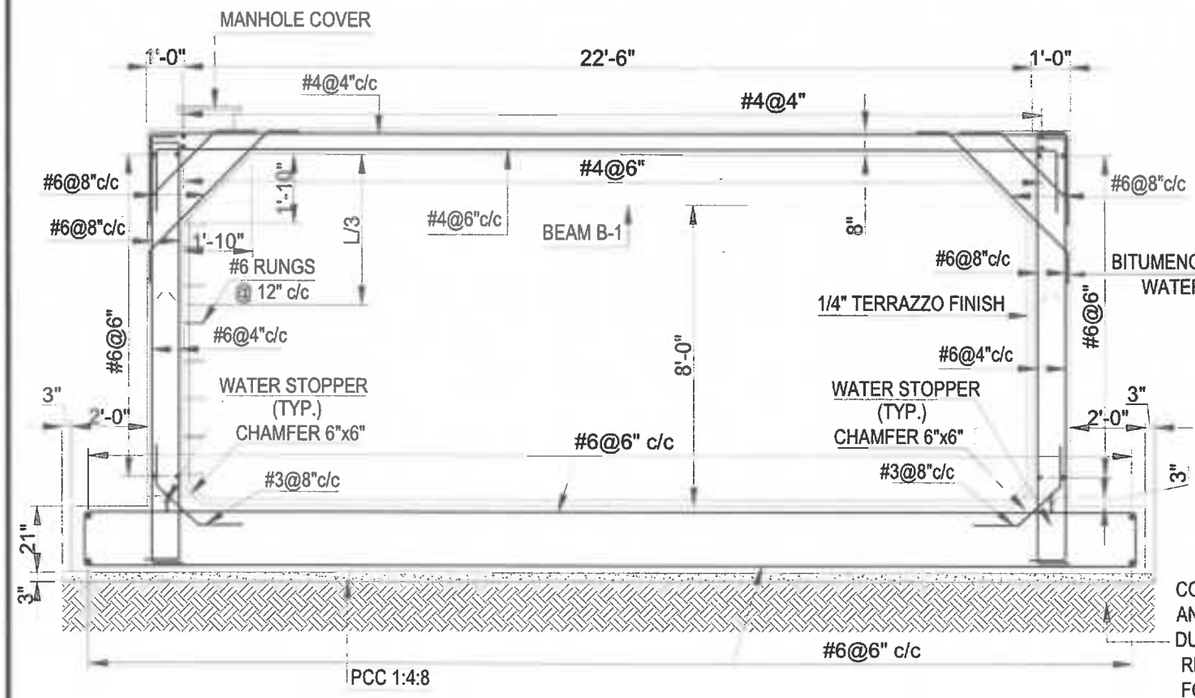

PLAN OF #6 M.S RUNGS

SCALE 3/4" = 1'-0"




SECTION - D

SCALE 3/4" = 1'-0"



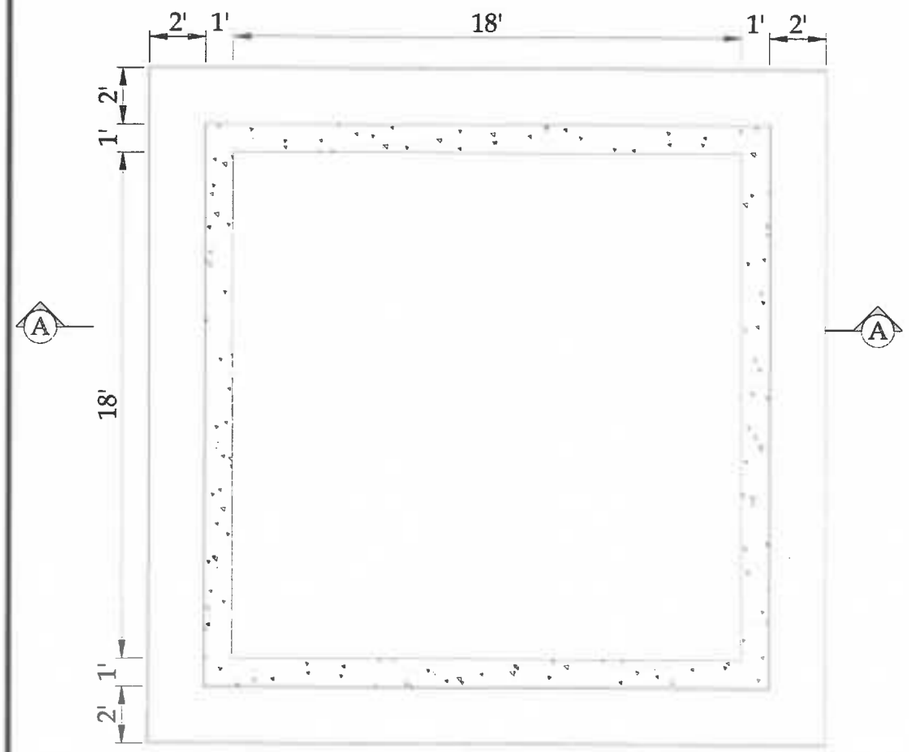

COMPACTED SUB-GRADE UP TO 95% MDD, ANY LOOSE MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO FIRM STRATA AND FOUNDATION SHALL BE PLACED ON FIRM SOIL STRATA.

SECTION A-A

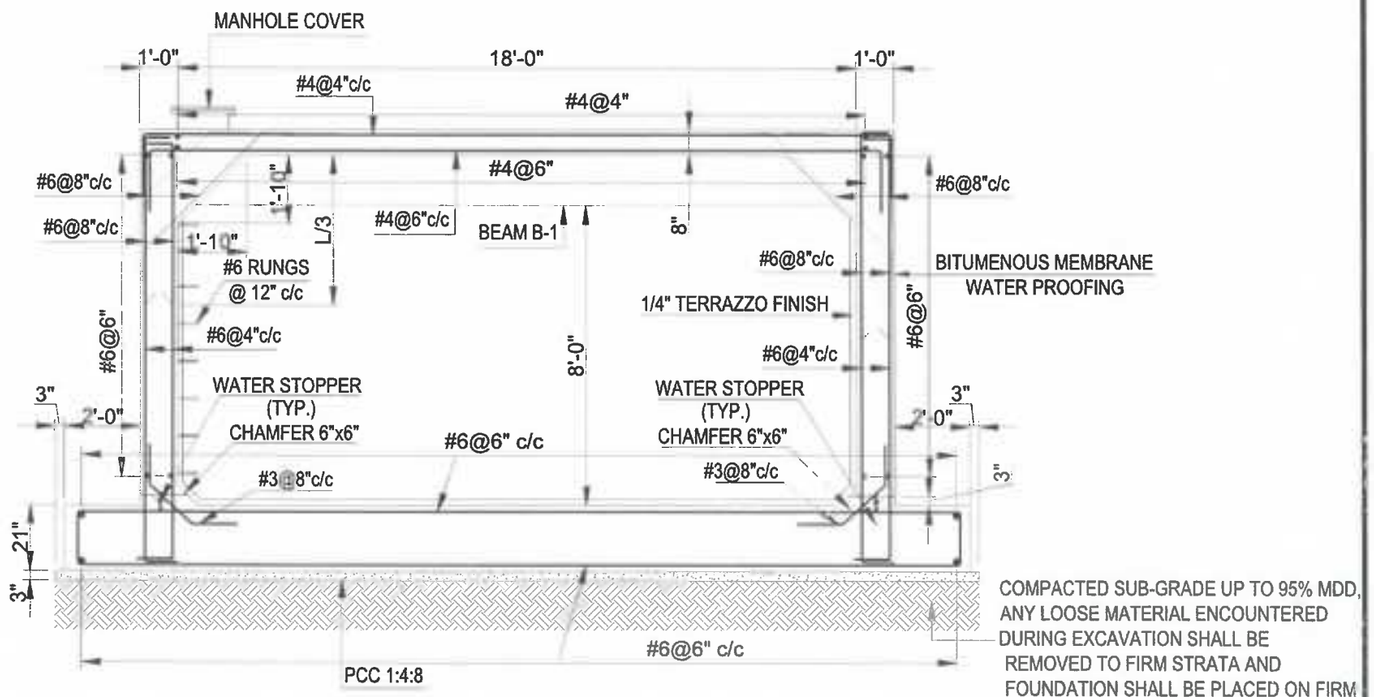
**TENDER DRAWING**

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: M.ADNAN<br>DESIGNED BY: M.HASNAIN<br>CHECKED BY: ALI RAZA / QASIM SULTAN<br>APPROVED BY: SABIR HUSSAIN<br>DATE: AUGUST, 2026 | **DRAWING TITLE:** DATA CENTER<br>UNDERGROUND WATER TANK FOR RAIN WATER COLLECTION | **DRAWING NO:** STR-13<br>**SCALE:** N.T.S<br>**SHEET:** A3 |

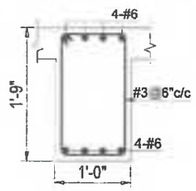
| REV. | DESCRIPTION | SIGN. | DATE |
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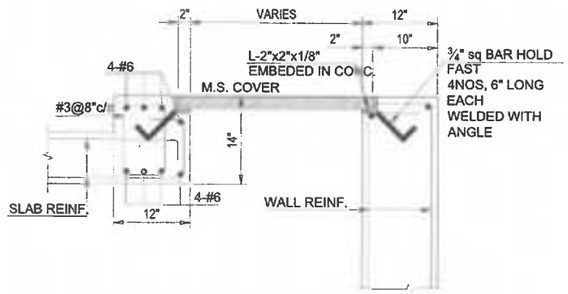

FOUNDATION PLAN



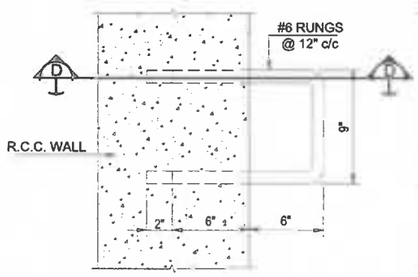

SECTION A-A



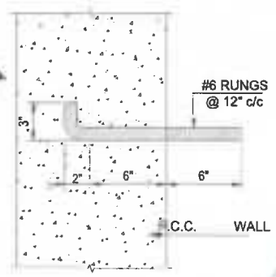

BEAM B-1




TYP. MANHOLE DETAIL
SCALE 3/4" = 1'-0"




PLAN OF #6 M.S RUNGS
SCALE 3/4" = 1'-0"

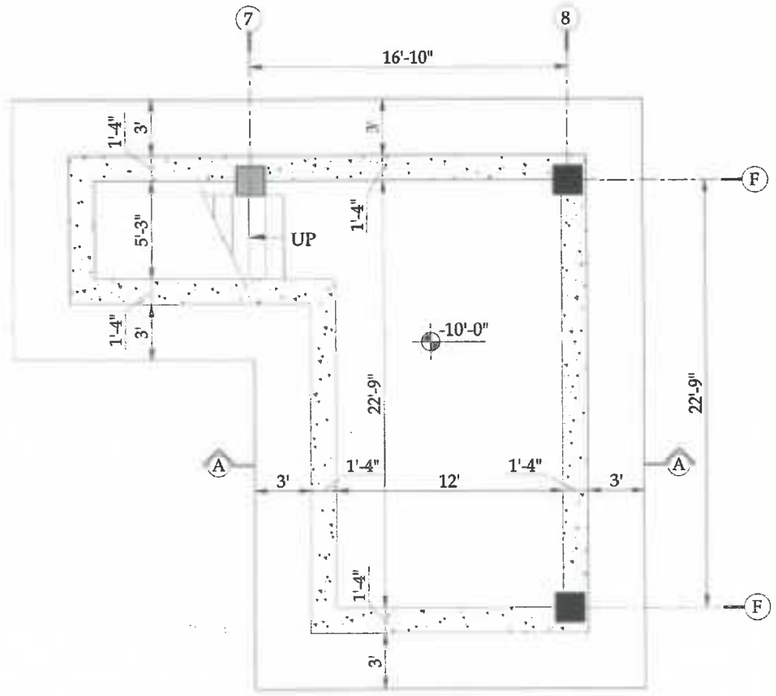



SECTION - D
SCALE 3/4" = 1'-0"

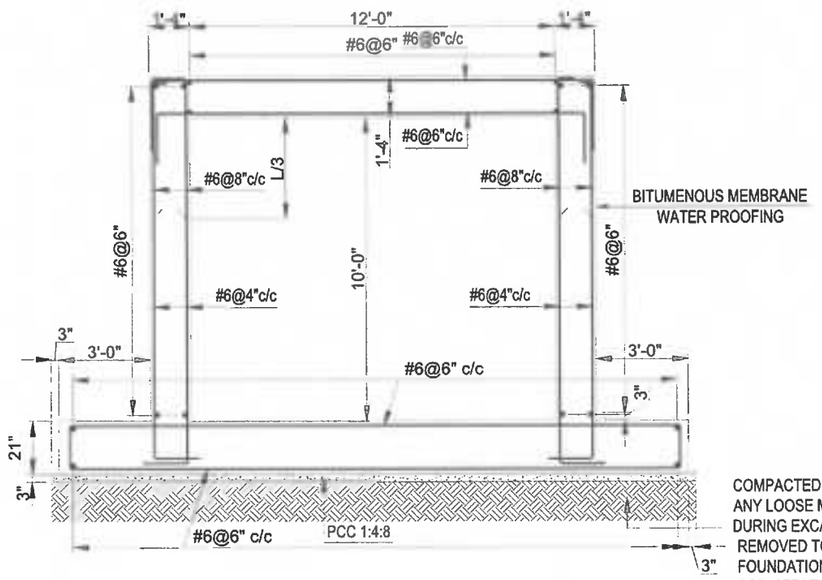
TENDER DRAWING

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: M.ADNAN<br>DESIGNED BY: M.HASNAIN<br>CHECKED BY: ALI RAZA / QASIM SULTAN<br>APPROVED BY: SABIR HUSSAIN<br>DATE: AUGUST, 2026 | DRAWING TITLE: DATA CENTER<br>UNDERGROUND WATER TANK FOR FIRE FIGHTING SYSTEM | DRAWING NO: STR-13<br>SCALE: N.T.S<br>SHEET: A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

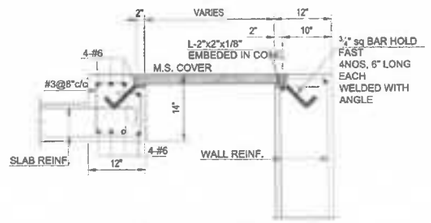



STRONG ROOM FOUNDATION PLAN

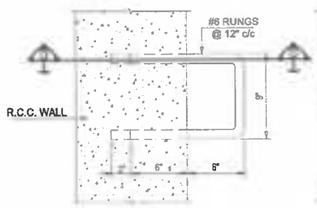



COMPACTED SUB-GRADE UP TO 95% MDD, ANY LOOSE MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO FIRM STRATA AND FOUNDATION SHALL BE PLACED ON FIRM SOIL STRATA.

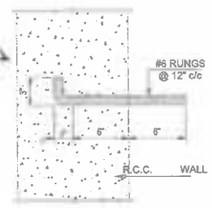
STRONG ROOM SECTION A-A




TYP. MANHOLE DETAIL
SCALE 3/4" = 1'-0"




PLAN OF #6 M.S RUNGS
SCALE 3/4" = 1'-0"




SECTION - D
SCALE 3/4" = 1'-0"

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:** Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

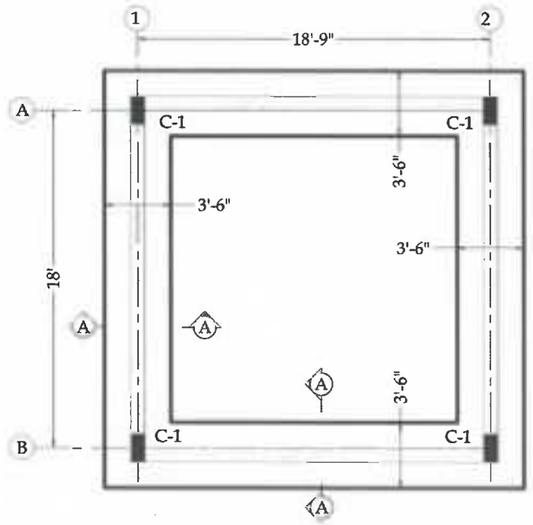
| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**DATA CENTER**
TYPICAL SECTION OF STRONG ROOM FOUNDATION PLAN STRONG ROOM

**DRAWING NO:** STR-14

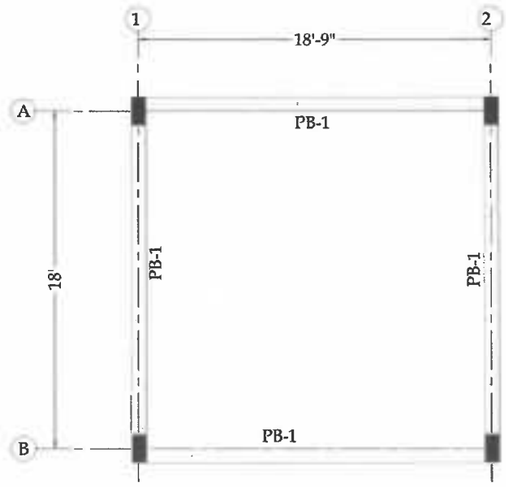
**SCALE:** N.T.S **SHEET:** A3

# ELECTRICAL SUBSTATION



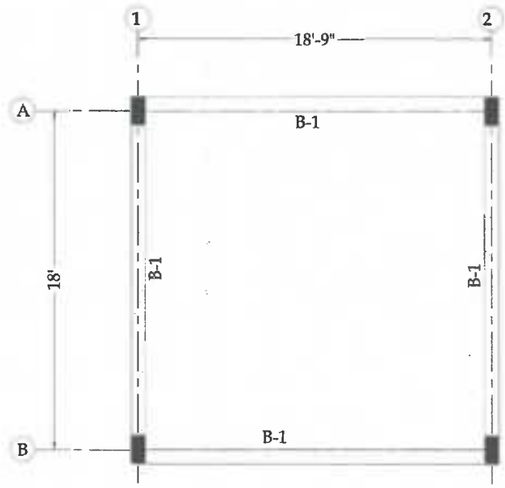

## FOUNDATION LAYOUT PLAN

SCALE:- 1/8" = 1'-0"



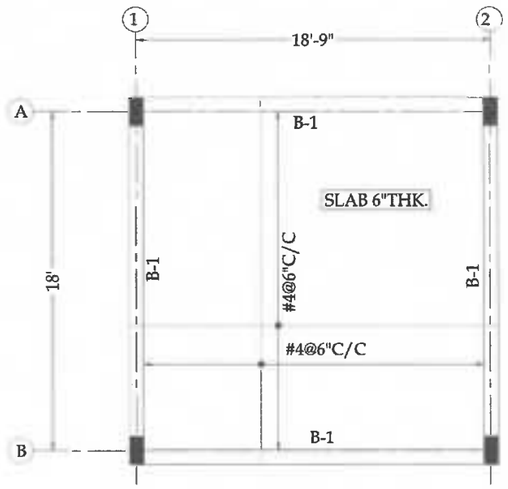

## PLINTH BEAM LAYOUT PLAN

SCALE:- 1/8" = 1'-0"




## BRACING BEAM LAYOUT PLAN (AT EL. +16'-0")

SCALE:- 1/8" = 1'-0"




## ROOF FRAMING & REINFORCEMENT PLAN AT ROOF LEVEL.

SCALE:- 1/8" = 1'-0"

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

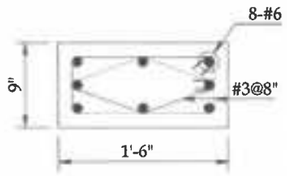
**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**ELECTRICAL SUBSTATION**
INCOMING / OUTGOING PANEL ROOM LAYOUT PLAN

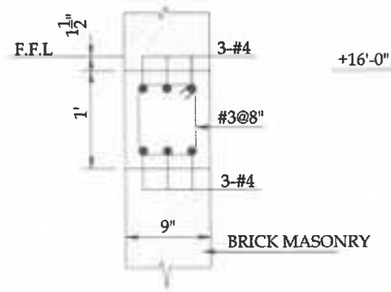
**DRAWING NO:** STR-01

**SCALE:** N.T.S **SHEET:** A3



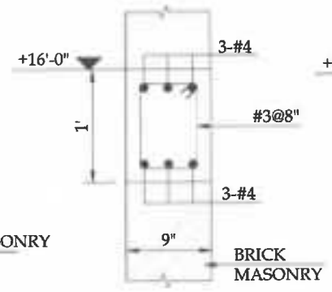

COLUMN C-1

SCALE:- 3/4" = 1'-0"



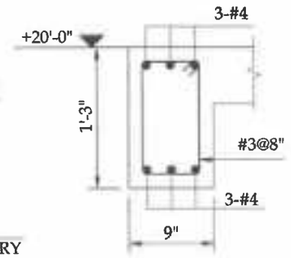

BEAM PB-1

SCALE:- 3/4" = 1'-0"



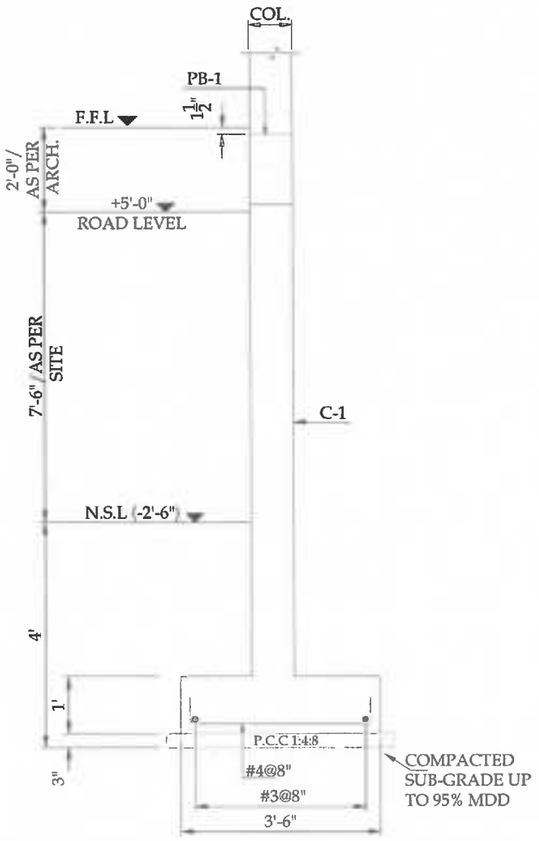

BEAM B-1

SCALE:- 3/4" = 1'-0"



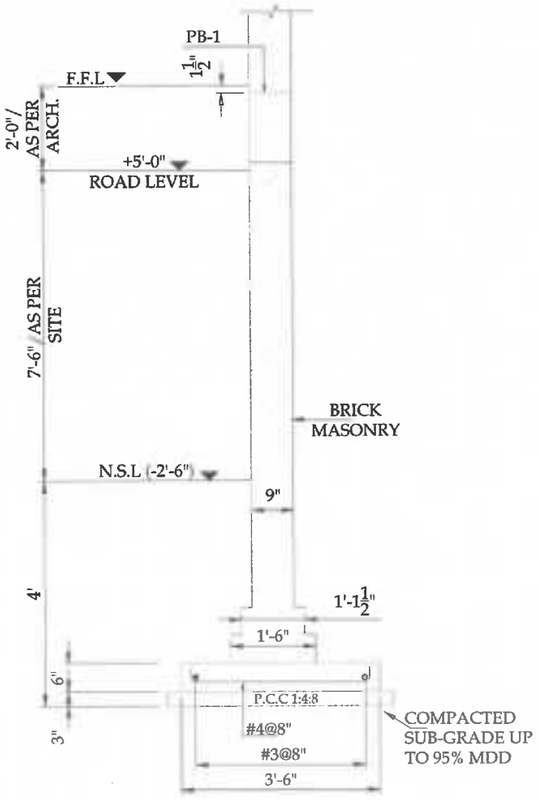

ROOF BEAM B-2

SCALE:- 3/4" = 1'-0"




TYP. COLUMN C-1 FOOTING

SCALE:- 3/8" = 1'-0"



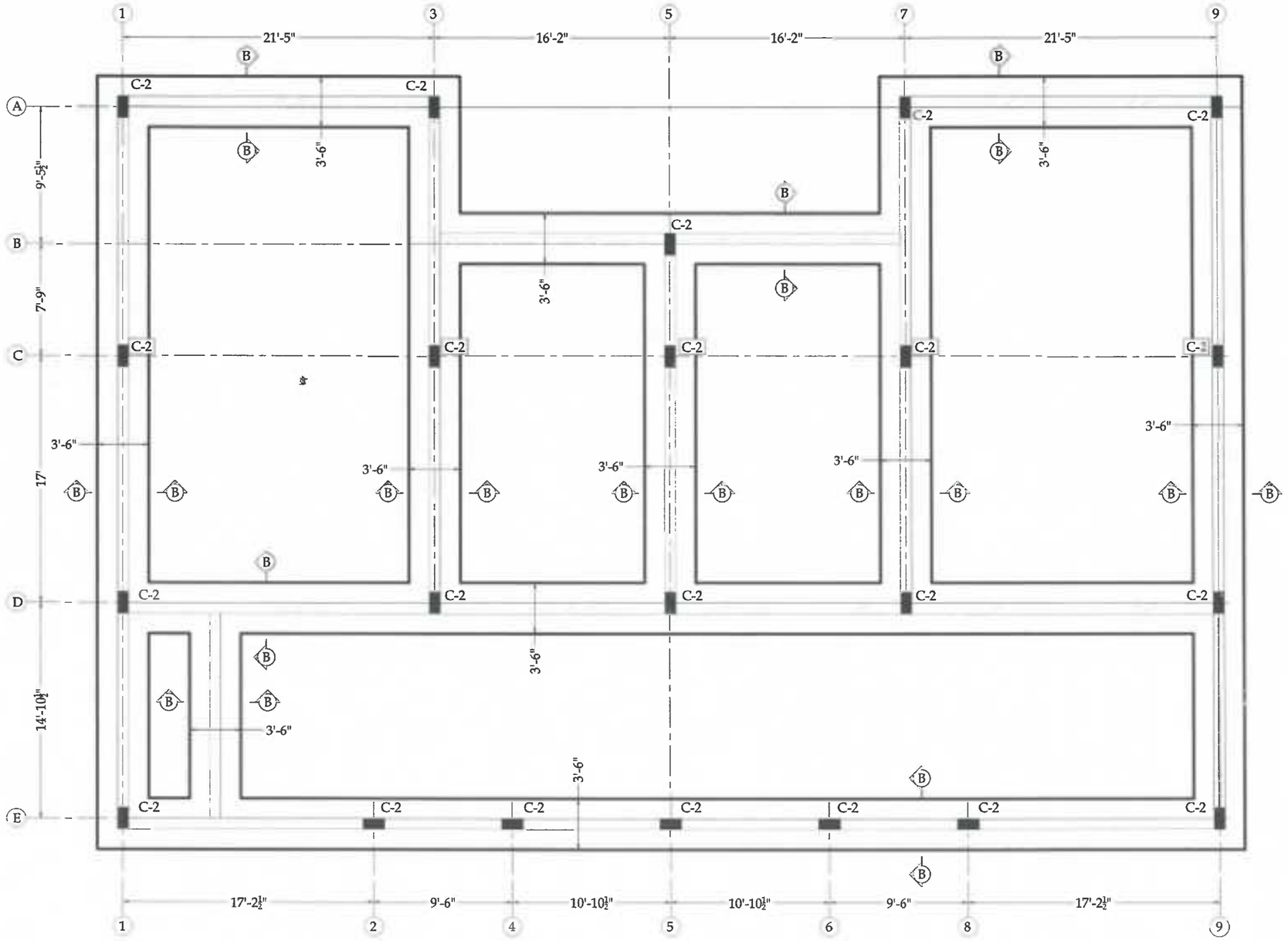

SECTION A-A

SCALE:- 3/8" = 1'-0"

TENDER DRAWING

| | | | |
|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | | |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | | |
| PROJECT: | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| DRAWING TITLE: | **ELECTRICAL SUBSTATION** INCOMING / OUTGOING PANEL ROOM FOUNDATION & BEAM DETAILS | | |
| DRAWING NO: | STR-02 | | |
| SCALE: | N.T.S | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |



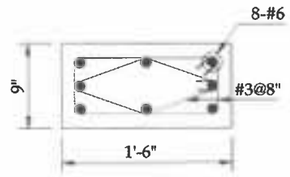

# FOUNDATION LAYOUT PLAN

SCALE:- 1/8" = 1'-0"

**TENDER DRAWING**

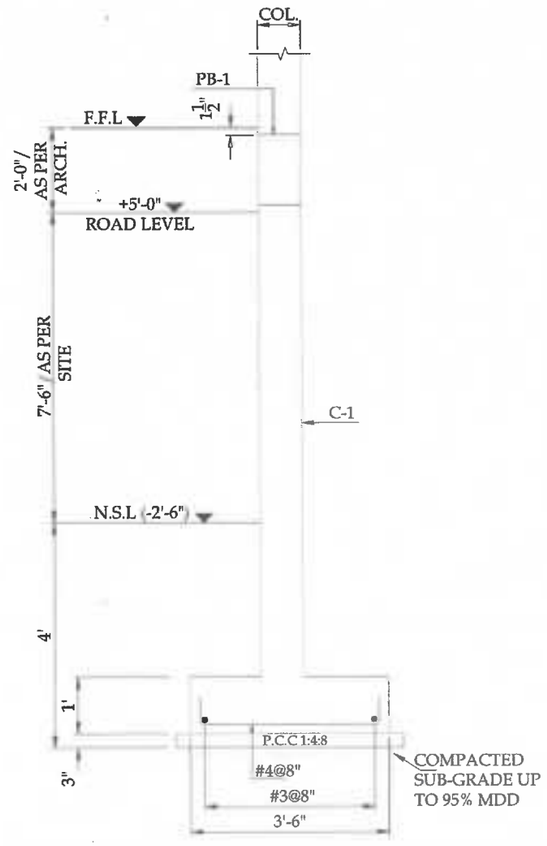
| | | | |
|---|---|---|---|
| **CLIENT:** | Punjab Information Technology Board (PITB) Lahore | | |
| **CONSULTANTS:** | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| **PROJECT:** | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| **DRAWING TITLE:** | **ELECTRICAL SUBSTATION**<br>GEN SET SYNC-MTTM ROOM<br>FOUNDATION LAYOUT PLAN | | |
| **DRAWING NO:** | STR-03 | | |
| **SCALE:** | N.T.S | **SHEET:** | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| -- | | | -- |
| -- | ---- | - | |



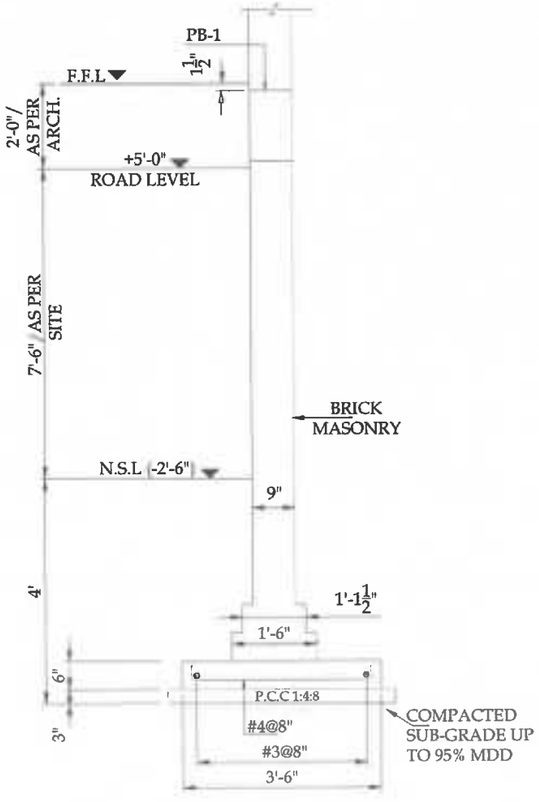

## COLUMN C-2

SCALE:- 3/4" = 1'-0"




## TYP. COLUMN C-1 FOOTING

SCALE:- 3/8" = 1'-0"




## SECTION A-A

SCALE:- 3/8" = 1'-0"

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:**
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**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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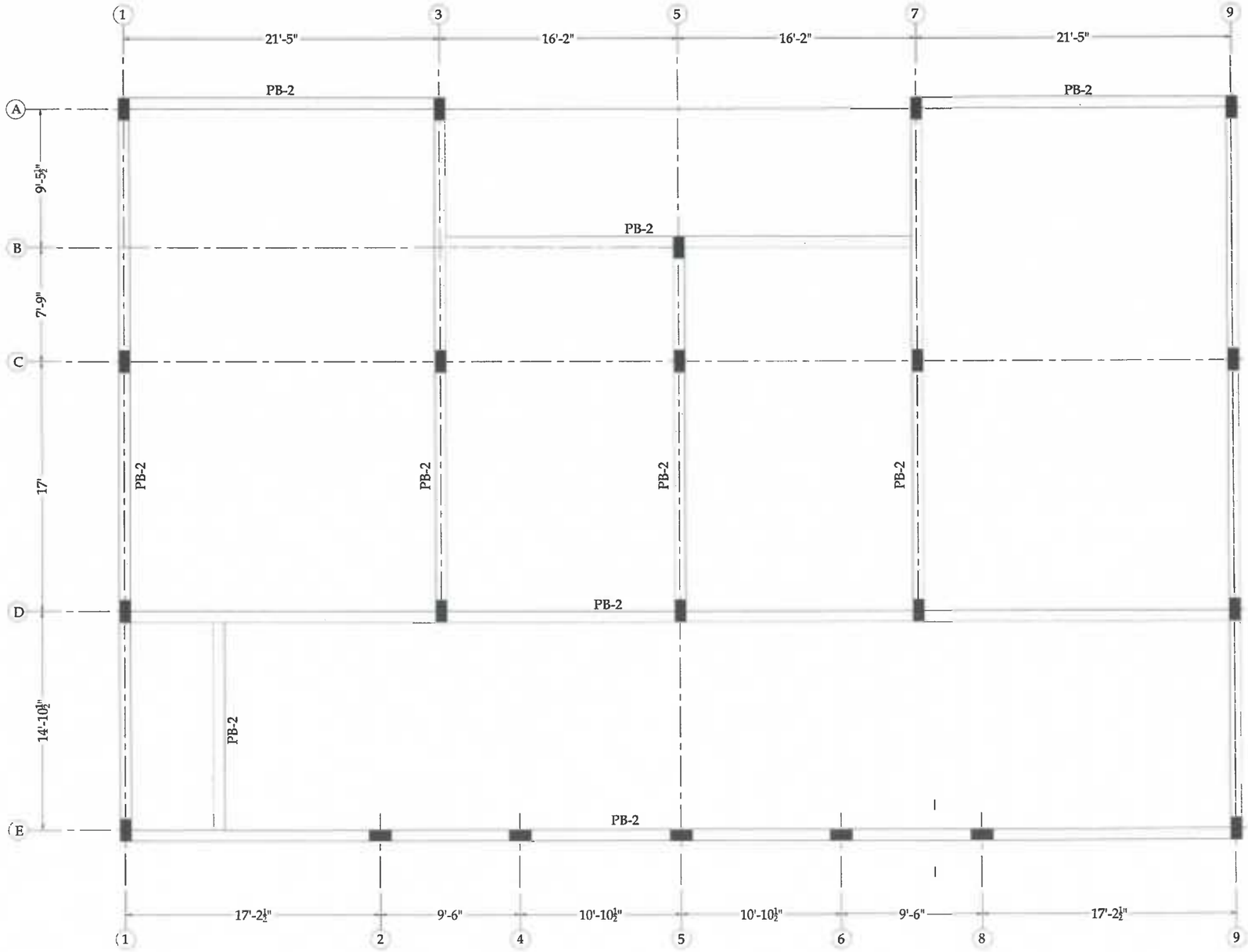
**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**ELECTRICAL SUBSTATION**
INCOMING / OUTGOING PANEL ROOM FOUNDATION & BEAM DETAILS

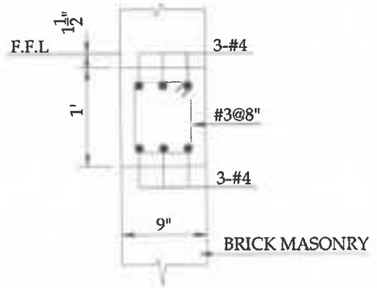
**DRAWING NO:** STR-04

**SCALE:** N.T.S **SHEET:** A3




## PLINTH BEAM LAYOUT PLAN

SCALE:- 1/8" = 1'-0"



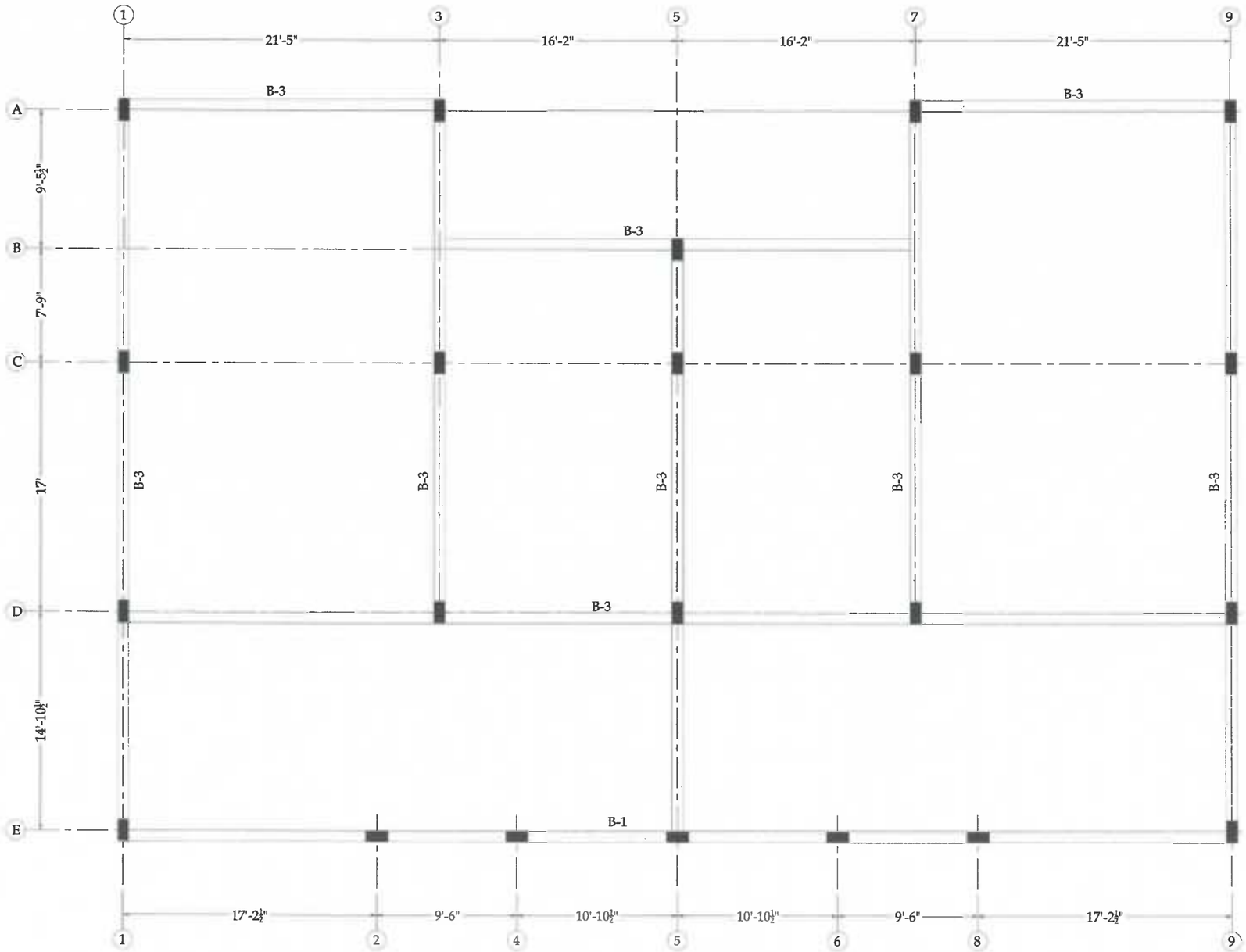

## BEAM PB-2

SCALE:- 3/4" = 1'-0"

**TENDER DRAWING**

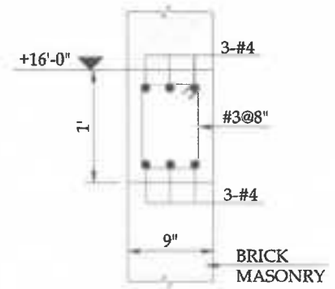
| CLIENT: | CONSULTANTS: | PROJECT: | | DRAWING TITLE: | DRAWING NO: |
|---|---|---|---|---|---|
| Punjab Information Technology Board (PITB) Lahore | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: M.ADNAN<br>DESIGNED BY: M.HASNAIN<br>CHECKED BY: ALI RAZA / QASIM SULTAN<br>APPROVED BY: SABIR HUSSAIN<br>DATE: AUGUST, 2026 | ELECTRICAL SUBSTATION<br>GEN SET SYNC-MTTM ROOM PLINTH BEAM LAYOUT PLAN | STR-05<br>SCALE: N.T.S<br>SHEET: A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




## BRACING BEAM LAYOUT PLAN (AT EL. +16'-0")

SCALE:- 1/8" = 1'-0"



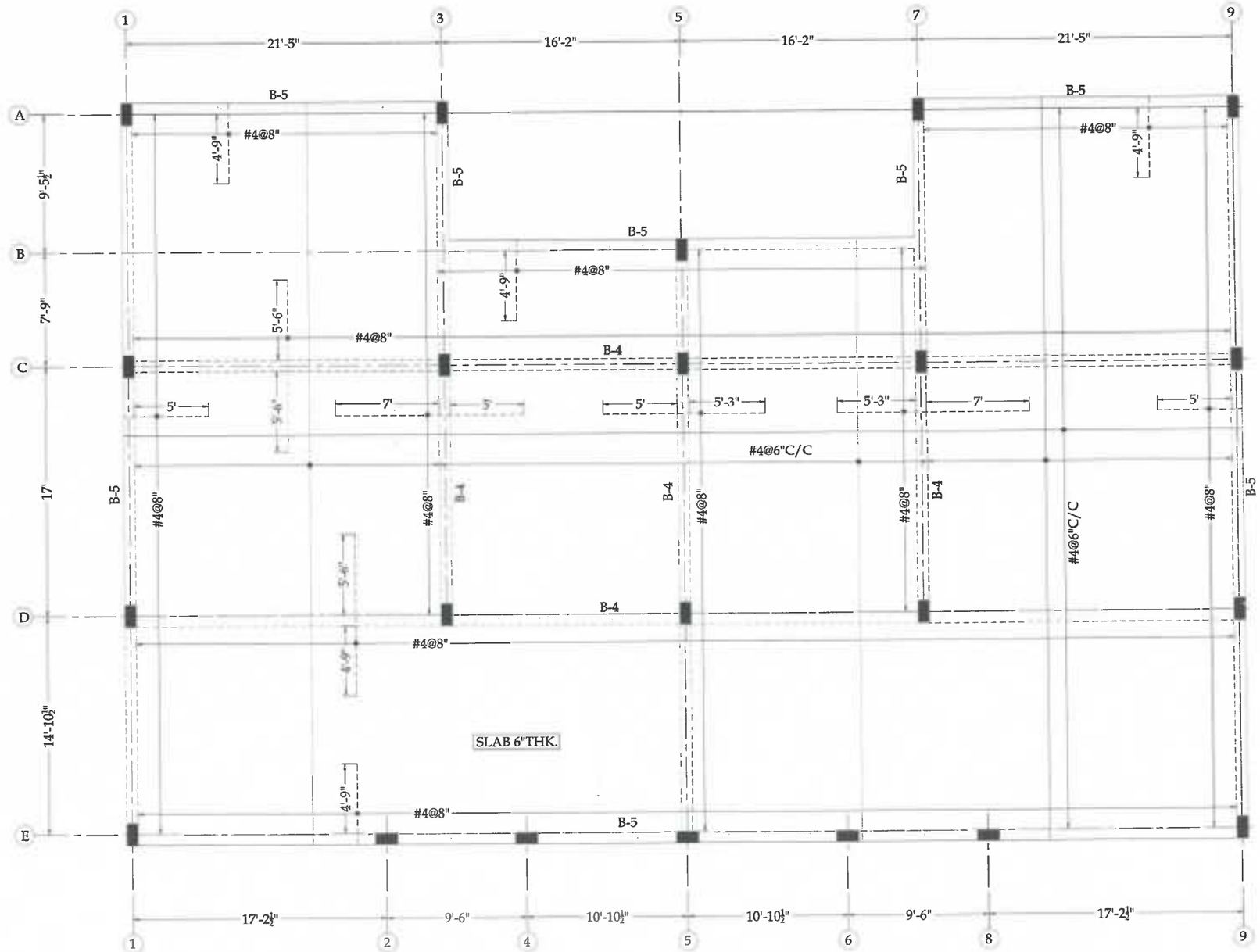

## BEAM B-3

SCALE:- 3/4" = 1'-0"

**TENDER DRAWING**

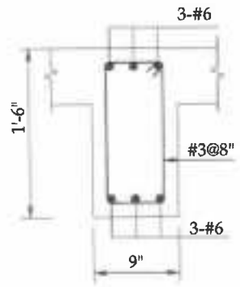
| | | | |
|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | | |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| PROJECT: | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| DRAWING TITLE: | ELECTRICAL SUBSTATION<br>GEN SET SYNC-MTTM ROOM BRACING BEAM LAYOUT PLAN | | |
| DRAWING NO: | STR-06 | | |
| SCALE: | N.T.S | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |



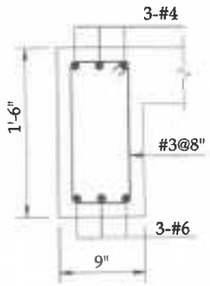

## ROOF FRAMING & REINFORCEMENT PLAN AT ROOF LEVEL.

SCALE:- 1/8" = 1'-0"




## BEAM B-4

SCALE:- 3/4" = 1'-0"



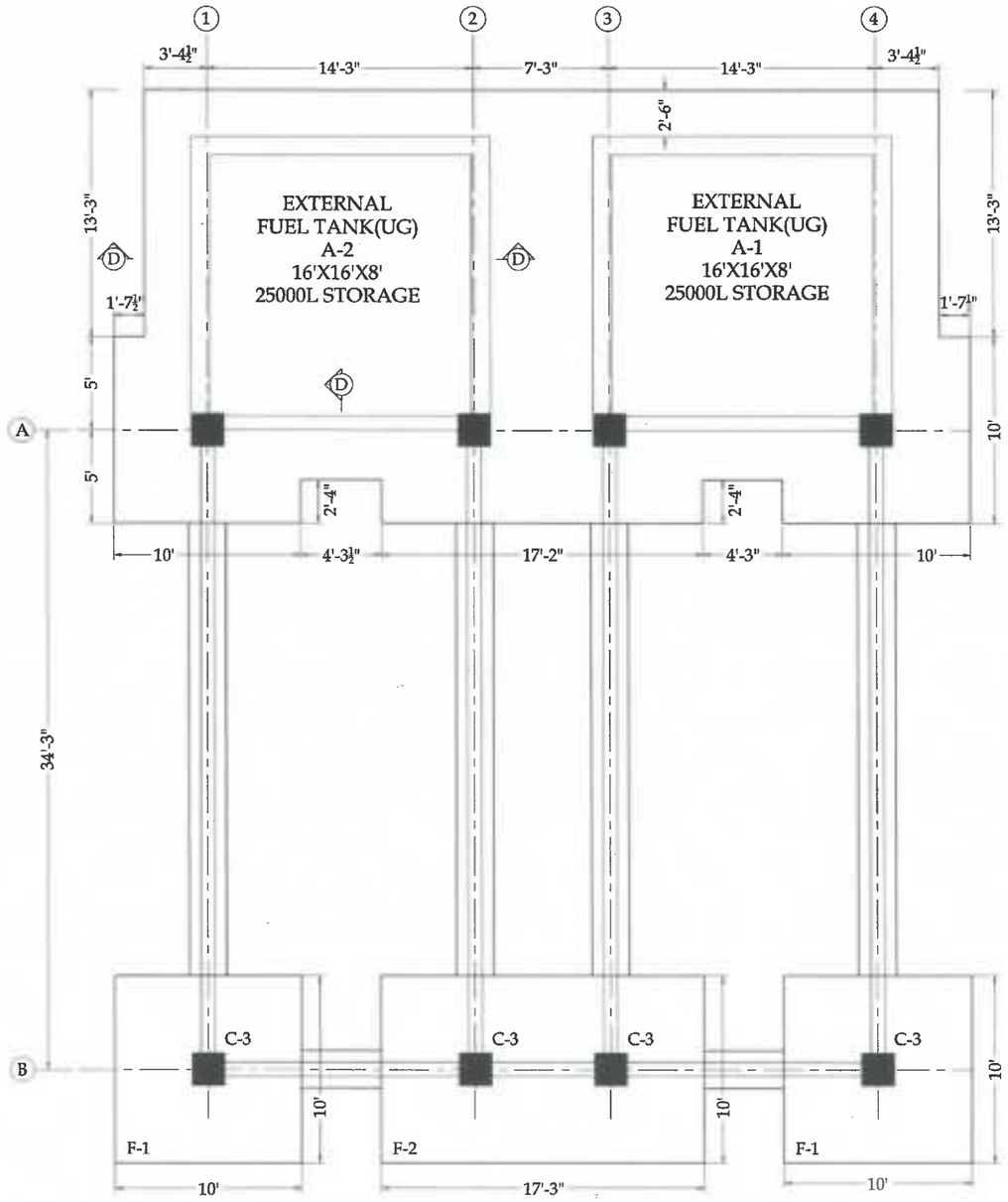

## ROOF BEAM B-5

SCALE:- 3/4" = 1'-0"

TENDER DRAWING

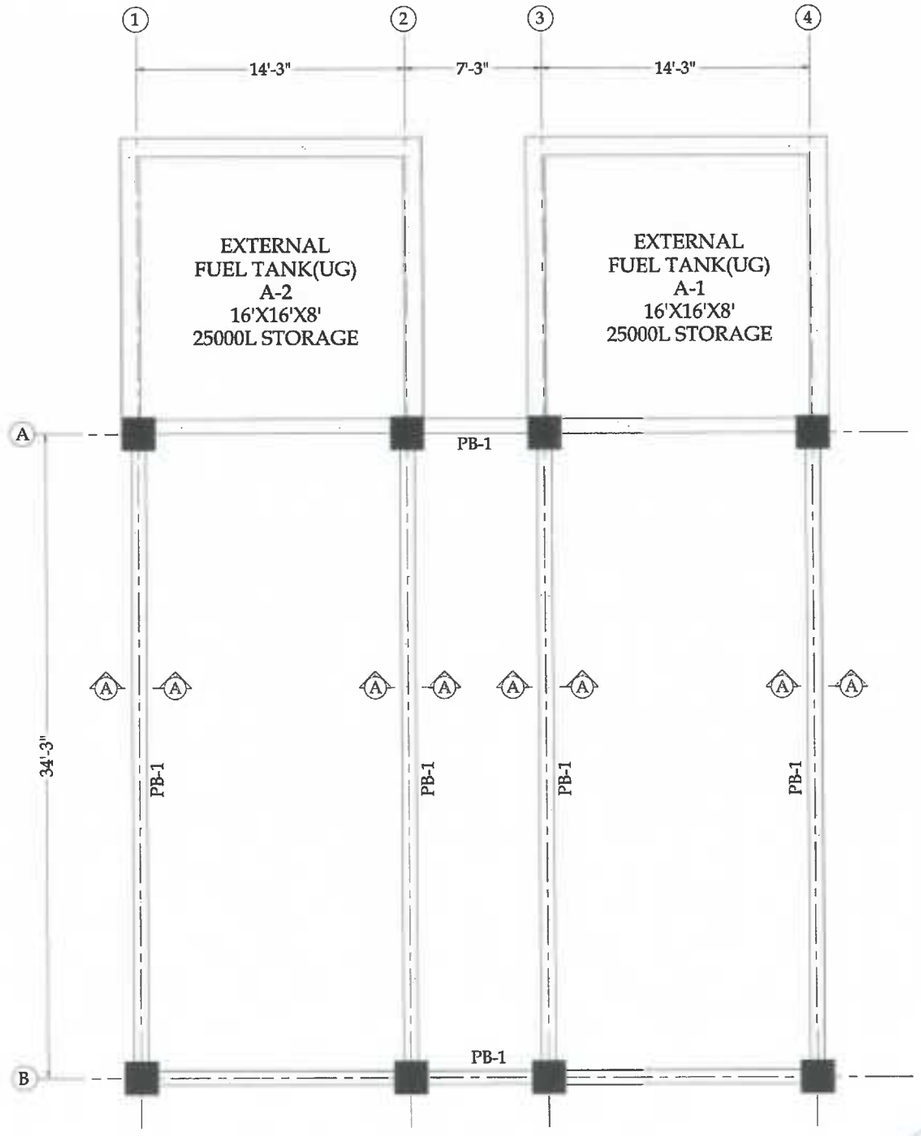
| | | | |
|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | | |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | | |
| PROJECT: | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| DRAWING TITLE: | ELECTRICAL SUBSTATION GEN SET SYNC-MTTM ROOM ROOF FRAMING & REINFORCEMENT PLAN | | |
| DRAWING NO: | STR-07 | | |
| SCALE: | N.T.S | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




## FOUNDATION LAYOUT PLAN

SCALE:- 1/8" = 1'-0"



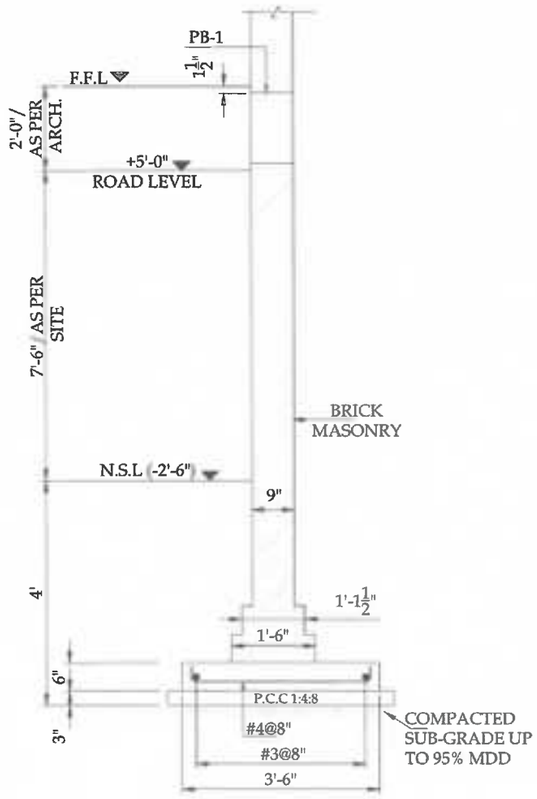

## PLINTH BEAM LAYOUT PLAN

SCALE:- 1/8" = 1'-0"

**TENDER DRAWING**

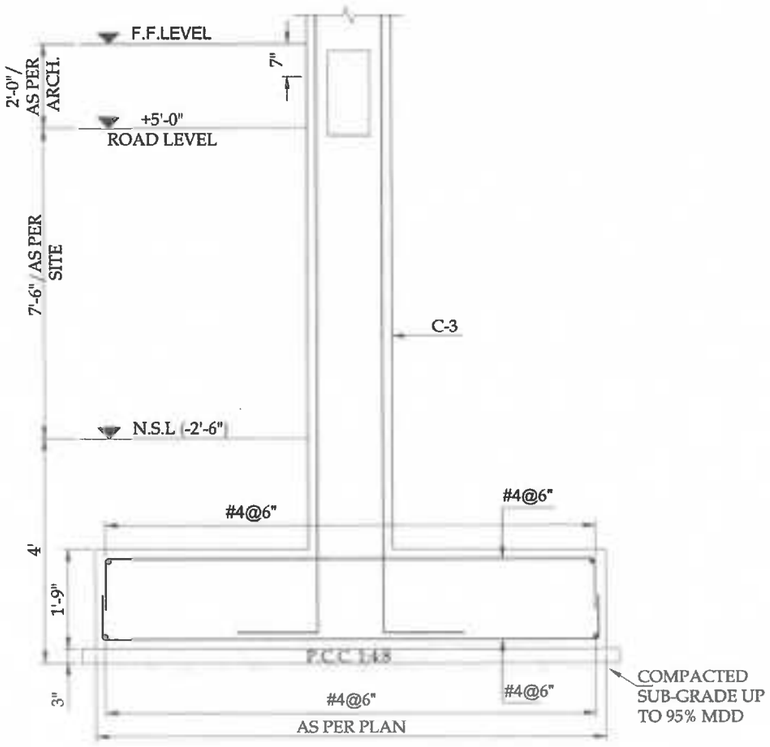
| | | | |
|---|---|---|---|
| **CLIENT:** | Punjab Information Technology Board (PITB) Lahore | | |
| **CONSULTANTS:** | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| **PROJECT:** | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| **DRAWING TITLE:** | **ELECTRICAL SUBSTATION**<br>FUEL TANK (UG)<br>FOUNDATION & PLINTH BEAM LAYOUT | | |
| **DRAWING NO:** | STR-08 | | |
| **SCALE:** | N.T.S | **SHEET:** | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

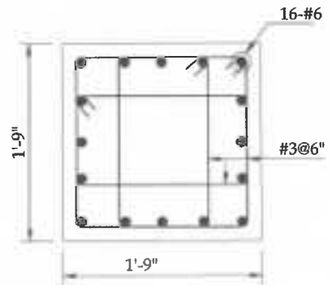



## SECTION A-A

SCALE:- 3/8" = 1'-0"

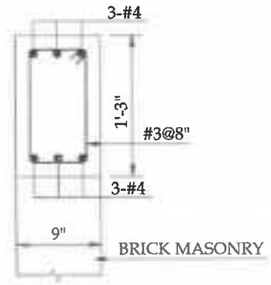



## TYP. FOOTING SECTION F-1 & F-2




## COLUMN C-3

SCALE:- 3/4" = 1'-0"




## BEAM PB-1

SCALE:- 3/4" = 1'-0"

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:** Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES
PUNJAB (PVT) LTD (ECSP).
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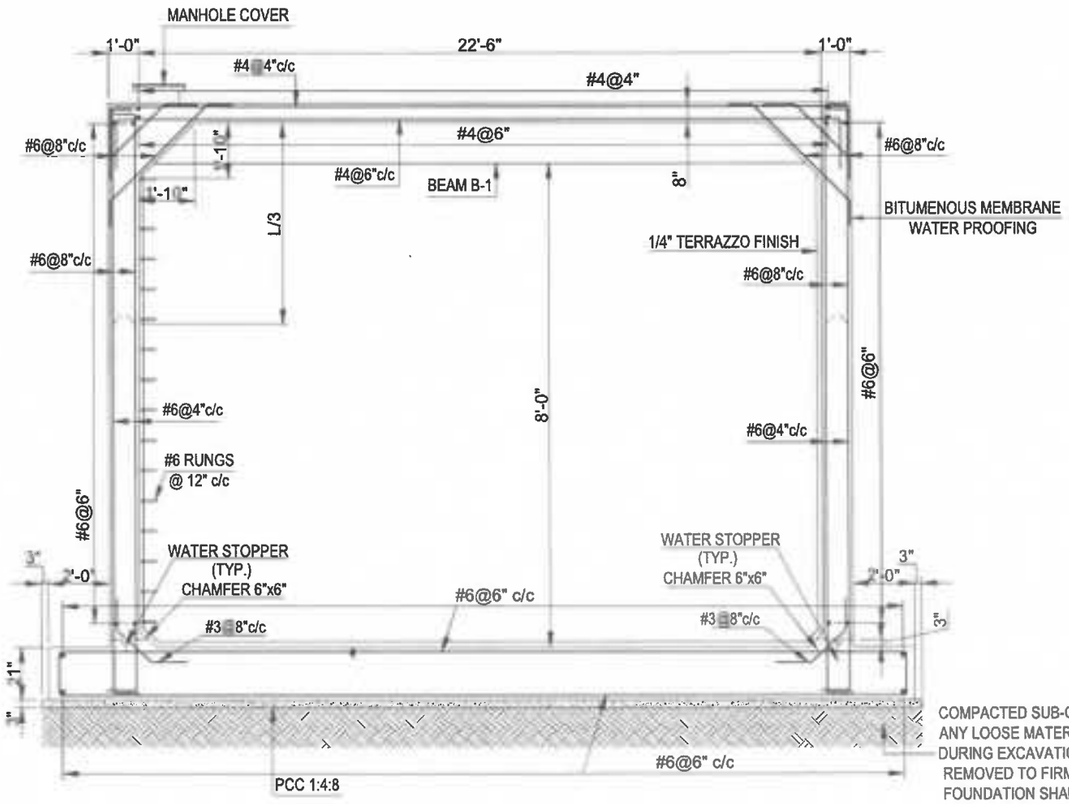
**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:**
**ELECTRICAL SUBSTATION**
FUEL TANK (UG)
FOUNDATION & COLUMN
SECTIONAL DETAILS

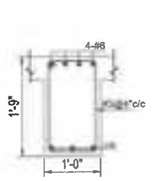
**DRAWING NO:** STR-09

**SCALE:** N.T.S **SHEET:** A3

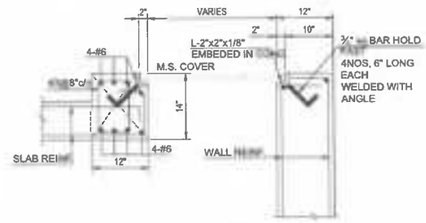



COMPACTED SUB-GRADE UP TO 95% MDD, ANY LOOSE MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO FIRM STRATA AND FOUNDATION SHALL BE PLACED ON FIRM SOIL STRATA.

# UNDERGROUND FUEL TANK SECTION

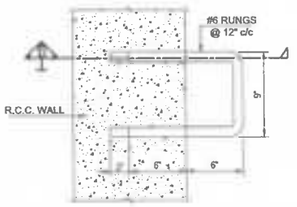



BEAM B-1



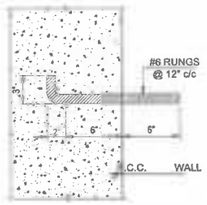

TYP. MANHOLE DETAIL

SCALE 3/4" = 1'-0"




PLAN OF #6 M.S RUNGS

SCALE 3/4" = 1'-0"



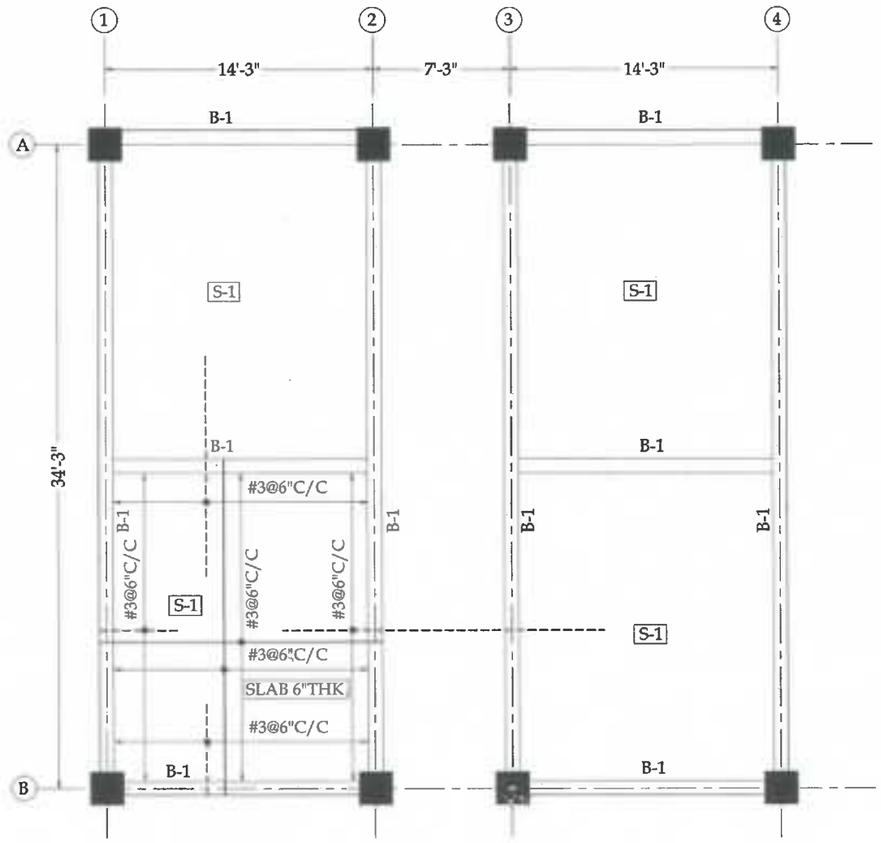

SECTION - D

SCALE 3/4" = 1'-0"

**TENDER DRAWING**

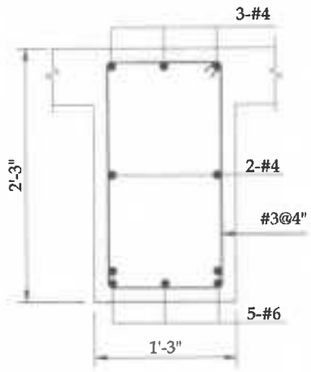
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|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | | |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| PROJECT: | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| DRAWING TITLE: | ELECTRICAL SUBSTATION<br>FUEL TANK DETAILS | | |
| DRAWING NO: | STR-10 | | |
| SCALE: | N.T.S | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
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| | | | |




## BEAM & SLAB REINFORCEMENT LAYOUT PLAN

SCALE:- 1/8" = 1'-0"




## BEAM B-1

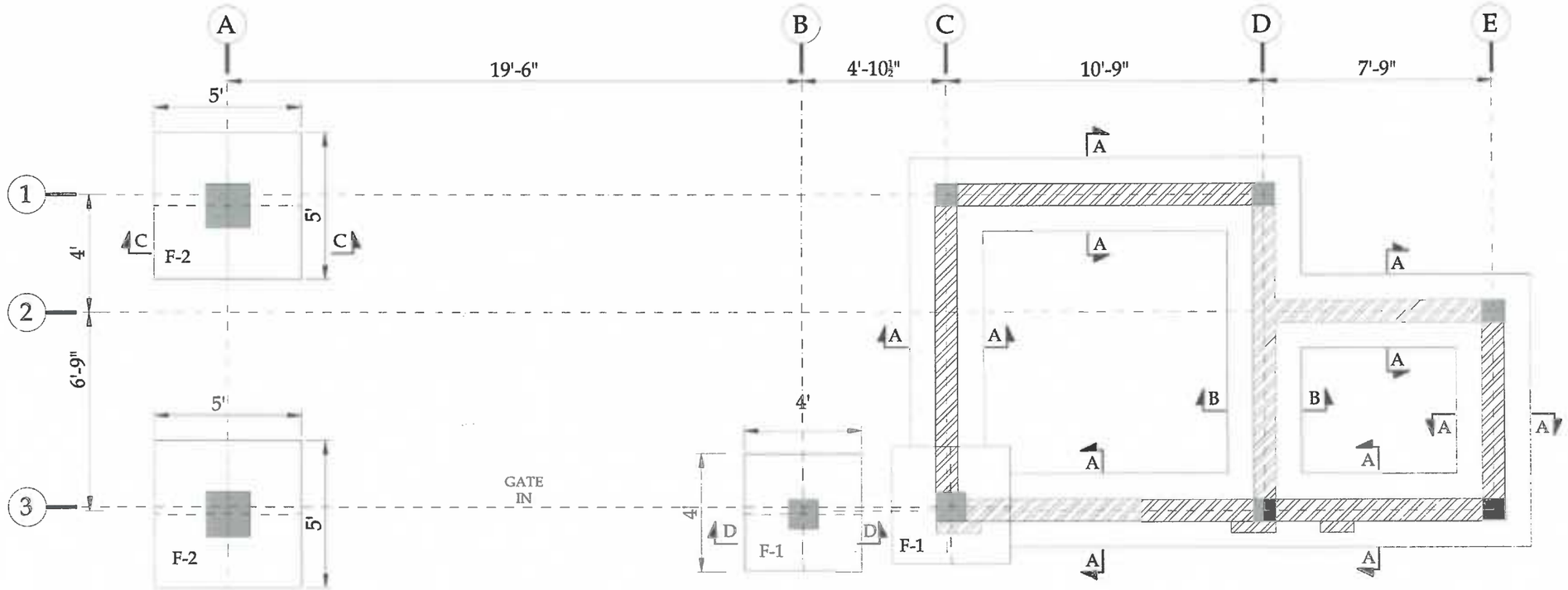
SCALE:- 3/4" = 1'-0"

**TENDER DRAWING**

| | | | |
|---|---|---|---|
| **CLIENT:** | Punjab Information Technology Board (PITB) Lahore | | |
| **CONSULTANTS:** | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
| **PROJECT:** | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | | |
| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| **DRAWING TITLE:** | **ELECTRICAL SUBSTATION** FUEL TANK (UG) BEAM & SLAB REINFORCEMENT LAYOUT PLAN & SECTION DETAIL | | |
| **DRAWING NO:** | STR-11 | | |
| **SCALE:** | N.T.S | **SHEET:** | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# MAIN GATE AND GUARD ROOM



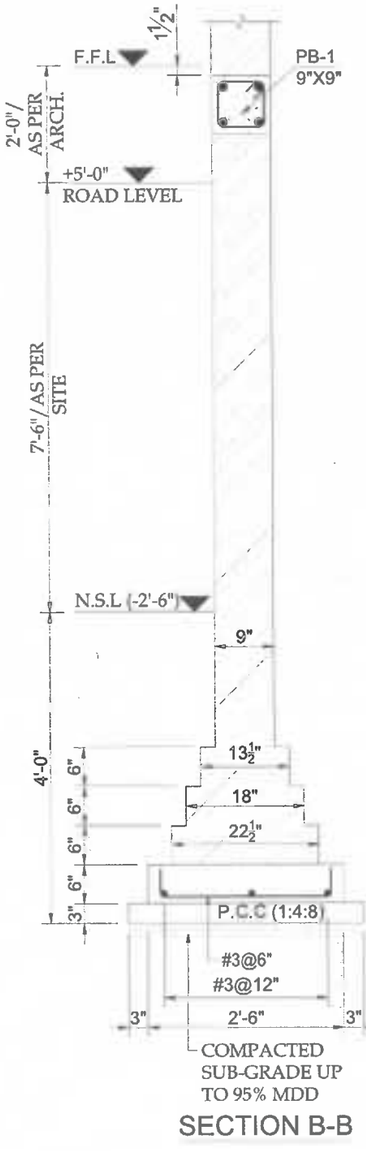

# FOUNDATION LAYOUT PLAN

TENDER DRAWING

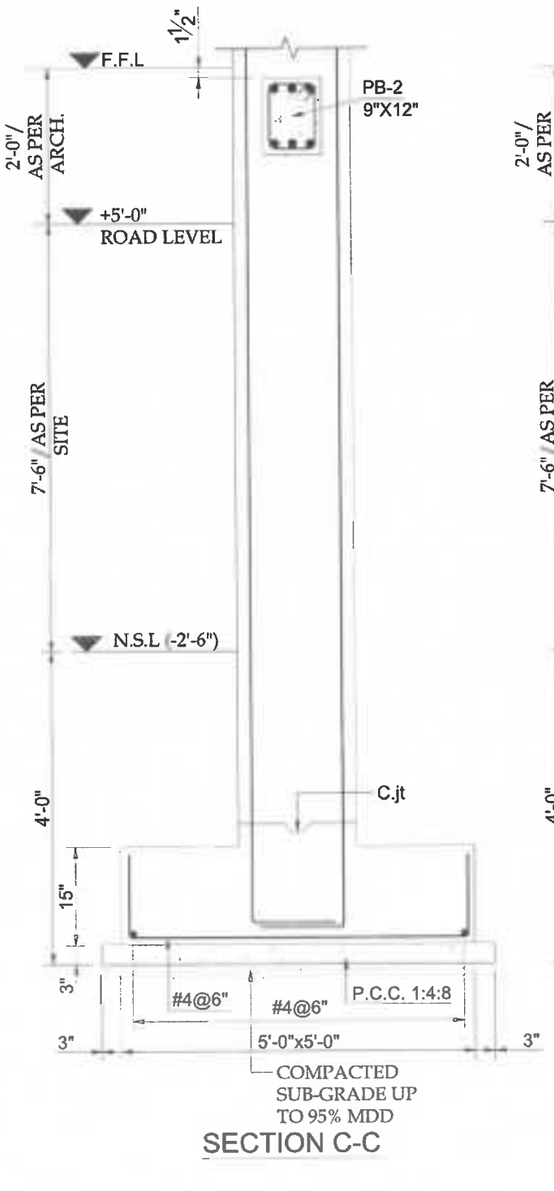
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: M.ADNAN<br>DESIGNED BY: M.HASNAIN<br>CHECKED BY: ALI RAZA / QASIM SULTAN<br>APPROVED BY: SABIR HUSSAIN<br>DATE: AUGUST, 2026 | DRAWING TITLE: MAIN GATE AND GUARD ROOM<br>FOUNDATION LAYOUT PLAN | DRAWING NO: STR-01<br>SCALE: N.T.S<br>SHEET: A3 | REV. / DESCRIPTION / SIGN. / DATE | |



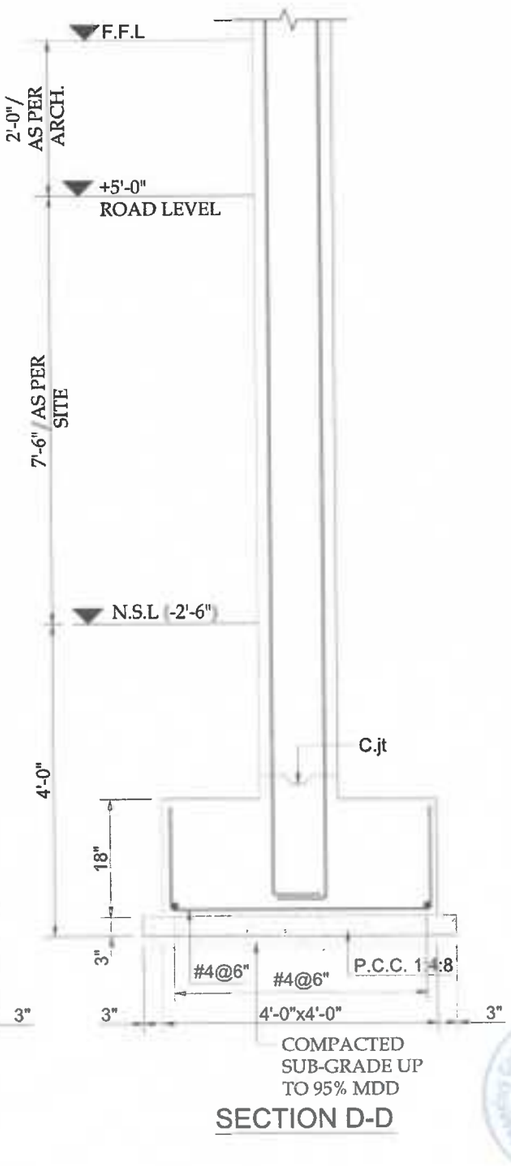

SECTION A-A




SECTION B-B




SECTION C-C




SECTION D-D

TENDER DRAWING

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

CLIENT:
Punjab Information Technology Board (PITB) Lahore

CONSULTANTS:
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

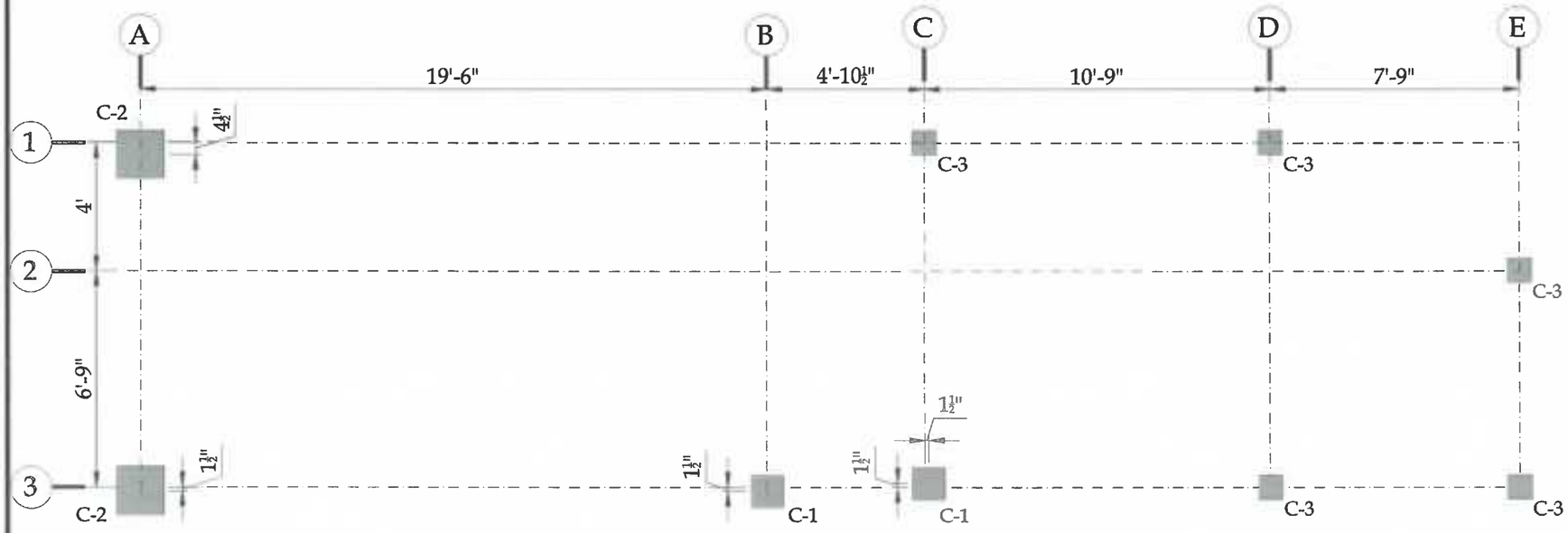
| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

DRAWING TITLE:
MAIN GATE AND GUARD ROOM
FOUNDATION
SECTIONAL DETAILS

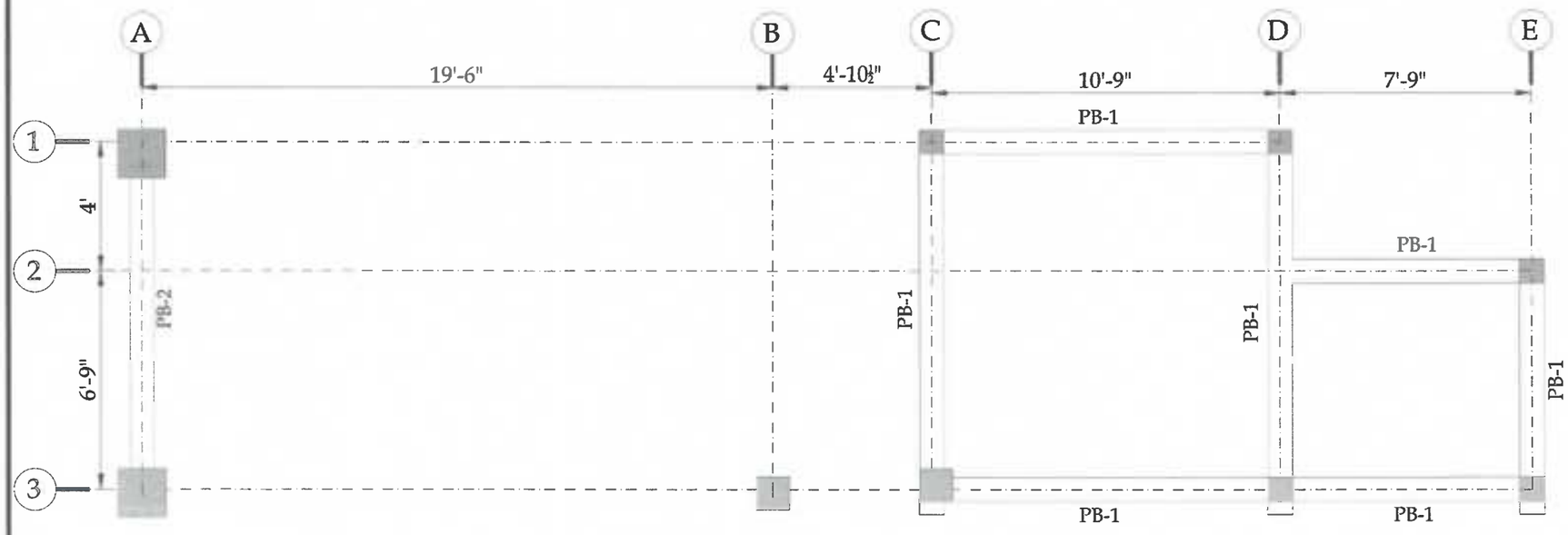
DRAWING NO: STR-02

SCALE: N.T.S

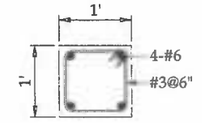
SHEET: A3




COLUMN LAYOUT PLAN

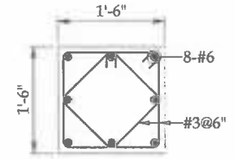



PLINTH BEAMS LAYOUT PLAN



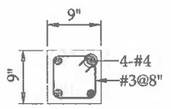

COLUMN C-1

SCALE:- 1/2" = 1'-0"



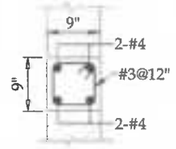

COLUMN C-2

SCALE:- 1/2" = 1'-0"

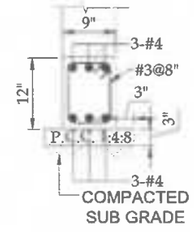



COLUMN C-3

SCALE:- 1/2" = 1'-0"




PLINTH BEAM PB-1




PLINTH BEAM PB-2

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:** Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

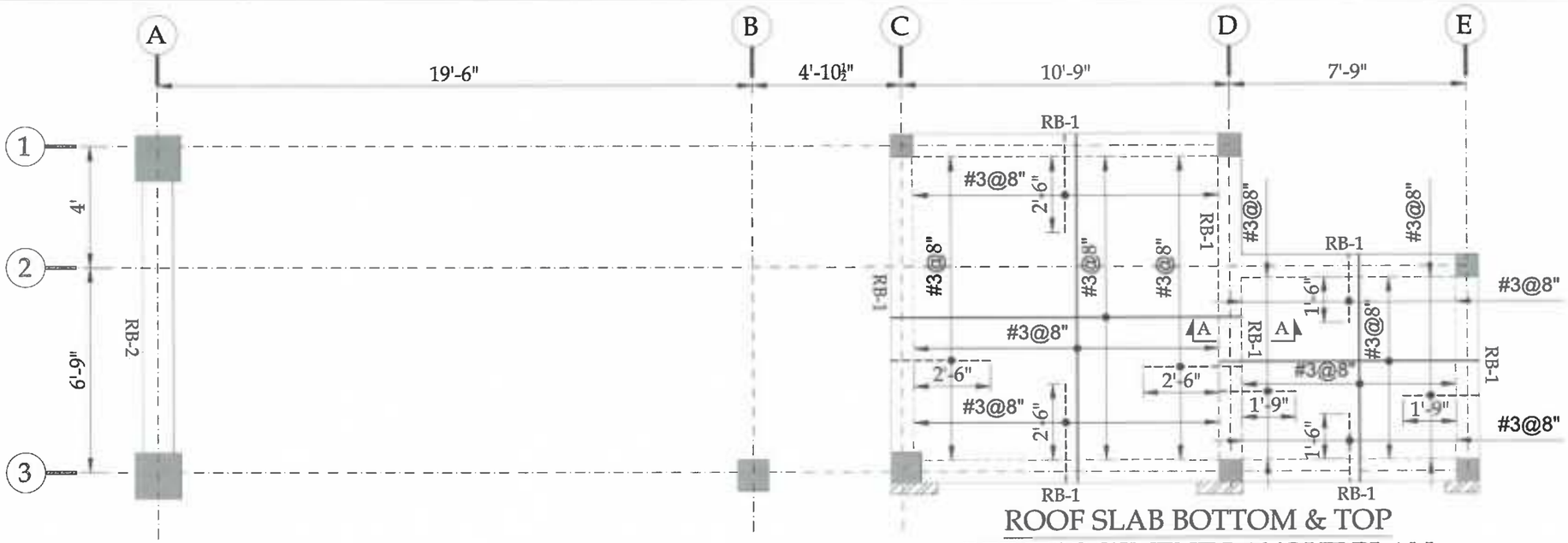
**PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.ADNAN |
| DESIGNED BY: | M.HASNAIN |
| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

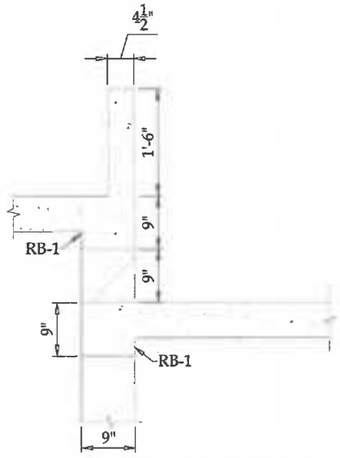
**DRAWING TITLE:** MAIN GATE & GUARD ROOM
COLUMN / PLINTH BEAMS LAYOUT PLAN & SECTIONAL DETAILS

**DRAWING NO:** STR-03

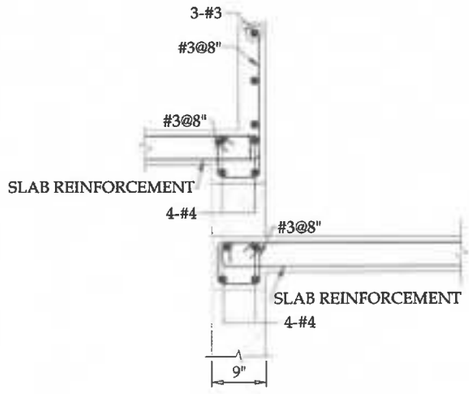
**SCALE:** N.T.S **SHEET:** A3



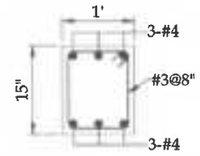

ROOF SLAB BOTTOM & TOP
REINFORCEMENT LAYOUT PLAN
SLAB THICKNESS = 5"




ROOF BEAM RB-1
CONCRETE OUTLINE
SECTION A-A




ROOF BEAM RB-1
REINFORCEMENT DETAILS
SECTION A-A




ROOF BEAM RB-2

**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

**CLIENT:** Punjab Information Technology Board (PITB) Lahore

**CONSULTANTS:**
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**PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
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| DRAWN BY: | M.ADNAN |
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| CHECKED BY: | ALI RAZA / QASIM SULTAN |
| APPROVED BY: | SABIR HUSSAIN |
| DATE: | AUGUST, 2026 |

**DRAWING TITLE:** MAIN GATE& GUARD ROOM
ROOF BEAMS & SLAB DETAILS

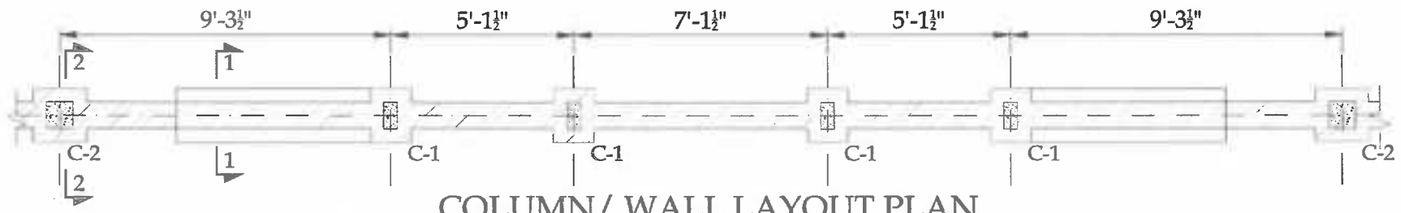
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**SCALE:** N.T.S **SHEET:** A3

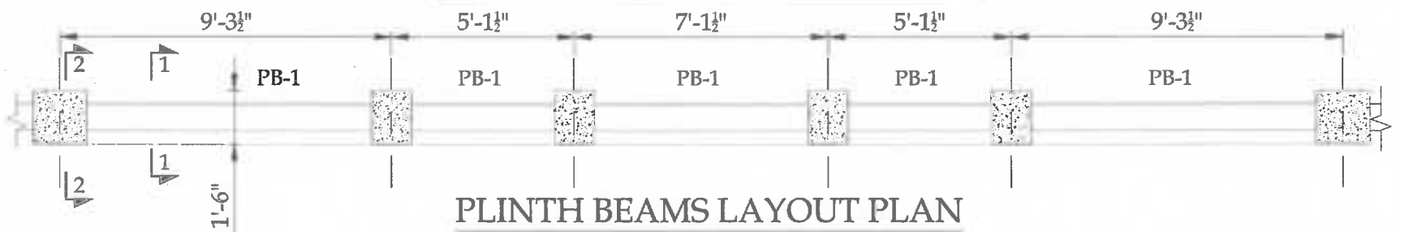
# BOUNDARY WALL



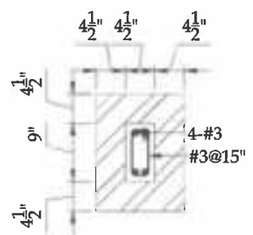

FOUNDATION LAYOUT PLAN




COLUMN/ WALL LAYOUT PLAN

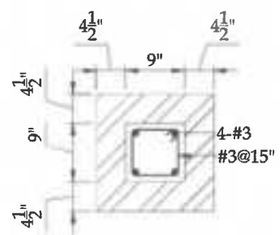



PLINTH BEAMS LAYOUT PLAN




COLUMN C-1

SCALE:- 1/2" = 1'-0"



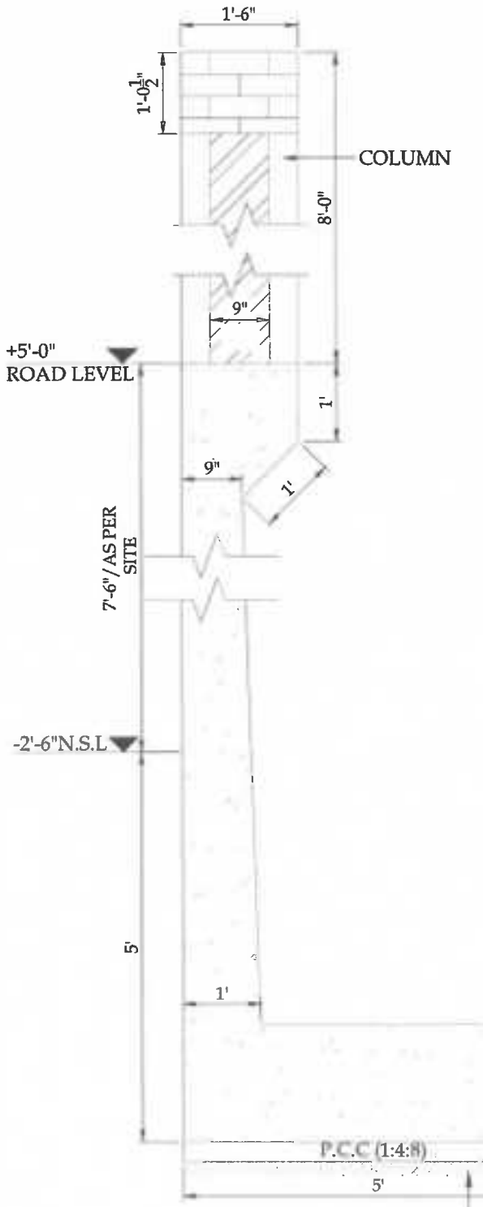

COLUMN C-2

SCALE:- 1/2" = 1'-0"

TENDER DRAWING

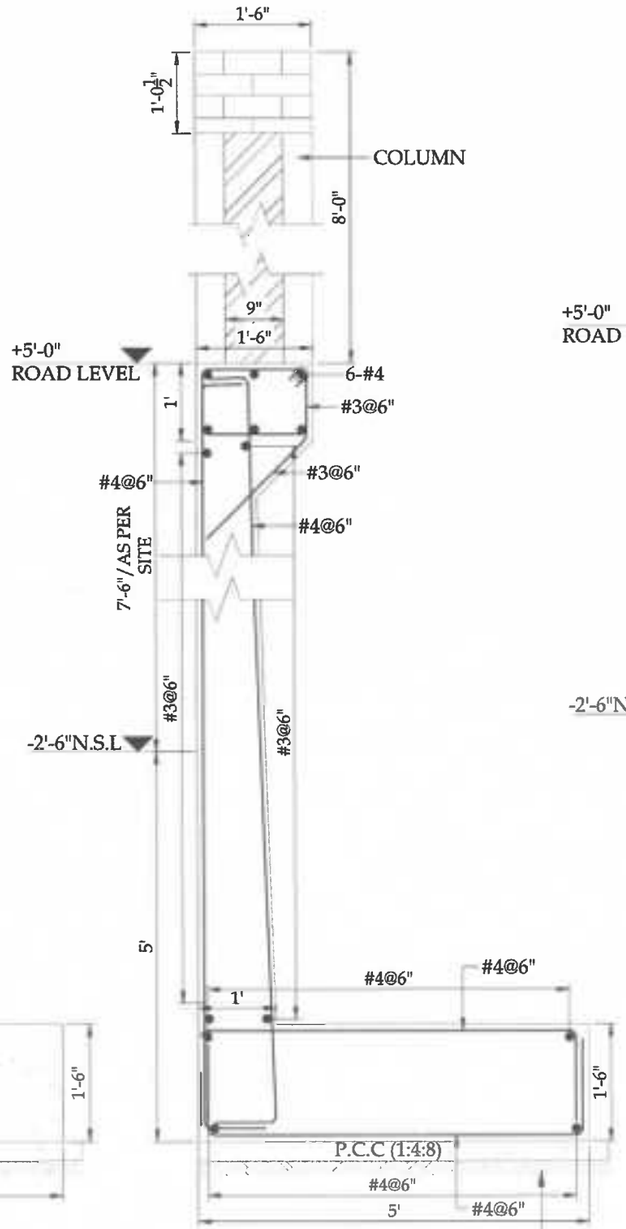
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|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | | |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | | |
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| DRAWN BY: | M.ADNAN | | |
| DESIGNED BY: | M.HASNAIN | | |
| CHECKED BY: | ALI RAZA / QASIM SULTAN | | |
| APPROVED BY: | SABIR HUSSAIN | | |
| DATE: | AUGUST, 2026 | | |
| DRAWING TITLE: | BOUNDARY WALL<br>FOUNDATION, COLUMNS & PLINTH BEAMS LAYOUT PLAN | DRAWING NO: | STR-01 |
| SCALE: | N.T.S | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN | DATE |
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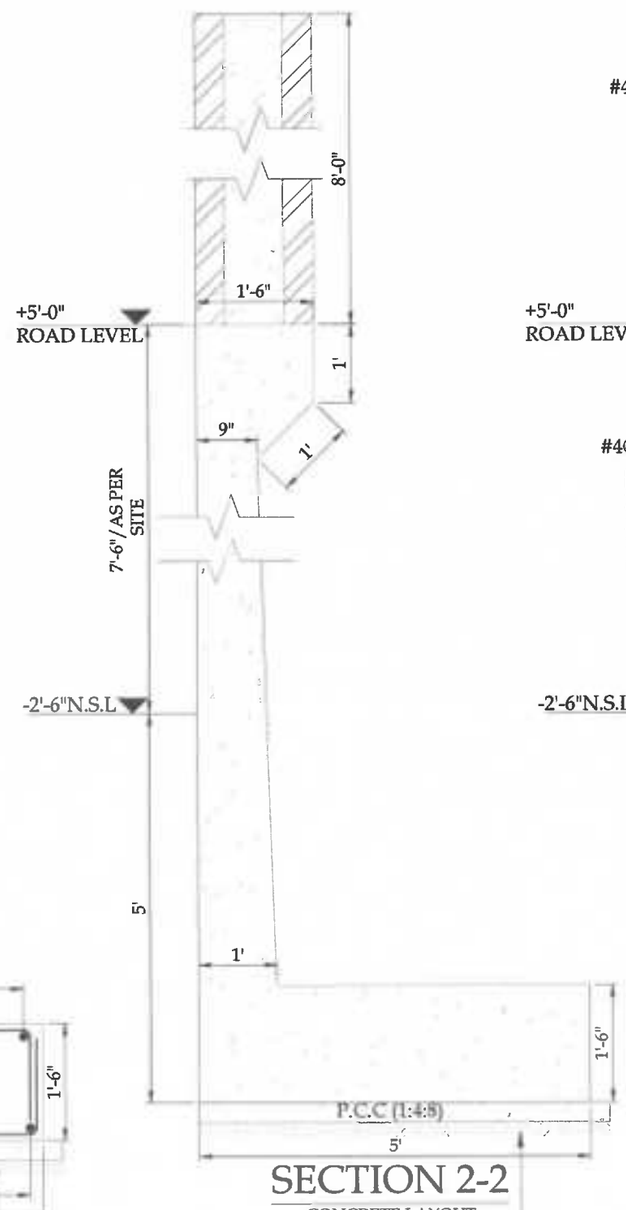

SECTION 1-1

CONCRETE LAYOUT



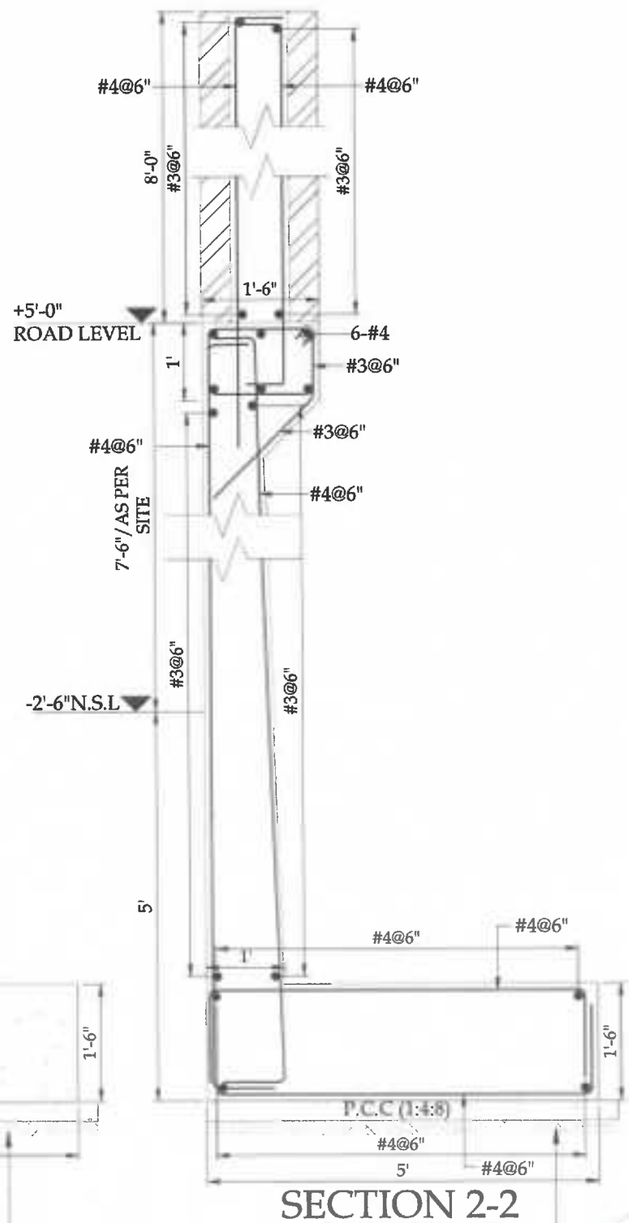

SECTION 1-1

REINFORCEMENT LAYOUT




SECTION 2-2

CONCRETE LAYOUT




SECTION 2-2

REINFORCEMENT LAYOUT

COMPACTED SUB-GRADE UP TO 95% MDD, ANY LOOSE MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO FIRM STRATA AND FOUNDATION SHALL BE PLACED ON FIRM SOIL STRATA.

COMPACTED SUB-GRADE UP TO 95% MDD, ANY LOOSE MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO FIRM STRATA AND FOUNDATION SHALL BE PLACED ON FIRM SOIL STRATA.

**TENDER DRAWING**

| | | | |
|---|---|---|---|
| CLIENT: | Punjab Information Technology Board (PITB) Lahore | DRAWN BY: | M.ADNAN |
| CONSULTANTS: | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | DESIGNED BY: | M.HASNAIN |
| PROJECT: | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | CHECKED BY: | ALI RAZA / QASIM SULTAN |
| | | APPROVED BY: | SABIR HUSSAIN |
| | | DATE: | AUGUST, 2026 |
| DRAWING TITLE: | BOUNDARY WALL<br>SECTIONAL DETAILS | DRAWING NO: | STR-02 |
| | | SCALE: | N.T.S |
| | | SHEET: | A3 |

| REV. | DESCRIPTION | SIGN. | DATE |
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| | | | |

# PUNJAB INFORMATION TECHNOLOGYBOARD (PITB)
# LAHORE

# ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

## ROAD WORKS

## TENDER DRAWING


**CONSULTANTS:**

**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

## GENERAL NOTES:

1. GENERAL SPECIFICATION OF C&W SHALL BE FOLLOWED FOR CONSTRUCTION OF ROAD WORKS.
2. ALL DIMENSIONS SHOWN ON PLAN & PROFILE DRAWINGS ARE IN FEET UNLESS SPECIFIED OTHERWISE.
3. EXISTING LEVELS, DIMNESIONS AND TOPOGRAPHY REPRESENT CONDITIONS AT THE TIME OF SURVEY IN AUGUST, 2026.
4. GRID COORDINATES & ELEVATIONS ARE BASED ON UTM.
5. EACH DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
6. NOTES GIVEN ON DRAWINGS ADJACENT TO A SECTION PERTAIN TO THE PARTICULAR DETAIL.
7. BEFORE STARTING PAVEMENT MARKING, CONTRACTOR SHALL SUBMIT WORKING DETAILS SHOWING EXACT LOCATION, TYPE AND SIZE OF MARKING FOR APPROVAL BY THE ENGINEER.
8. RELOCATION WORK OF ANY KIND SHALL BE DONE BY THE CONTRACTOR IN CONSULTATION WITH THE CONCERNED AUTHORITIES PRIOR TO THE EXECUTION OF WORK, AT NO ADDITIONAL COST TO THE EMPLOYER.
9. ANY DAMAGE DONE TO THE EXISTING UTILITIES, SERVICES AND TO EXISTING DRAINS DURING EXCAVATION AND EXECUTION OF WORK BY THE CONTRACTOR SHALL BE REPAIRED AND MADE GOOD BY THE CONTRACTOR, AT NO EXTRA COST TO THE EMPLOYER.
10. CONTRACTOR SHALL PREPARE SHOP DRAWINGS FOR STRUCTURES, LOCATIONS OF SIGN BOARDS, CONCRETE KERB STONES, FOOTPATH, PAVEMENT STUDS AND OTHER ANCILLARY ITEMS ETC AND SUBMIT TO THE ENGINEER FOR APPROVAL WITHOUT ANY ADDITIONAL COST TO THE EMPLOYER.
11. SUBGRADE MATERIAL SHALL HAVE A MINIMUM CBR OF 07% AT 95% M.D.D AS PER AASHTO T-180.
12. EMBANKMENT MATERIAL SHALL HAVE A MINIMUM CBR OF 5% AT 95% M.D.D AS PER AASHTO T-180. ZONES BELOW SUBGRADE SHALL BE COMPACTED AS GIVEN IN THE SPECIFICATIONS.
13. ALL PROFILES ARE TENTATIVE. LOCAL CHANGES IN HORIZONTAL/VERTICAL ALIGNMENT MAY BE DONE WITH PRIOR APPROVAL OF THE ENGINEER AS PER SITE REQUIREMENTS. THE PAVEMENT DESIGN AND DESIGN OF PROFILE SHALL BE RE-EVALUATED AFTER COMPLETION OF SOIL/GEOTECHNCIAL INVESTIGATIONS AND SHALL BE REVISED IF DEEMED NECESSARY.
14. THE CONTRACTOR SHALL PERFORM EARTHWORK IN ORDINARY SOIL FOR EMBANKMENTS INCLUDING PLOUGHING AND MIXING WITH BLADE GRADE, COMPLETE IN ALL RESPECT, AS PER SOURCE APPROVED BY THE ENGINEER.
15. REMOVAL OF TREES FALLING WITHIN THE CONSTRUCTION LIMITS SHALL BE DONE AFTER THE VERIFICATION BY THE CONCERNED DEPARTMENT WITH THE APPROVAL OF THE ENGINEER & SAME SHALL BE HANDED OVER TO THE CONCERNED DEPARTMENT/OWNER.
16. THE CONTRACTOR SHALL MANAGE/EXECUTE DEWATERING AT NO ADDITIONAL COST TO THE EMPLOYER.
17. CONTRACTOR SHALL GIVE CONSTRUCTION METHOD STATEMENT BEFORE START OF WORK.
18. UNSUITABLE MATERIAL SHALL BE EXCAVATED TO LIMITS AND DEPTH APPROVED BY THE ENGINEER. C&W GENERAL SPECIFICATIONS SHALL BE ADOPTED FOR THE PROJECT.
19. BRICKS RETRIEVED FROM EXISTING STRUCTURES/WATER COURSES SHALL BE STACKED BY THE CONTRACTOR AND HANDED OVER TO RELEVANT DEPARTMENT/EMPLOYER THROUGH THE ENGINEER.
20. MATERIAL FROM DISMANTLED STRUCTURES SHALL BE HANDED OVER TO THE CONCERNED OWNER BY THE CONTRACTOR THROUGH THE ENGINEER.
21. CONTRACTOR SHALL COORDINATE WITH CONCERNED DEPARTMENTS TO RELOCATE UTILITIES & SHALL PROTECT ANY UTILITY COMING UNDER ROAD. ANY DAMAGE CAUSED DURING THE OPERATION SHALL BE MADE GOOD AT NO ADDITIONAL COST TO THE EMPLOYER.

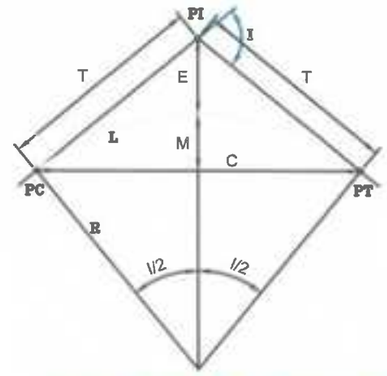
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CLIENT:** PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: | USMAN MUSTAFA | | **TENDER DRAWING** NOT FOR CONSTRUCTION | **DRAWING NO:** HWY-GN-001 | REV. | DESCRIPTION | SIGN. | DATE |
| | | | DESIGNED BY: | ENGR. SALMAN SHAKEEL | | **DRAWING TITLE:** GENERAL NOTES | | | | | |
| | | | CHECKED BY: | ENGR. HUMAYON | | | | | | | |
| | | | APPROVED BY: | ENGR. HUMAYON | | | **SCALE:** N.T.S | **SHEET:** A3 | | | |
| | | | DATE: | AUGUST, 2026 | | | | | | | |

## LEGEND

EXISTING CENTERLINE
ELECTRIC POLE
RAILWAY TRACK
SIGNAL
TREES
LIGHT POLE
SEWERAGE MAN HOLE
TELEPHONE POLE
NURSERY
UNDER GROUND PHONE CABLE
BUILDING/SHOPS
HAND PUMP
ADVERTISING BOARD
POUND
GRAVEYARD
GAS MANHOLE
ROAD
EXISTING DRAIN
BRIDGE
EXISTING CULVERT
MOSQUE
GATE
FOOT PATH
BRICK WALL
TRACK
TOWER
CONTROL POINT
BENCH MARK
HUT
TOLL PLAZA
HIGH TENSION LINE

## ABBREVIATIONS

| | |
|---|---|
| A | AREA |
| ALIG. | ALIGNMENT |
| B | BREADTH |
| BC | BOX CULVERT |
| B.M | BENCH MARK |
| BOP | BEGINNING OF PROJECT |
| C | CHORD LENGTH |
| C.B.R | CALIFORNIA BEARING RATIO |
| C/C | CENTER TO CENTER |
| CHD. | CHECKED |
| C/L, $L^C$ | CENTER LINE |
| CM/cm | CENTIMETER |
| CONC. | CONCRETE |
| CONST/JT | CONSTRUCTION JOINT |
| CS | CURVE TO SPIRAL |
| CUL | CULVERT |
| Cu.m | CUBIC METER |
| CURVE LEN | VERTICAL CURVE LENGTH |
| DC | DEPTH OF CUT |
| Da | DEGREE OF CURVE (BY ARC) |
| Dc | DEGREE OF CURVE (BY CHORD) |
| DEG | DEGREE |
| DIA. | DIAMETER |
| DIM. | DIMENSION |
| D/S | DOWNSTREAM |
| D.S.T | DOUBLE SURFACE TREATMENT |
| DRG. | DRAWING |
| E | EASTING , EAST , EXTERNAL DISTANCE (SHIFT) |
| ELEV./EL | ELEVATION |
| EOP | END OF PROJECT |
| EXP/JT | EXPANSION JOINT |
| G.I | GALVANIZED IRON |
| H/HOR. | HORIZONTAL |
| H.T/L.T | HIGH TENSION/LOW TENSION |
| HF | HEIGHT OF FILL |
| HFL | HIGH FLOOD LEVEL |
| HWY. | HIGHWAY |
| I | DEFLECTION ANGLE (HORIZONTAL CURVE) |
| Ic | CIRCULAR DEFLECTION ANGLE |
| I.L | INVERT LEVEL |
| K | SMOOTHNESS FACTOR (IN CASE OF VERTICAL CURVE) |
| Kg. | KILOGRAM |
| KM/Km | KILOMETER |
| L | LENGTH OF HORIZONTAL CURVE/SPIRAL |
| LIN.M | LINEAR METER |
| LHS. | LEFT HAND SIDE |
| LT. | LEFT |
| LT. | LONG TANGENT |
| M/m | METER |
| M | MIDDLE ORDINATE |
| MAX. | MAXIMUM |
| M.H | MAN HOLE |
| MIN. | MINIMUM |
| mm | MILLIMETER |
| N.S.L | NATURAL SURFACE LEVEL (E.G.L) |
| N | NORTHING, NORTH |
| NO. | NUMBER |
| N.T.S | NOT TO SCALE |
| P | OFFSET OF TANGENT LINE TO PC OF SHIFTED CIRCLE CURVE |
| PC | POINT OF HORIZONTAL CURVATURE (START OF HORIZONTAL CURVE) |
| P.C. | REINFORCED CONCRETE PIPE CULVERT |
| PGL | PROFILE GRADE LINE |
| P.I. | PLASTICITY INDEX |
| PI | POINT OF HORIZONTAL INTERSECTION |
| PR | POINT OF ROTATION |
| PT | POINT OF HORIZONTAL TANGENCY (END OF HORIZONTAL CURVE) |
| R | RADIUS OF HORIZONTAL CURVE |
| R.C | REINFORCED CONCRETE |
| REINF. | REINFORCEMENT |
| REV. | REVISION |
| RHS. | RIGHT HAND SIDE |
| R.O.W. | RIGHT OF WAY |
| RT. | RIGHT |
| R/W | RETAINING WALL |
| RWC | RELOCATED WATER COURSE |
| S | SLOPE GRADIENT (PERCENT) |
| SE | SUPERELEVATION |
| S.B.P | SHOULDER BREAK POINT |
| S.C. | SLAB CULVERT |
| SC | SPIRAL TO CURVE, SLAB CULVERT |
| SHLD | SHOULDER |
| Sq.m | SQUARE METER |
| S.T. | SHORT TANGENT |
| ST | SPIRAL TO TANGENT |
| STA./STA | STATION (CHAINAGE) |
| STRUCT | STRUCTURE |
| SUPEREL. | SUPERELEVATION |
| S'WALK | SIDE WALK |
| T | TANGENT LENGTH OF HORIZONTAL CURVE |
| TS | TANGENT TO SPIRAL |
| T.S.T | TRIPPLE SURFACE TREATMENT |
| TAN. | TANGENT |
| TH | THICKNESS |
| TR | TRANSITION |
| TYP. | TYPICAL |
| U/S | UPSTREAM |
| V | VERTICAL |
| VAR. | VARIABLE |
| VER. | VERIFIED |
| VPC | VERTICAL POINT OF CURVATURE (START OF VERTICAL CURVE) |
| VPI | VERTICAL POINT OF INTERSECTION OF PROFILE GRADE. |
| VPT | VERTICAL POINT OF TANGENCY (END OF VERTICAL CURVE) |
| W. | WEST, WIDTH OF ROADWAY |
| W.B.M | WATER BOUND MACADAM |
| WC | WATER COURSE |
| X | DISTANCE, PERPENDICULAR TO THE TANGENT, FROM BEGINNING TO THE END OF SPIRAL |
| Y | DISTANCE, PERPENDICULAR TO THE TANGENT, FROM BEGINNING TO THE END OF SPIRAL |
| $\theta$ | SKEW ANGLE |




## CIRCULAR CURVE PARAMETERS

| | | |
|---|---|---|
| CLIENT: | CONSULTANTS: | PROJECT: |
| PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN |

| | | |
|---|---|---|
| DRAWN BY: | USMAN MUSTAFA | |
| DESIGNED BY: | ENGR. SALMAN SHAKEEL | |
| CHECKED BY: | ENGR. HUMAYON | |
| APPROVED BY: | ENGR. HUMAYON | |
| DATE: | AUGUST, 2026 | |

TENDER DRAWING
NOT FOR CONSTRUCTION

DRAWING TITLE: SYMBOLS AND ABBREVIATIONS

DRAWING NO: HWY-SA-001

SCALE: N .T.S

SHEET: A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

| Sr. No. | Design elements | Unit | Design parameters |
|---|---|---|---|
| 1 | Design Speed | MPH | 15 |
| 2 | Min. Radius | FT | 39 |
| 3 | Max. Rate of super elevation | % | 6 |
| 4 | Min. Stopping sight distance | FT | 80 |
| 5 | 'K' Value For Crest Vertical Curves | - | 3 |
| 6 | 'K' Value For Sag Vertical Curves | - | 10 |
| 7 | Min. Gradient | % | 0.3 |
| 8 | Max. Gradient | % | 4 |
| **Cross Section of ROADS with Cross-Slopes** | | | |
| 9 | Lane Width | FT | 12 |
| 10 | Footpath | FT | 5 |
| 11 | Transverse Slope/ Camber | % | 2 |
| 12 | Embankment side slope | | 2:1 (for fill) |

CLIENT:
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LAHORE

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PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

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|---|---|---|
| DRAWN BY: | USMAN MUSTAFA | |
| DESIGNED BY: | ENGR. SALMAN SHAKEEL | |
| CHECKED BY: | ENGR. HUMAYON | |
| APPROVED BY: | ENGR. HUMAYON | |
| DATE: | AUGUST, 2026 | |

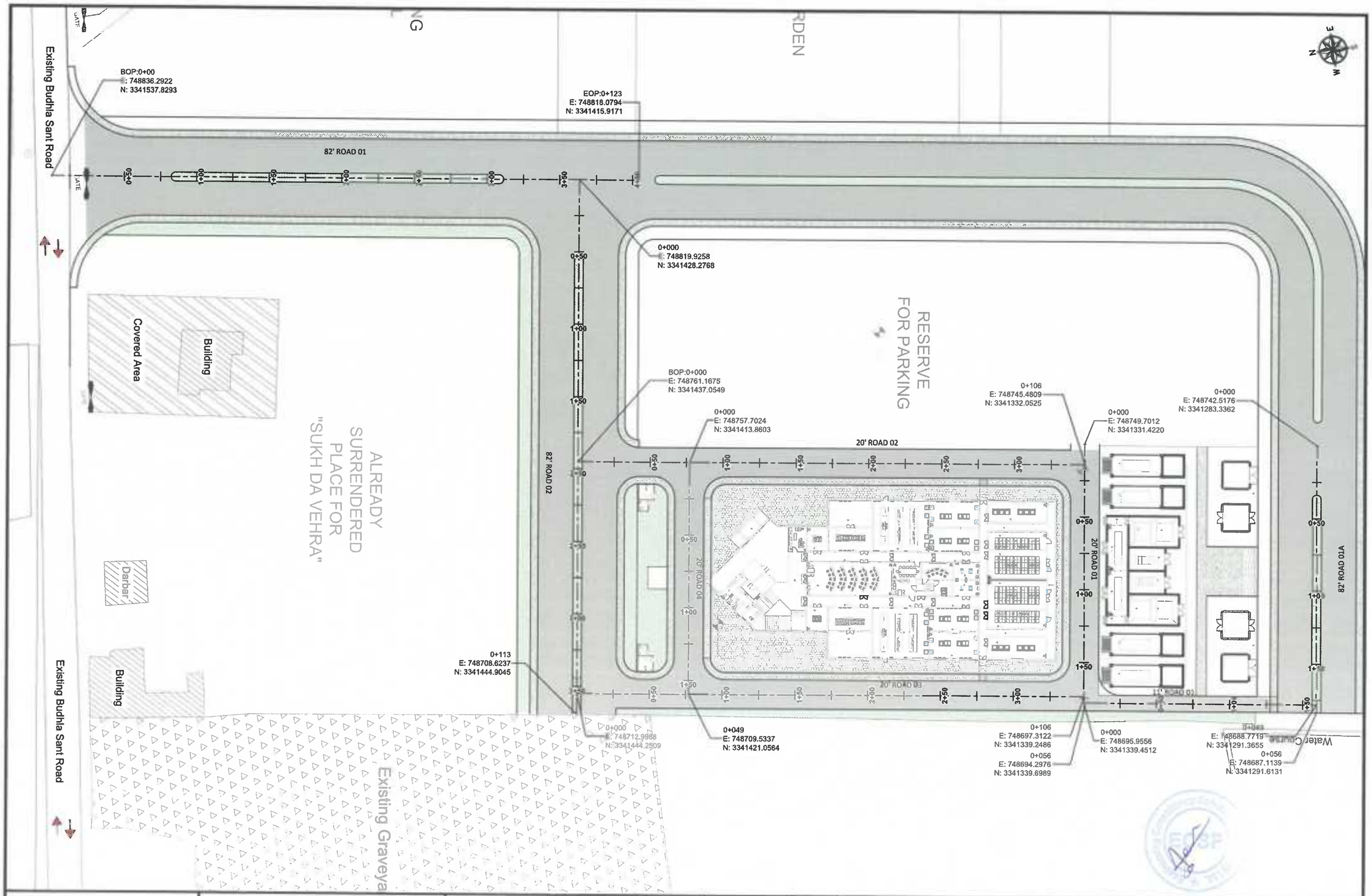
TENDER DRAWING
NOT FOR CONSTRUCTION

DRAWING TITLE:
DESIGN CRITERIA

DRAWING NO:
HWY-DC-001

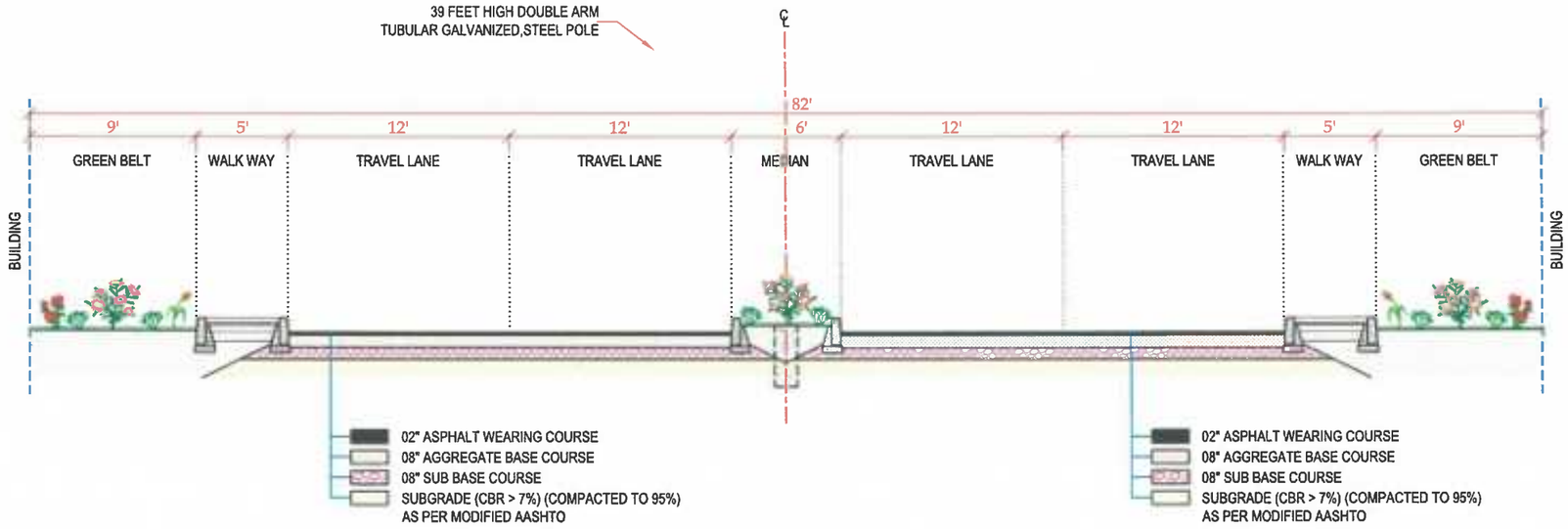
SCALE: N.T.S
SHEET: A3

| REV. | DESCRIPTION | SIGN. | DATE |
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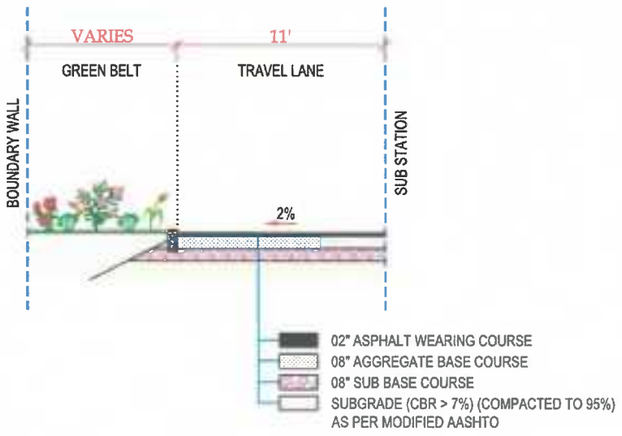



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CLIENT:** PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: | USMAN MUSTAFA | | TENDER DRAWING NOT FOR CONSTRUCTION | DRAWING NO: HWY-RNP-01 |
| | | | DESIGNED BY: | ENGR. SALMAN SHAKEEL | | DRAWING TITLE: ROAD NETWORK PLAN | SCALE: H : 1"=60' / SHEET: A3 |
| | | | CHECKED BY: | ENGR. HUMAYON | | | |
| | | | APPROVED BY: | ENGR. HUMAYON | | | |
| | | | DATE: | AUGUST, 2026 | | | |

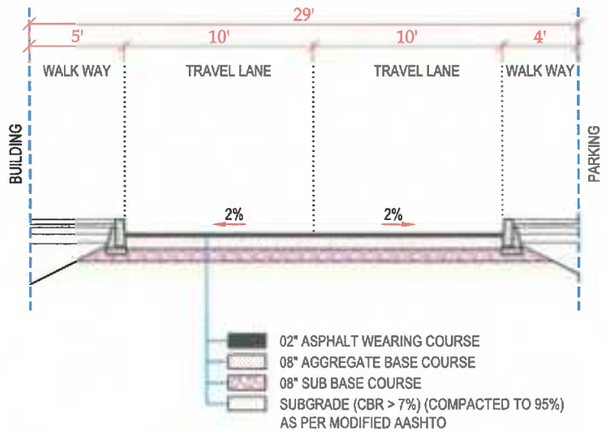
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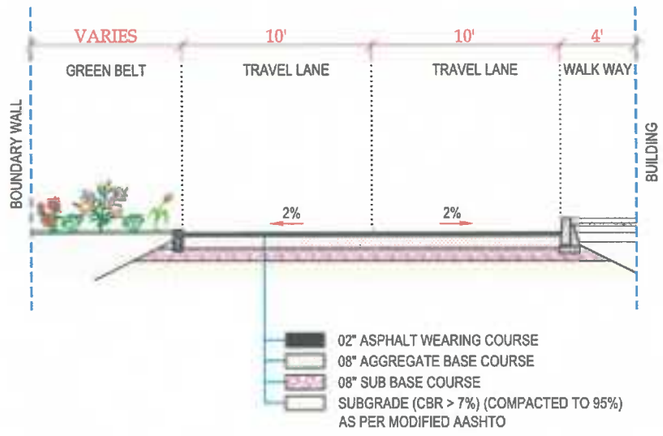

**TYPICAL CROSS SECTION R.O.W 82' ROAD**




**TYPICAL CROSS SECTION 11' WIDE ROAD**




**TYPICAL CROSS SECTION R.O.W 29' ROAD**




**TYPICAL CROSS SECTION R.O.W 29' ROAD**

**NOTE**

1. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED.
2. THE PROVIDED PAVEMENT DESIGN IS TENTATIVE AND WILL BE REVISED AFTER DETAILED GEOTECHNICAL INVESTIGATIONS ACCORDINGLY

| | | | |
|---|---|---|---|
| **CLIENT:** | **CONSULTANTS:** | **PROJECT:** | |
| PUNJAB INFORMATION TECHNOLOGY BOARD (PITB)<br>LAHORE | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | |

| | | |
|---|---|---|
| DRAWN BY: | USMAN MUSTAFA | |
| DESIGNED BY: | ENGR. SALMAN SHAKEEL | |
| CHECKED BY: | ENGR. HUMAYON | |
| APPROVED BY: | ENGR. HUMAYON | |
| DATE: | AUGUST, 2026 | |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

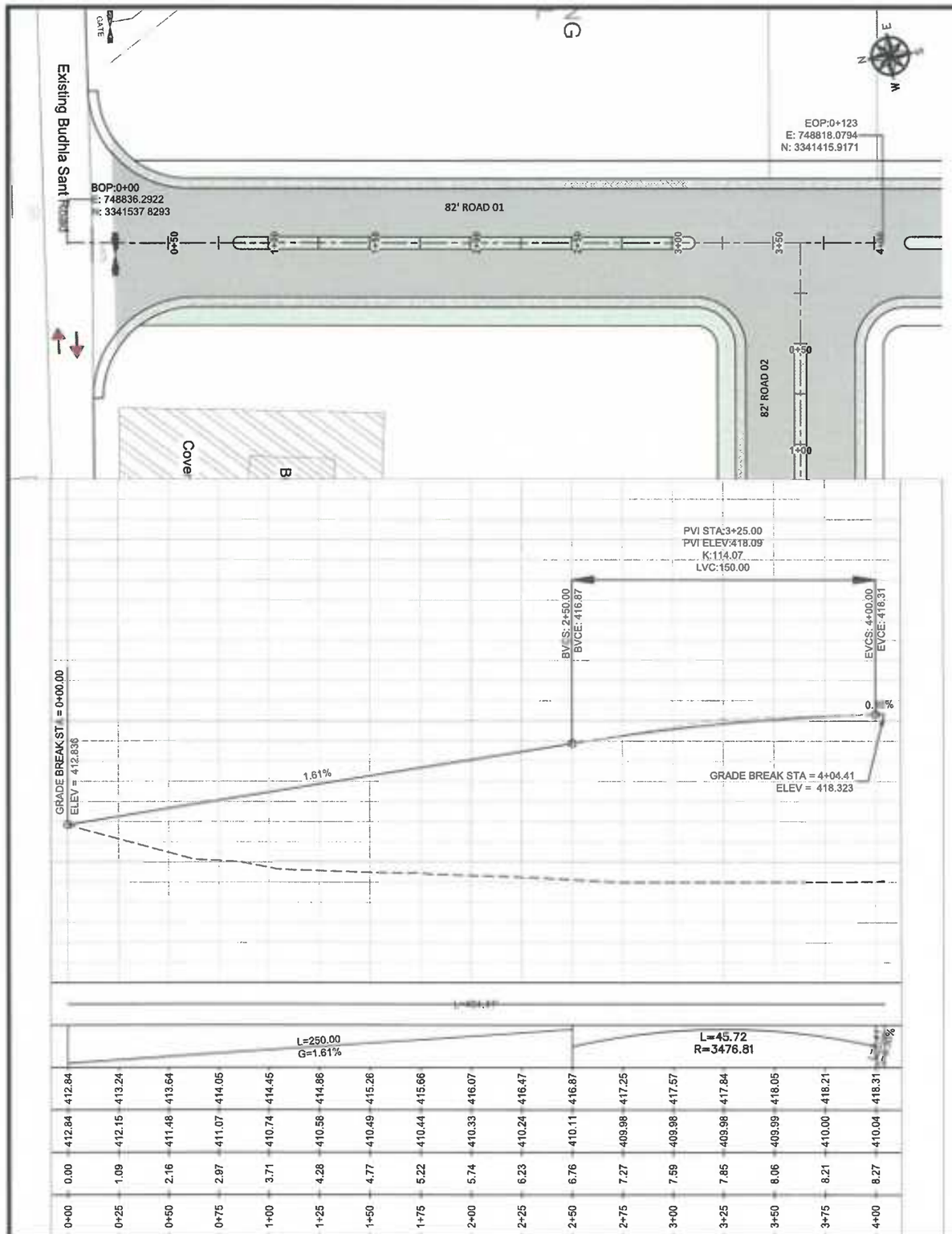
DRAWING TITLE:
**TYPICAL CROSS SECTION MAIN CARRAGEWAY & LINK ROADS**

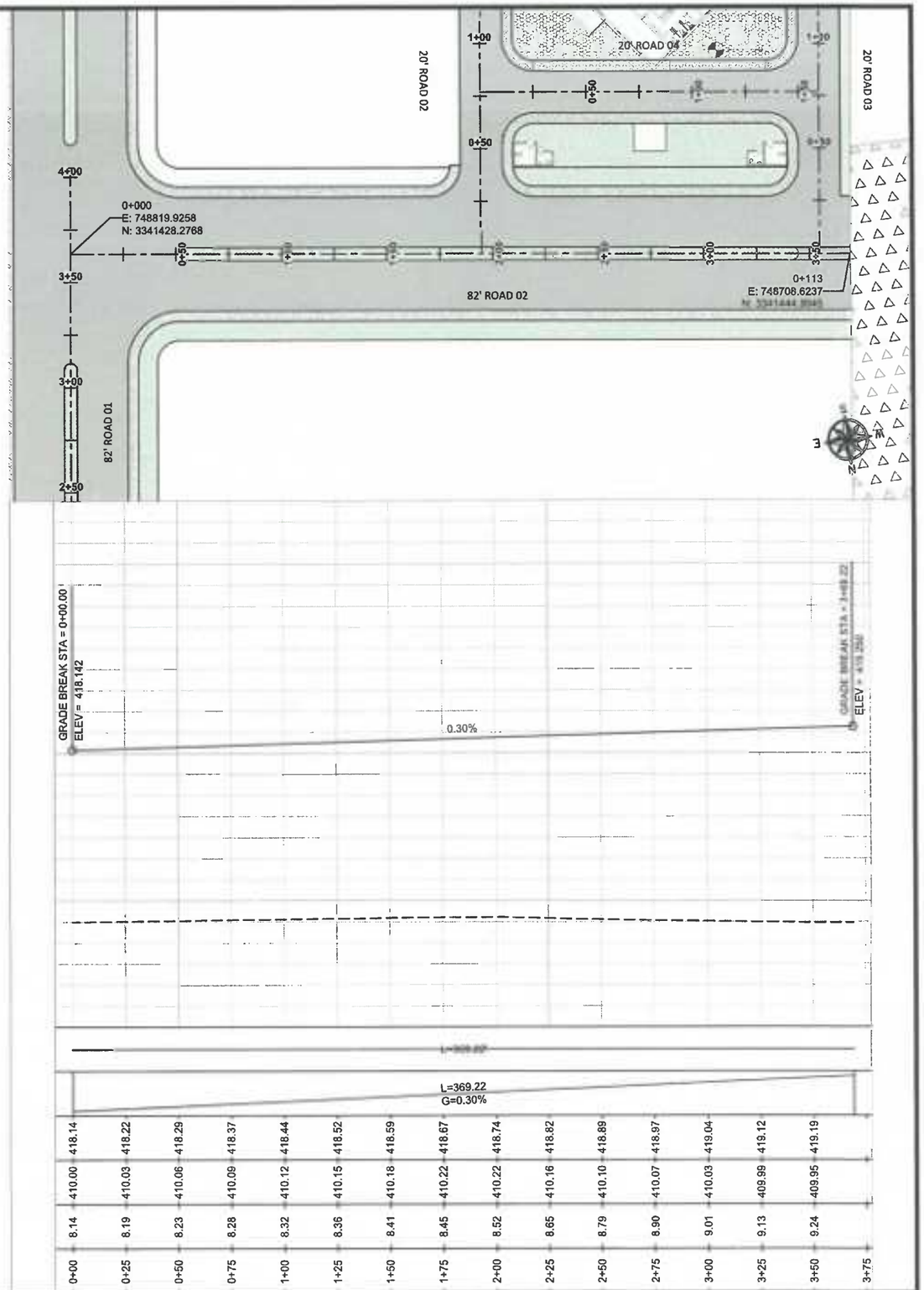
DRAWING NO: HWY-XS-001

SCALE: N.T.S

SHEET: A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| 01 | REVISED AS PER SITE REQUIREMENT | | 10-AUG-2026 |




**CLIENT:**
PUNJAB INFORMATION TECHNOLOGY BOARD (PITB)
LAHORE

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | | |
|---|---|---|
| DRAWN BY: | USMAN MUSTAFA | |
| DESIGNED BY: | ENGR. SALMAN SHAKEEL | |
| CHECKED BY: | ENGR. HUMAYON | |
| APPROVED BY: | ENGR. HUMAYON | |
| DATE: | AUGUST, [illegible] | |

TENDER DRAWING
NOT FOR CONSTRUCTION

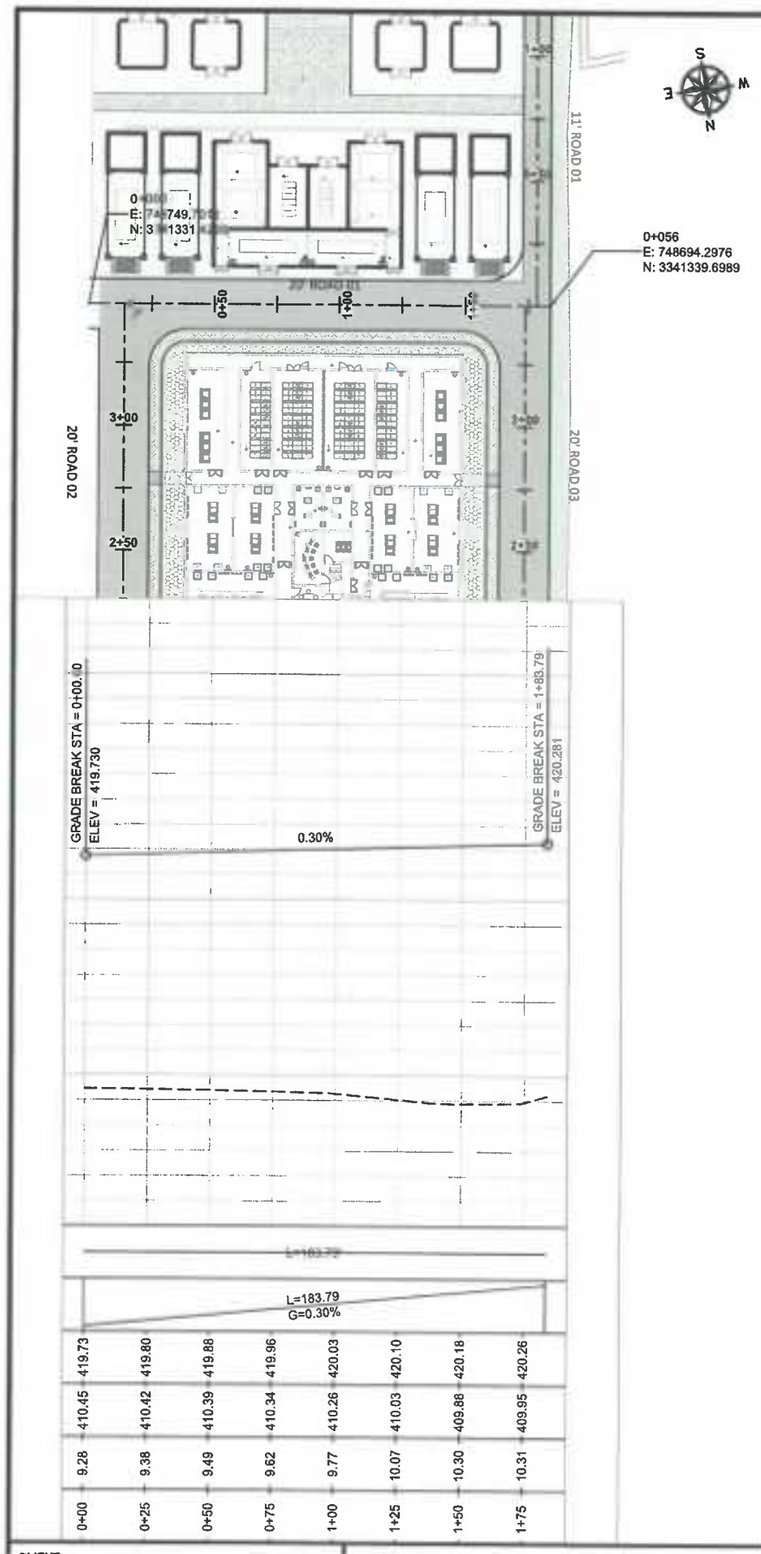
**DRAWING TITLE:**
82FT ROAD 01
00+00 TO 4+04.41
82FT ROAD 02
00+00 TO 3+69.22

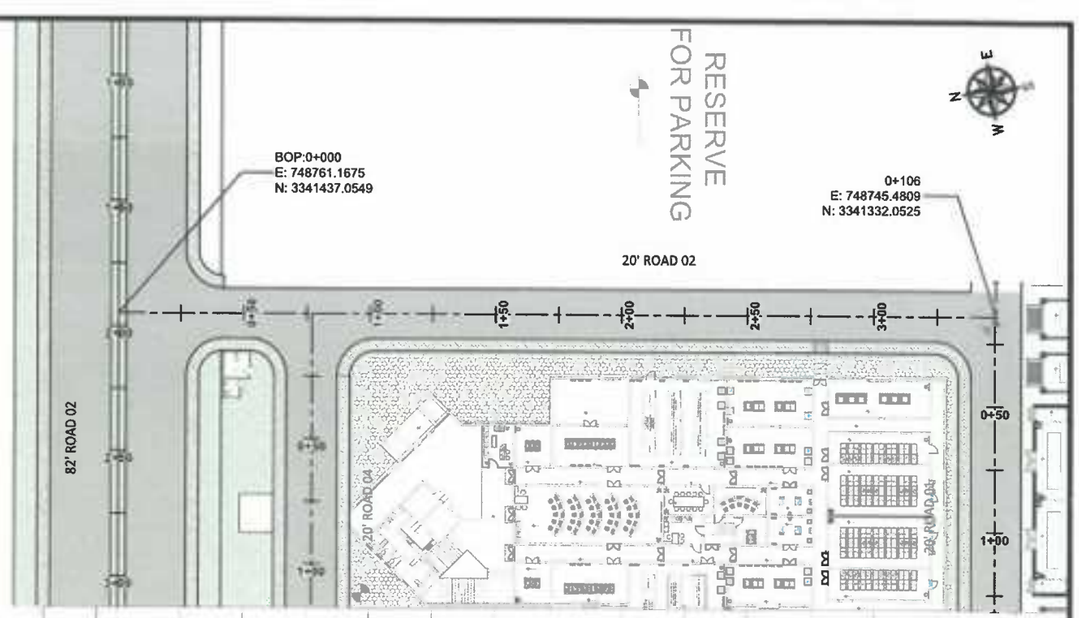
**DRAWING NO:** HWY-PP-01

**SCALE:** V : 1"=6' H : 1"=60'

**SHEET:** A3

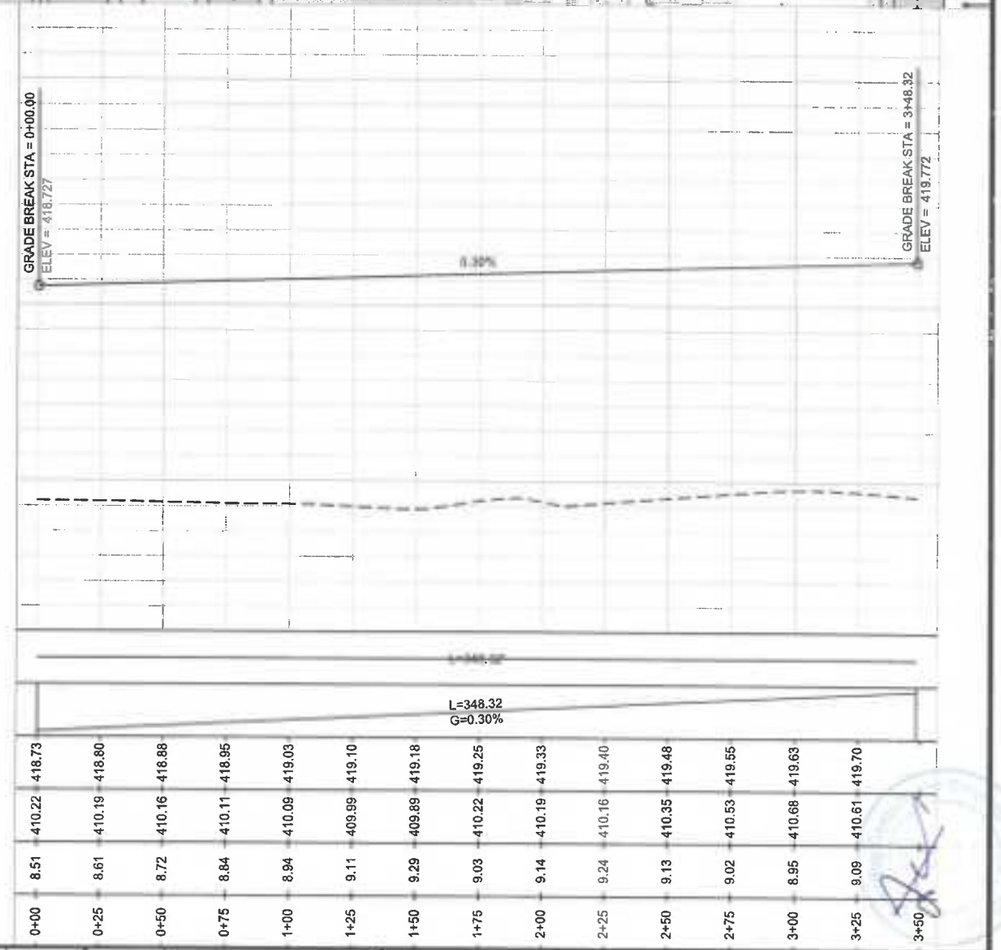
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |










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ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

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| DESIGNED BY: | ENGR. SALMAN SHAKEEL |
| CHECKED BY: | ENGR. HUMAYON |
| APPROVED BY: | ENGR. HUMAYON |
| DATE: | AUGUST, 2026 |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

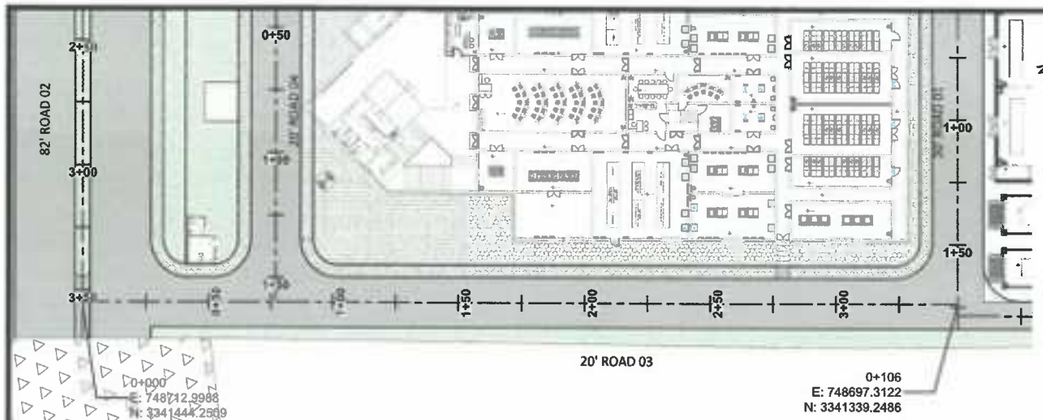
**DRAWING TITLE:**
20FT ROAD 01
00+00 TO 1+83.79
20FT ROAD 02
00+00 TO 3+48.32

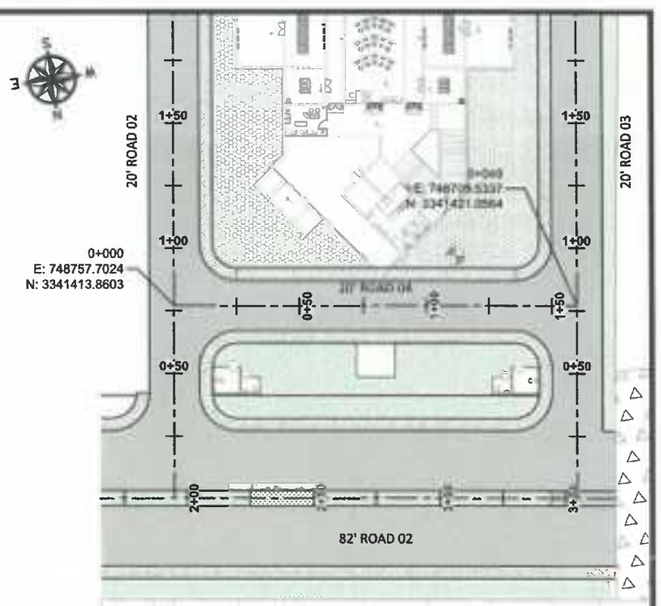
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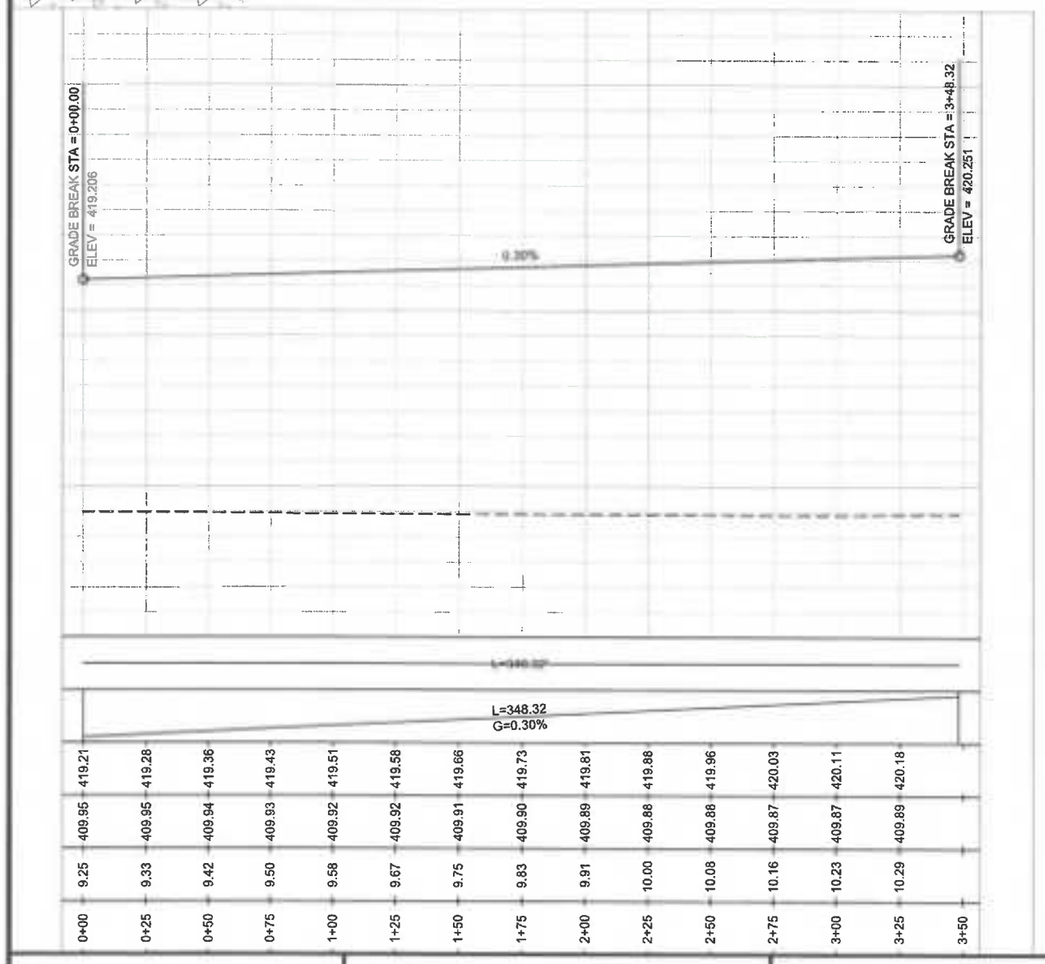
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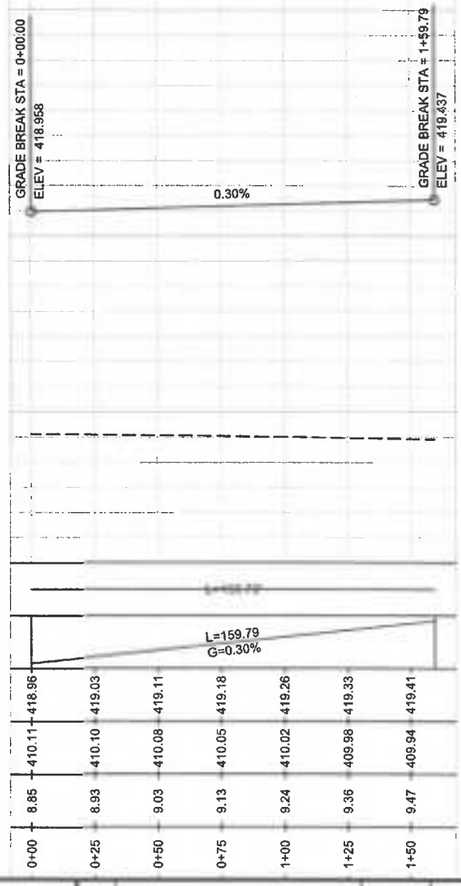
**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

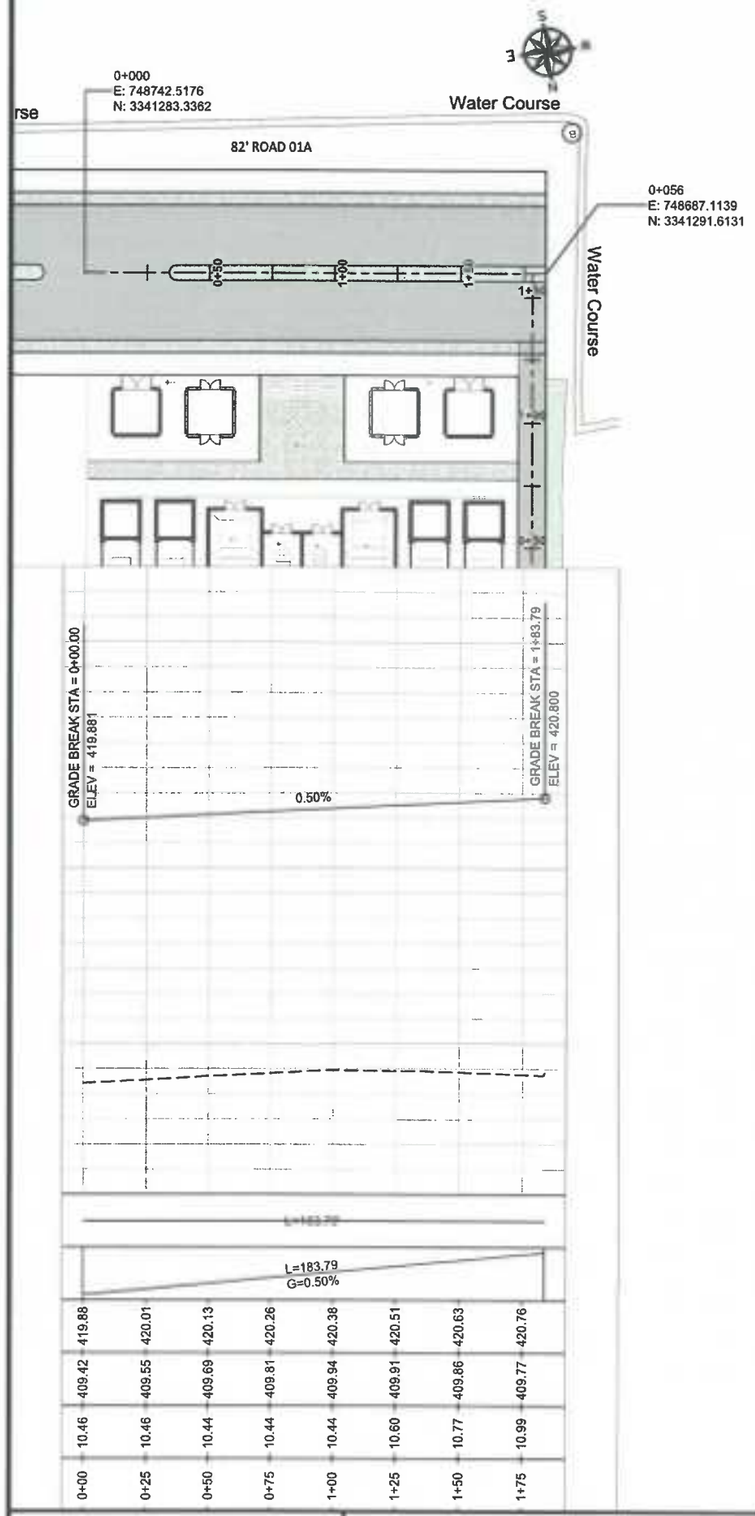


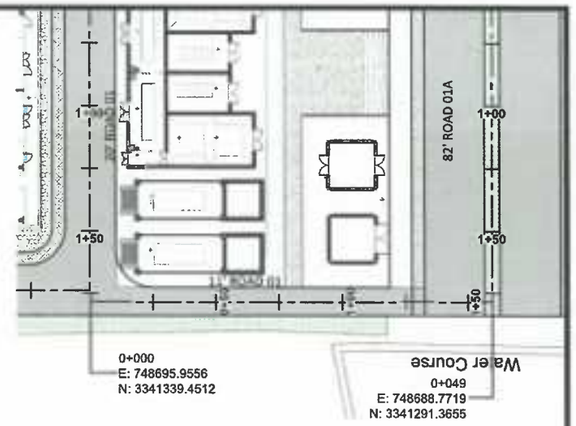



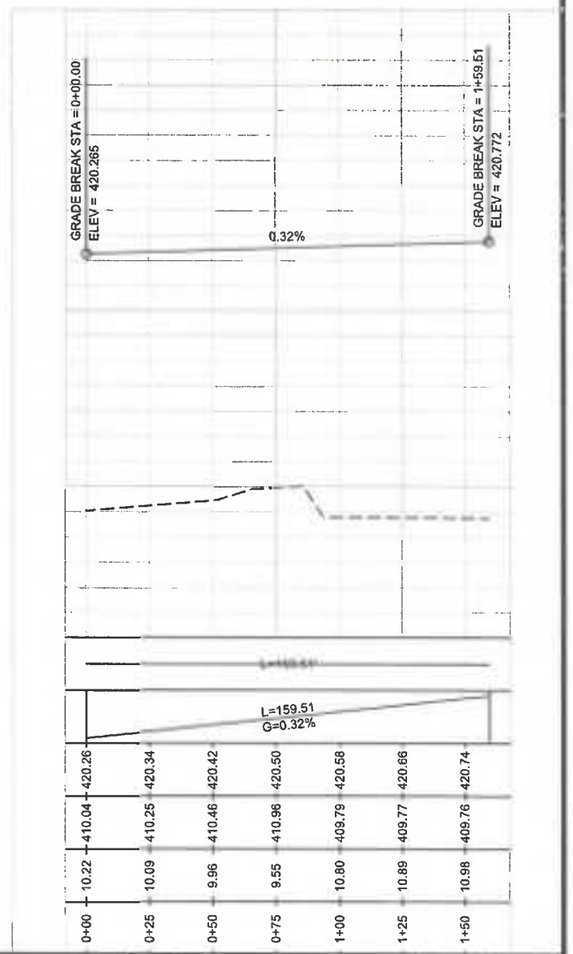




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CLIENT:** PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: USMAN MUSTAFA<br>DESIGNED BY: ENGR. SALMAN SHAKEEL<br>CHECKED BY: ENGR. HUMAYON<br>APPROVED BY: ENGR. HUMAYON<br>DATE: AUGUST, 2026 | **TENDER DRAWING**<br>**NOT FOR CONSTRUCTION**<br>**DRAWING TITLE:** 20FT ROAD 03 00+00 TO 3+48.32<br>20FT ROAD 04 00+00 TO 1+59.79 | **DRAWING NO:** HWY-PP-03<br>**SCALE:** V : 1"=6' H : 1"=60'<br>**SHEET:** A3 | REV. / DESCRIPTION / SIGN. / DATE | |




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CLIENT:** PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: | USMAN MUSTAFA | | **TENDER DRAWING** NOT FOR CONSTRUCTION | **DRAWING NO:** HWY-PP-04 |
| | | | DESIGNED BY: | ENGR. SALMAN SHAKEEL | | **DRAWING TITLE:** 82FT ROAD 01A 00+00 TO 1+83.79 11FT ROAD 01 00+00 TO 1+59.51 | |
| | | | CHECKED BY: | ENGR. HUMAYON | | | |
| | | | APPROVED BY: | ENGR. HUMAYON | | **SCALE:** V : 1"=6' H : 1"=60' | **SHEET:** A3 |
| | | | DATE: | AUGUST, 2026 | | | |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
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# CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

# DATA CENTER

## ELECTRICAL TENDER DRAWINGS

Aug 27, 2026



DESIGN & RESIDENT SUPERVISION CONSULTANT:


**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
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CLIENT:

**PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) | LAHORE**

## LIST OF DRAWINGS (ELECTRICAL)

| SR NO. | DRAWING TITLE | DRAWING NO. |
|---|---|---|
| 01 | LIST OF DRAWING | PITB-MB-MUL-04-ELE00 |
| 02 | ELECTRICAL LEGEND & GENERAL NOTES | PITB-MB-MUL-04-ELE01 |
| 03 | ELECTRICAL MASTER PLAN | PITB-MB-MUL-04-ELE02 |
| | LIGHTING LAYOUT | |
| 04 | BASEMENT FLOOR PLAN LIGHTING & POWER LAYOUT | PITB-MB-MUL-04-ELE03 |
| 05 | MASTER GROUND FLOOR PLAN LIGHTING LAYOUT | PITB-MB-MUL-04-ELE04 |
| 06 | GROUND FLOOR PLAN-A LIGHTING LAYOUT | PITB-MB-MUL-04-ELE05 |
| 07 | GROUND FLOOR PLAN-B LIGHTING LAYOUT | PITB-MB-MUL-04-ELE06 |
| 08 | GROUND FLOOR PLAN-C LIGHTING LAYOUT | PITB-MB-MUL-04-ELE07 |
| 09 | MASTER ELECTRICAL SUBSTATION LIGHTING LAYOUT | PITB-MB-MUL-04-ELE08 |
| 10 | ELECTRICAL SUBSTATION A LIGHTING LAYOUT | PITB-MB-MUL-04-ELE09 |
| 11 | ELECTRICAL SUBSTATION B LIGHTING LAYOUT | PITB-MB-MUL-04-ELE10 |
| | POWER LAYOUT | |
| 12 | MASTER GROUND FLOOR PLAN POWER LAYOUT | PITB-MB-MUL-04-ELE11 |
| 13 | GROUND FLOOR PLAN-A POWER LAYOUT | PITB-MB-MUL-04-ELE12 |
| 14 | GROUND FLOOR PLAN-B POWER LAYOUT | PITB-MB-MUL-04-ELE13 |
| 15 | GROUND FLOOR PLAN-C POWER LAYOUT | PITB-MB-MUL-04-ELE14 |
| 16 | MASTER ELECTRICAL SUBSTATION POWER LAYOUT | PITB-MB-MUL-04-ELE15 |
| 17 | ELECTRICAL SUBSTATION A POWER LAYOUT | PITB-MB-MUL-04-ELE16 |
| 18 | ELECTRICAL SUBSTATION B POWER LAYOUT | PITB-MB-MUL-04-ELE17 |
| | POWER AC LAYOUT | |
| 19 | MASTER GROUND FLOOR PLAN POWER AC LAYOUT | PITB-MB-MUL-04-ELE18 |
| 20 | GROUND FLOOR PLAN-A POWER AC LAYOUT | PITB-MB-MUL-04-ELE19 |
| 21 | GROUND FLOOR PLAN-B POWER AC LAYOUT | PITB-MB-MUL-04-ELE20 |
| 22 | GROUND FLOOR PLAN-C POWER AC LAYOUT | PITB-MB-MUL-04-ELE21 |
| 23 | ROOF TOP PLANPOWER LAYOUT (AC OUTDOOR) | PITB-MB-MUL-04-ELE22 |
| 24 | MASTER ELECTRICAL SUBSTATION POWER LAYOUT | PITB-MB-MUL-04-ELE23 |
| 25 | ELECTRICAL SUBSTATION A POWER AC LAYOUT | PITB-MB-MUL-04-ELE24 |
| 26 | ELECTRICAL SUBSTATION B POWER AC LAYOUT | PITB-MB-MUL-04-ELE25 |
| | FIRE ALARM SYSTEM LAYOUT | |
| 27 | MASTER GROUND FLOOR PLAN FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE26 |
| 28 | GROUND FLOOR PLAN-A FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE27 |
| 29 | GROUND FLOOR PLAN-B FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE28 |
| 30 | GROUND FLOOR PLAN-C FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE29 |
| 31 | MASTER ELECTRICAL SUBSTATION FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE30 |
| 32 | ELECTRICAL SUBSTATION A FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE31 |
| 33 | ELECTRICAL SUBSTATION B FIRE ALARM SYSTEM LAYOUT | PITB-MB-MUL-04-ELE32 |

| SR NO. | DRAWING TITLE | DRAWING NO. |
|---|---|---|
| | DATA & TELEPHONED | |
| 34 | MASTER GROUND FLOOR PLAN DATA & TELEPHONED LAYOUT | PITB-MB-MUL-04-ELE33 |
| 35 | GROUND FLOOR PLAN-A DATA & TELEPHONED LAYOUT | PITB-MB-MUL-04-ELE34 |
| 36 | GROUND FLOOR PLAN-B DATA & TELEPHONED LAYOUT | PITB-MB-MUL-04-ELE35 |
| | CCTV SYSTEM | |
| 37 | MASTER GROUND FLOOR PLAN CCTV SYSTEM LAYOUT | PITB-MB-MUL-04-ELE36 |
| 38 | GROUND FLOOR PLAN-A CCTV SYSTEM LAYOUT | PITB-MB-MUL-04-ELE37 |
| 39 | GROUND FLOOR PLAN-B CCTV SYSTEM LAYOUT | PITB-MB-MUL-04-ELE38 |
| | SINGLE LINE DIAGRAM | |
| 40 | LT PANEL-DATA CENTER ZONE-A&B SINGLE LINE DIAGRAM | PITB-MB-MUL-04-ELE39 |
| 41 | LT PANEL-DATA CENTER ZONE-A SINGLE LINE DIAGRAM | PITB-MB-MUL-04-ELE40 |
| 42 | LT PANEL-DATA CENTER ZONE-B SINGLE LINE DIAGRAM | PITB-MB-MUL-04-ELE41 |
| | SCHEDULE | |
| 43 | DBLP BF SCHEDULE BASEMENT FLOOR PLAN | PITB-MB-MUL-04-ELE42 |
| 44 | DBLPA1 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE43 |
| 45 | DBLPA2 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE44 |
| 46 | DBLPA3 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE45 |
| 47 | DBLPA4 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE46 |
| 48 | DBLPA S1 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE47 |
| 49 | DBACA1 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE48 |
| 50 | DBACA2 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE49 |
| 51 | DBAC3 (1) SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE50 |
| 52 | DBAC3 (2) SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE51 |
| 53 | DBAC3 (3) SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE52 |
| 54 | DBACA4 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE53 |
| 55 | DBLPB1 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE54 |
| 56 | DBLPB2 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE55 |
| 57 | DBLPB3 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE56 |
| 58 | DBACB3 (1) SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE57 |
| 59 | DBLPB4 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE58 |
| 60 | DBACB1 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE59 |
| 61 | DBACB2 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE60 |
| 62 | DBACB3 (2) SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE61 |
| 63 | DBACB3 (3) SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE62 |
| 64 | DBACB4 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE63 |
| 65 | DBLPA S2 SCHEDULE GROUND FLOOR PLAN | PITB-MB-MUL-04-ELE64 |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

LIST OF DRAWINGS

PITB-MB-MUL-04-ELE00

TENDER DRAWINGS

## LIGHT

| S.N | DESCRIPTION | SYMBOLS | MOUNTING HEIGHT |
|---|---|---|---|
| 1 | EXHAUST FAN 12" (PLASTIC) | | H=8'-0"/AFFL |
| 2 | RECESSED PVC CONDUIT SIZE 1" DIA | | RECESSED IN SLAB |
| 3 | DISTRIBUTION BOX (DB) | | ON WALL AT 4' F.F.L |
| 4 | 5A, 220V, ONE WAY, MULTI GANG SWITCH " /6 " INDICATES NUMBER OF SWITCHES | (01-6) | H=4'-0"/AFFL |
| 5 | 5A, 220V, TWO WAY, MULTI GANG SWITCH " /1 " INDICATES NUMBER OF SWITCHES | (01-1) | H=4'-0"/AFFL |
| 6 | 5A, 220V, ONE WAY, MULTI GANG SWITCH WITH REGULATOR | | H=4'-0"/AFFL |
| 7 | WIDE BATTEN LIGHT SURFACE / CEILING MOUNTED 36W | | |
| 8 | VANITY LED LIGHT 7W | | 8" ABOVE MIRROR |
| 9 | LED DOWN LIGHT 12W | | RECESSED MOUNTED |
| 10 | LED DOWN LIGHT 15W | | RECESSED MOUNTED |
| 11 | CEILING FAN | | |
| 12 | LED PANEL LIGHT 2 X 2 FT | | |

## POWER

| | | | |
|---|---|---|---|
| 13 | RECESSED PVC CONDUIT SIZE 1" DIA | | |
| 14 | DISTRIBUTION BOX (DB) | | N WALL AT 4' F.F.L |
| 15 | MULTI STANDARD UNIVERSAL SOCKET 13 AMPS | | ON WALL AT 2' F.F.L |
| 16 | MULTI STANDARD UNIVERSAL SOCKET 15 AMPS | | ON WALL AT 2' F.F.L |
| 17 | FLOOR STANDING AC | | |
| 18 | 20 AMPS DOUBLE POLE SWITCH (FOR AC) | | AT AC INDOOR UNIT LEVEL |
| 19 | AC EVAPORATOR UNIT | | WALL MOUNTED |
| 20 | DISCONNECT LINK | | |
| 21 | 1Cx70 mm² COPPER CONDUCTOR XLPE BURIAL 600 BELOW GRID | | |
| 22 | COMPLETE WITH EARTHING PIT 450X450X600MM DEEP & OPENABLE WATER TIGHT COVER | | |
| 23 | MANHOLE 600mm x 600mm | | |
| 24 | ELECTRICAL CABLES TRENCH (3'-0" x3'-0") | | |
| 25 | UPVC 225mm DIA PIPE DUCT | | |

## FIRE ALARM SYSTEM

| | | | |
|---|---|---|---|
| 26 | SMOKE DETECTOR | SD | |
| 27 | HEAT DETECTOR | HD | |
| 28 | MANUAL CALL POINT | | |
| 29 | VESDA VEP | VESDA VEP | |
| 30 | SENSOR POINT | S | |
| 31 | SOUNDER | | |
| 32 | FIRE ALARM CONTROL PANEL | FACP | |
| 33 | RECESSED PVC CONDUIT 1" DIA | | |

## ELV SYSTEM

| | | | |
|---|---|---|---|
| 34 | DATA CABINET | | |
| 35 | TELEPHONE CABINET | | |
| 36 | CCTV CABLE CAT-6 | | |
| 37 | TELEPHONE OUTLET | | |
| 38 | DATA OUTLET | | |
| 39 | WIRELESS ACCESS POINT (WAP) | | |
| 40 | THUMB PAD/ KEYPAD/ FACIAL RECOGNITION PAD | | |
| 41 | ELECTROMAGNET LOCK | | |

## CCTV NETWORK

| | | | |
|---|---|---|---|
| 42 | FIXED BULLET CAMERA | | ON WALL AT 8' F.F.L |
| 43 | DOME CAMERA | | |
| 44 | CCTV CABINET | | |
| 45 | CCTV CABLE CAT-6 | | |

## SLD SYMBOL

| | | |
|---|---|---|
| 46 | PHASE INDICATION LED LIGHTS | R Y B |
| 47 | DIGITAL TYPE VOLTMETER | V |
| 48 | DIGITAL TYPE AMMETER | A |
| 49 | SELECTOR SWITCH | |
| 50 | FUSE | |
| 51 | SURGE PROTECTOR | |
| 52 | GENERATOR | G |
| 53 | BRASS CABLE GLAND | |
| 54 | DO ACB | |
| 55 | MOLDED CASE CIRCUIT BREAKER | |
| 56 | EARTH CONNECTING POINT | ECP: |
| 57 | CURRENT TRANSFORMERS | CTS: |
| 58 | KILO VOLT AMPERE | kA: |

### CAPACITY OF CONDUITS

| S.No | CAPACITY OF CONDUITS: NOMINAL CONDUCTOR SIZE-mm sq | NO. & DIA OF WIRES | OVER ALL DIAMETER | MAXIMUM NUMBER OF CABLES IN PVC CONDUITS SIZES: 3/4" DIA (20mm DIA) | 1" DIA (25mm DIA) | 1 1/4" DIA (32mm DIA) |
|---|---|---|---|---|---|---|
| 1 | 1.5 | 1/ 1.38 | 3.1 | 10 | 18 | 30 |
| 2 | 2.5 | 1/ 1.78 | 3.5 | 6 | 14 | 25 |
| 3 | 2.5 | 7/ 0.67 | 3.8 | 7 | 12 | 20 |
| 4 | 4 | 7/ 0.85 | 4.3 | 5 | 9 | 15 |
| 5 | 6 | 7/ 1.04 | 4.9 | 4 | 7 | 12 |
| 6 | 10 | 7/ 1.35 | 6.2 | - | 4 | 7 |
| 7 | 16 | 7/ 1.78 | 7.3 | - | 3 | 5 |
| 8 | 16 | 7/ 2.14 | 9.0 | - | 2 | 3 |
| 9 | 25 | 19 / 1.33 | 10.3 | - | - | 2 |

GENERAL NOTES:

**A LEGEND**

A 1 REFER TO LEGEND FOR THOSE SYMBOLS ONLY MENTIONED ON ALL LAYOUT PLANS. OTHER SYMBOLS SHOWN IN LEGEND BUT NOT ACTUALLY SHOWN ON LAYOUT DRAWINGS MAY PLEASE BE IGNORED.

**B ELECTRICAL WORKS**

B 1 THE FOLLOWING NOTES SHALL IN GENERAL APPLY TO ALL ELECTRICAL DRAWINGS. THE INSTRUCTIONS IN THESE NOTES SHALL BE FOLLOWED UNLESS ALL ELECTRICAL WORKS PERTAINING TO WIRING OF ELECTRICAL SYSTEMS SHALL STRICTLY CONFORM TO I.E.E LATEST EDITION OF RULES & REGULATIONS.

**2 ELECTRICAL DRAWINGS**

ALL ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH BOQ, TECHNICAL SPECIFICATIONS AND IN CO-ORDINATION WITH ARCHITECTURAL, STRUCTURAL, PLUMBING AND HVAC DRAWINGS.

**3 DIMENSIONS ON ELECTRICAL PLANS**

ALL DIMENSIONS IF SHOWN ON THE ELECTRICAL LAYOUT PLANS ARE APPROXIMATE. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO DO ALL NECESSARY CALCULATIONS TO ARRIVE AT THE ACTUAL DIMENSIONS/MEASUREMENTS IN CO-ORDINATION WITH ALL OTHER RELEVANT DRAWINGS OF OTHER SERVICES.

**4 SHOP DRAWINGS**

THE ELECTRICAL CONTRACTOR SHALL PREPARE ELECTRICAL SHOP DRAWINGS WITH ALL NECESSARY RELEVANT DETAILS. THE SHOP DRAWINGS SHALL BE SUBMITTED TO ENGINEER TENDER DRAWING BEFORE THE COMMENCEMENT OF ANY WORKS AT SITE.

**5 CO-ORDINATION**

THE ELECTRICAL CONTRACTOR SHALL DO ALL NECASSARY CO-ORDINATION OF ELECTRICAL WORKS AND ALLIED SYSTEMS WITH ALL OTHER SERVICES AT SITE.

**6 BALANCING OF ELECTRICAL LOADS**

ELECTRICAL LOADS ON ALL 3 PHASES SHALL BE BALANCED ON THE ELECTRICAL WORKS AT THE TIME OF TESTING AND COMMISSIONING OF THE ELECTRICAL INSTALLATIONS.

**7 ELECTRICAL WIRING**

ALL WIRING SHALL BE DONE IN PVC CONDUIT TO BE CONCEALED IN WALLS, SLABS, COLUMNS AND FLOORS OR AS SHOWN ON DRAWINGS.

7.1 WIRING SHOULD BE DONE IN FLEXIBLE CONDUIT AT SPLIT SLAB & FLOOR LEVELS

8 THE WIRING SHOULD BE STARTED ONLY AFTER THE CONDUIT SYSTEM HAS BEEN COMPLETED AND ALL OUTLET BOXES ARE FIXED AT THEIR RESPECTIVE POSITIONS.

**9 PVC CONDUITS**

ALL PVC CONDUIT SHALL BE OF 1" DIA FROM SWITCH BOARD TO LIGHT POINTS & FROM DBs TO SWITCH BOARDS AND POWER SOCKETS OR AS SHOWN ON DRAWINGS.

**10 LUBRICATION**

NO LUBRICATION EXCEPT AS RECOMMENDED BY MANUFACTURER SHALL BE USED FOR PULLING OF WIRES IN PVC CONDUITS. NO OIL OF ANY KIND SHALL BE USED.

**11 COLOUR CODING**

COLOUR CODING FOR WIRING SHALL BE AS FOLLOWS: RED,YELLOW AND BLUE FOR PHASES, BLACK FOR NEUTRAL AND GREEN / YELLOW FOR CPC (EARTH).

**12 SIZE OF WIRES**

FOLLOWING SIZES OF PVC INSULATED WIRES WITH COPPER CONDUCTORS SHALL BE USED FOR INTERNAL WIRING,UNLESS STATED OTHERWISE.

12.1 1.5mm sq PVC INSULATED WIRES SHALL BE USED FROM SWITCH BOARD TO LIGHT POINTS AND 5 Amps SOCKETS OR AS SPECIFIED IN B.O.Q

12.2 2.5mm sq PVC INSULATED WIRES SHALL BE USED FROM DB TO SWITCH BOARDS FOR LIGHTING CIRCUITS.

12.3 4mm sq OR 6mm sq PVC INSULATED WIRES OR AS SHOWN ON DRAWING/BOQ SHALL BE USED FOR WIRING FROM DB TO POWER SOCKETS.

**12.4 BACK BOXES**

ALL BACK BOXES FOR SWITCHES & SOCKETS SHALL MADE OF G.I SHEET 16SWG OR AS SPECIFIED IN BOQ WITH EARTH TERMINAL. SIZE OF BACK BOX SHALL CORRESPOND TO THE SIZE OF SWITCHES/SOCKETS.

**13 EARTHING OF POINTS**

ALL ELECTRICAL AND POWER SOCKETS SHALL BE PROPERLY EARTHED WITH 2.5mm sq PVC INSULATED WIRES OF COLOUR GREEN-YELLOW.

**14 CAPACITY OF CONDUITS**

THE NUMBER OF WIRES TO BE PULLED IN ANY CONDUIT FOR WIRING PURPOSES SHALL CONFORM TO I.E.E RULES & REGULATIONS

**15 CONDUIT FOR LIGHT WIRING**

WIRING SHALL BE DONE IN 1" DIA PVC CONDUIT FOR LIGHT POINTS AND CIRCUIT WIRING ON NORMAL/ GENERATOR SUPPLY OR AS SPECIFIED IN BOQ OR AS SHOWN ON DRAWINGS.

**16 DISTRIBUTION BOARDS "LIGHT" & "POWER"**

ALL DISTRIBUTION BOARDS SHOWN ON DRAWINGS SHALL BE CONCEALED IN WALL & INSTALLED AT 4FT (1000mm) F.F.L OR AS SHOWN IN LEGEND/DRAWINGS.

**C TELEPHONE CONDUIT**

C 1 PVC CONDUIT SHALL BE 1"(25mm) DIA FOR WIRING OF TELEPHONE POINTS,PVC CONDUIT SHALL BE BURIED IN FLOOR /SLAB & WALLS FROM TDBs TO TELEPHONE POINTS, OR AS SHOWN ON DRAWINGS./B.O.Q

**D CLOSE CIRCUIT TV (CCTV) WIRING**

D 1 PVC CONDUIT SHALL BE 1"(25mm) DIA FOR WIRING OF CCTV SYSTEM.PVC CONDUIT SHALL BE BURIED IN SLAB, WALLS & COLUMNS OR AS SHOWN ON DRAWING/BOQ

**2 CLOSE CIRCUIT TV JUNCTION BOX (CCJB)**

G.I JUNCTION BOX 225x150x100mm 16 SWG WITH COVER CONCEALED IN WALL AT 225BELOW SLAB TO FACILITATE PULLING OF CLOSE CIRCUIT TV CABLES.

**E OTHER SYSTEMS**

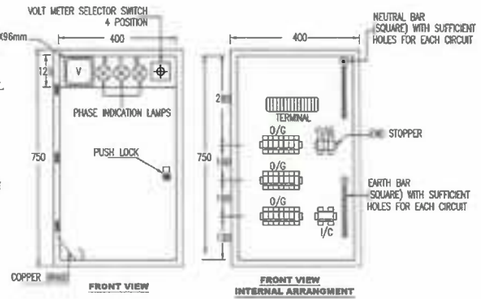
E 1 25mm DIA PVC CONDUIT SHALL BE USED FOR WIRING OF ALL OTHER SYSTEMS UNLESS OTHERWISE MENTIONED ON PLANS OR AS SPECIFIED IN B.O.Q

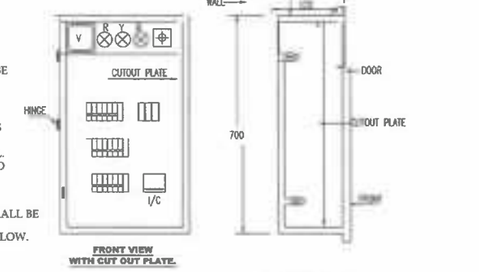
**F ELECTRICAL CONSULTANT**

F 1 ELECTRICAL CONTRACTOR TO CONSULT ELECTRICAL CONSULTANT/ENGINEER FOR ANY FURTHER CLARIFICATIONS. NO ASSUMPTIONS SHOULD BE MADE.

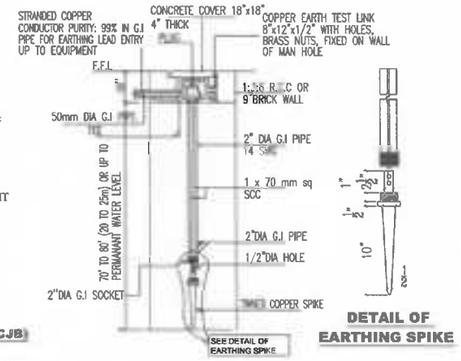
**G ELECTRICAL TESTS**

G 1 CONTRACTOR SHALL CARRY OUT ALL ELECTRICAL TESTS AT HIS EXPENSE THROUGH LICENSED ELECTRICAL SUPERVISOR IN THE PRESENCE OF ENGINEER INCHARGE OR HIS REPRESENTATIVE.




## EARTHING DETAIL




### NOTES FOR EARTHING SYSTEM

1- EARTH BORE SHALL BE MADE AT 6'-0" AWAY FROM FOUNDATION.
2- DISTANCE BETWEEN 2 EARTH BORES SHALL NOT BE LESS THEN 10 ft (3m)
3- COPPER CONDUCTOR AT TOP OF G.I PIPE SHALL BE BOLTED WITH THIMBLES, BRASS NUTS, BOLTS ETC.
4- JOINTS SHALL BE COVERED WITH BITUMEN
5- CONTRACTOR TO MEASURE EARTHING RESISTANCE AT HIS EXPENSE IN THE PRESENCE OF SITE ENGINEER. BOTH THE SITE ENGINEER AND CONTRACTOR SHALL SIGN THE EARTH TESTING RESULT AND SUBMIT IT TO THE CLIENT FOR RECORD.

CLIENT:
Punjab Information Technology Board (PITB) | Lahore

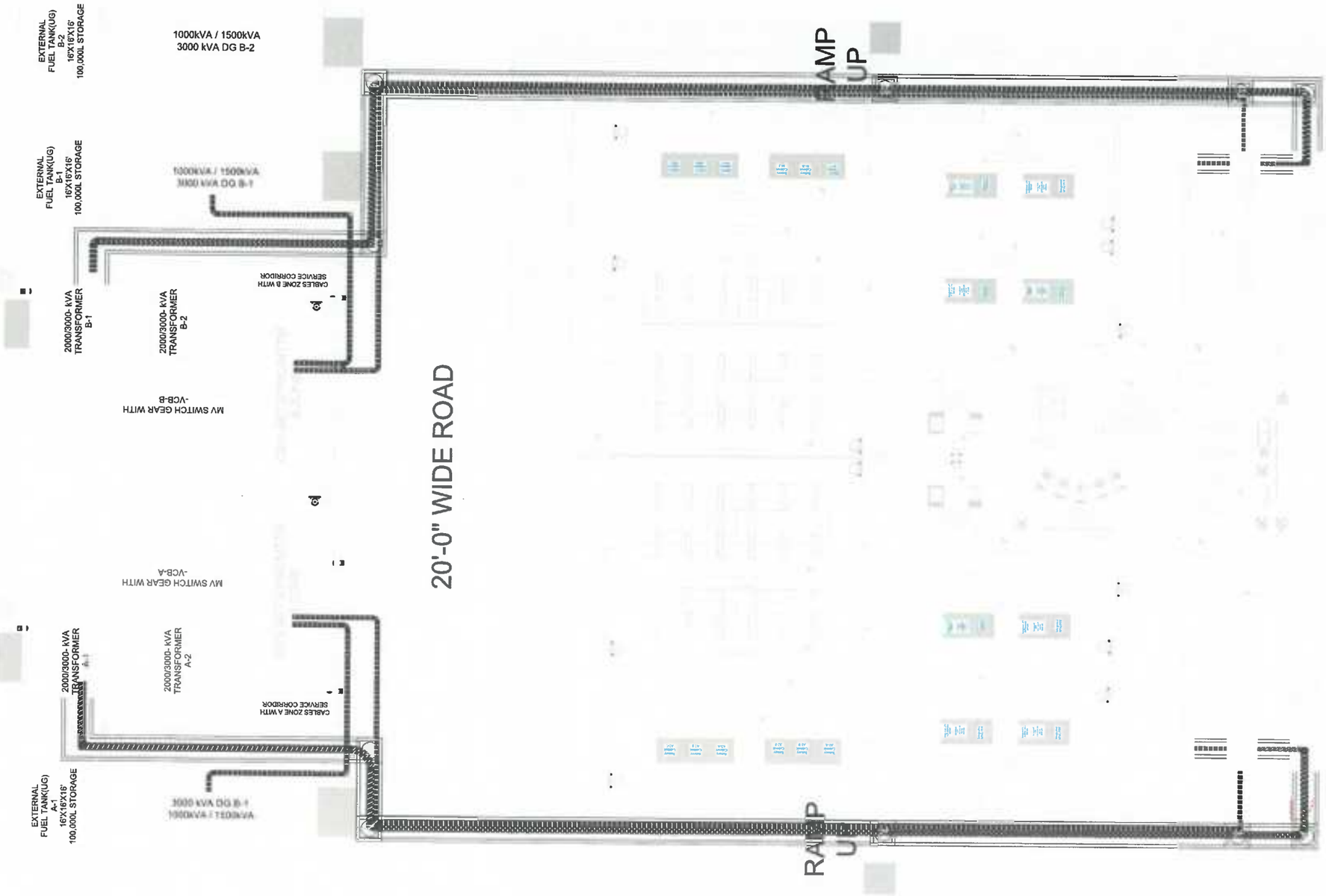
CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

ELECTRICAL LEGEND & GENERAL NOTES

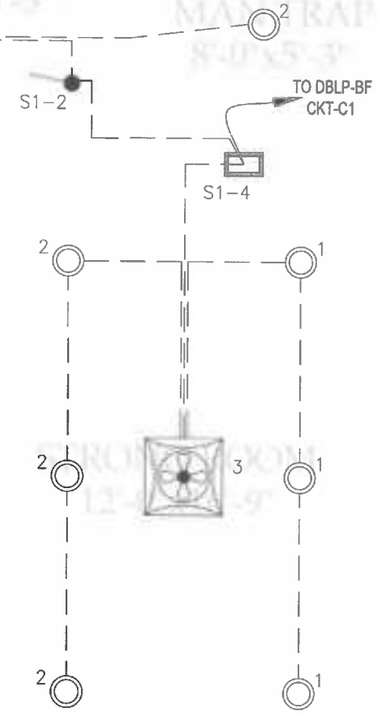
PITB-MB-MUL-04-ELE01

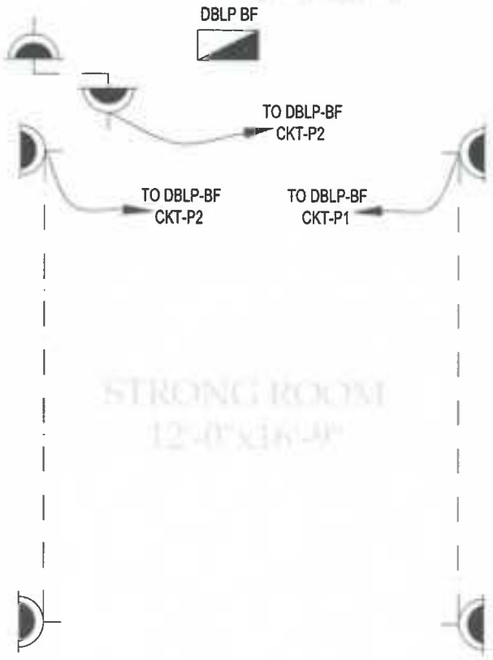
TENDER DRAWINGS

20'-0" WIDE ROAD




| | | | | | | |
|---|---|---|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | | CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | | ELECTRICAL MASTER PLAN | PITB-MB-MUL-04-ELE02 | TENDER DRAWINGS |




| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |
| **DRAWING TITLE:** BASEMENT FLOOR PLAN LIGHTING & POWER LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE03<br>**SCALE:** 1'=1/8" **SHEET:** | **TENDER DRAWINGS** | |

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

PITB-MB-MUL-04-ELE05

PITB-MB-MUL-04-ELE06

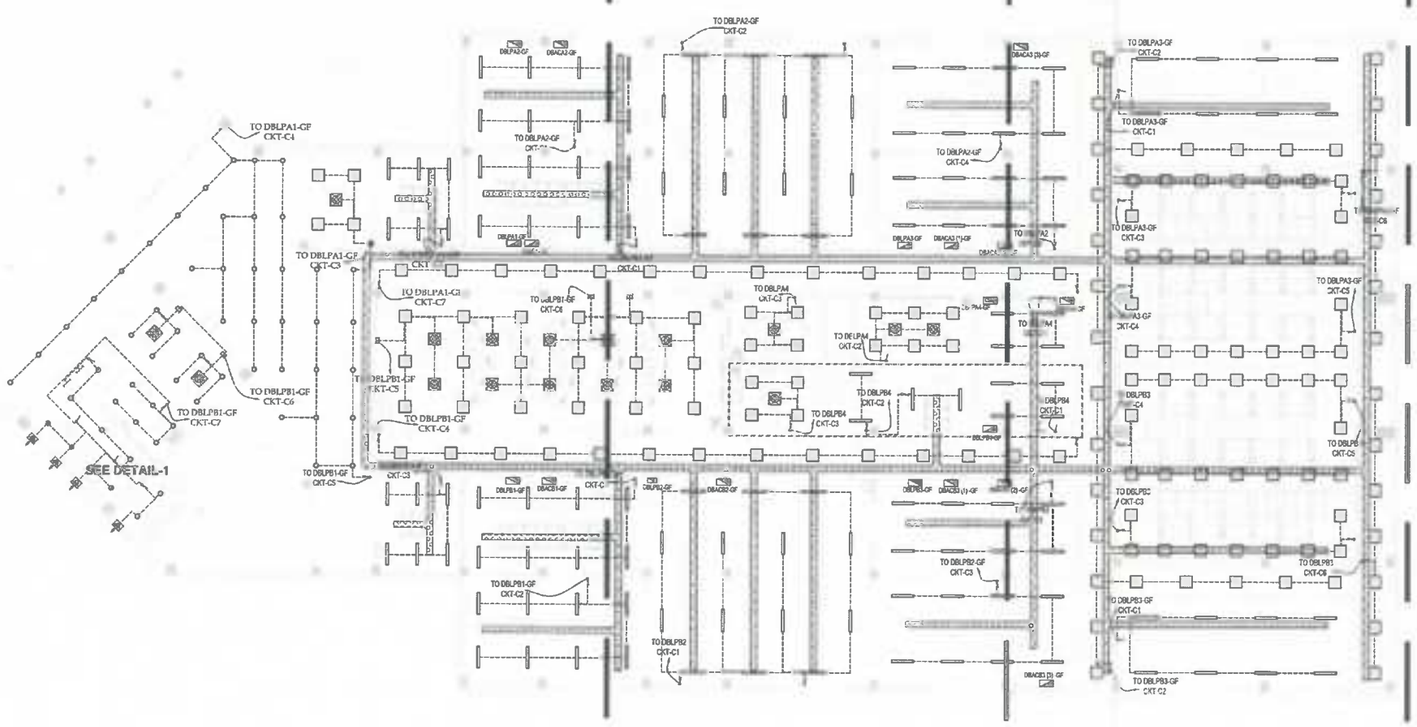
PITB-MB-MUL-04-ELE07

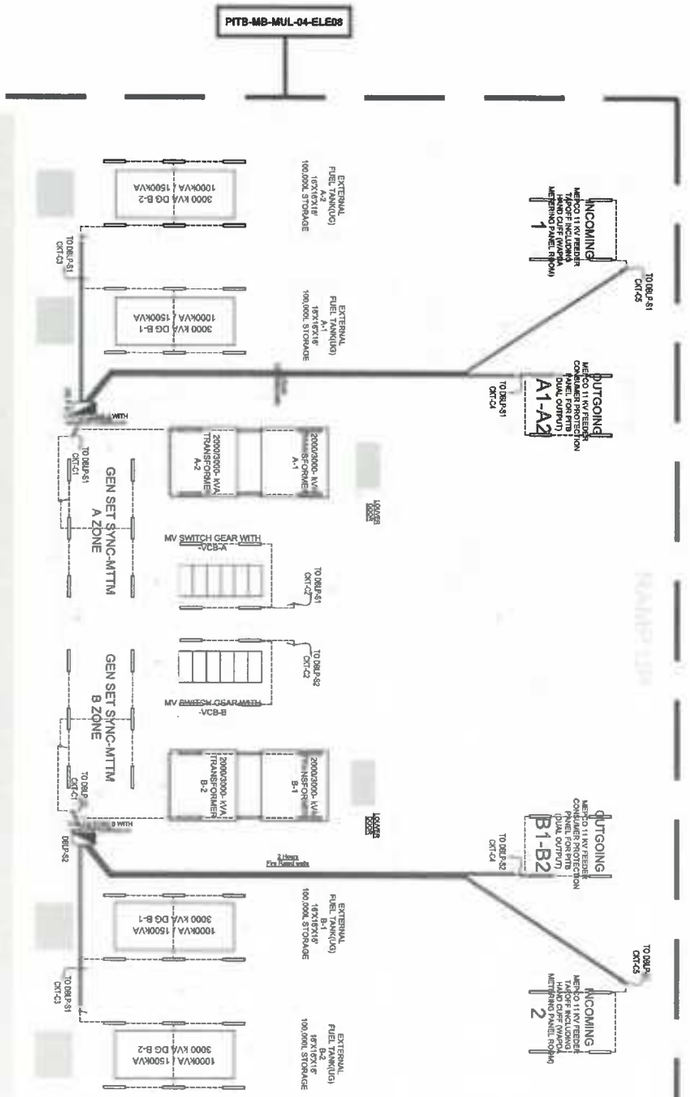
PITB-MB-MUL-04-ELE08

## GROUND FLOOR PLAN-A

## GROUND FLOOR PLAN-B

## GROUND FLOOR PLAN-C




| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) | Lahore | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWING TITLE:** MASTER GROUND FLOOR PLAN LIGHTING LAYOUT |

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP),
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| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

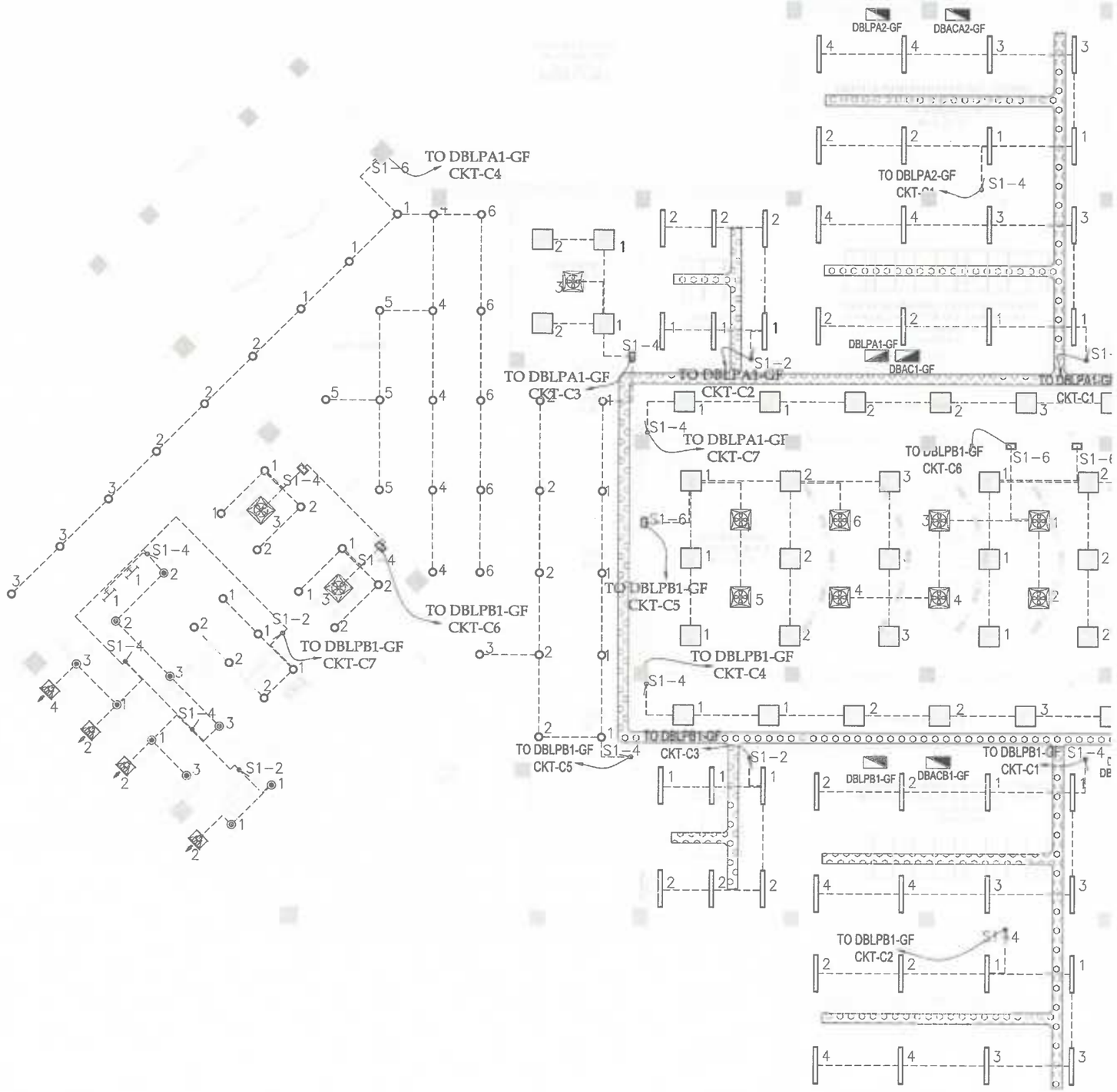
**DRAWING NO:** PITB-MB-MUL-04-ELE04

**SCALE:** 1"=1/16"

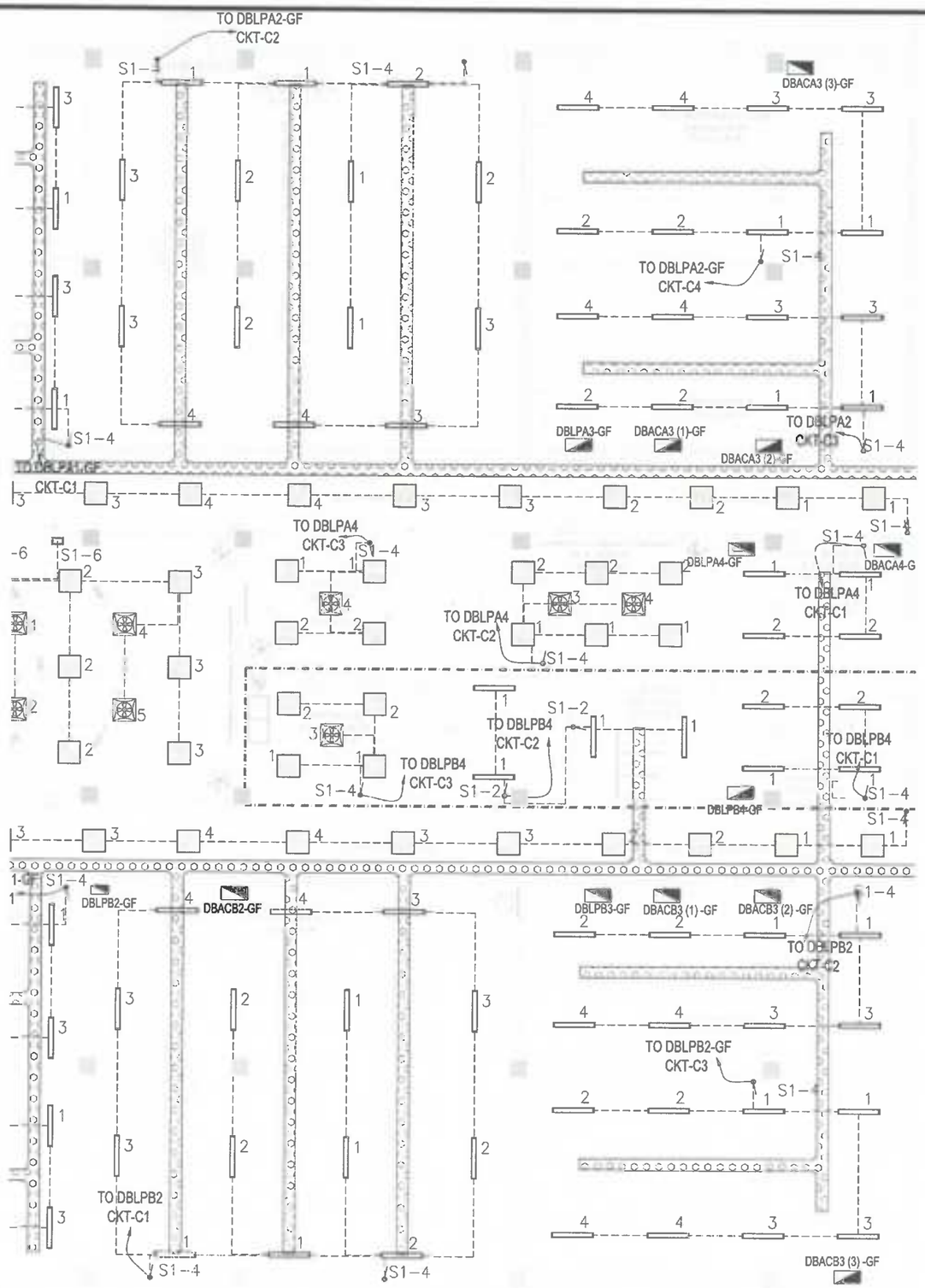
**SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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|---|---|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** GROUND FLOOR PLAN-A LIGHTING LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE05 SHEET 1-3<br>SCALE: 1'=1/8"<br>SHEET: | **TENDER DRAWINGS**<br>REV. \| DESCRIPTION \| SIGN. \| DATE | |




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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWING TITLE:** GROUND FLOOR PLAN-B LIGHTING LAYOUT |

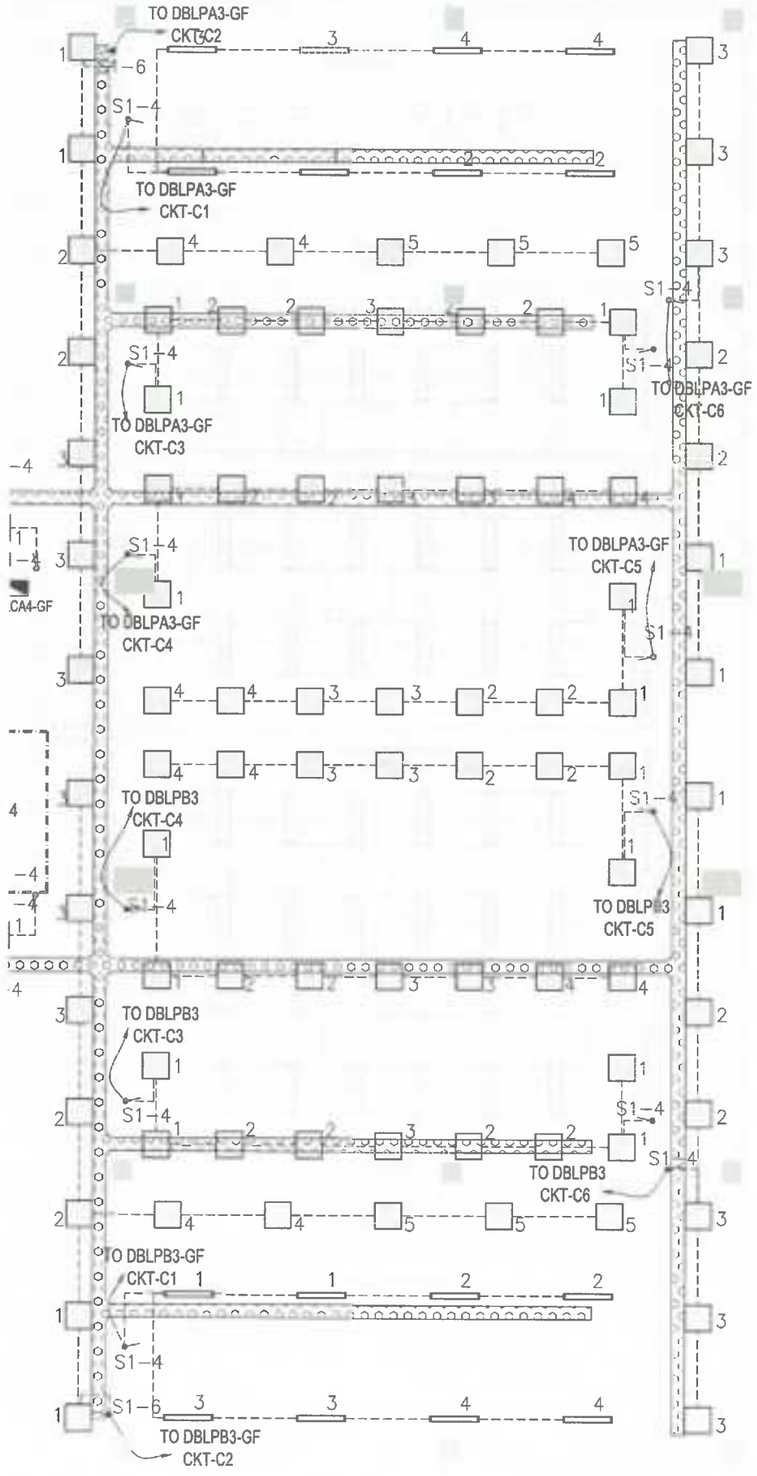
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|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

**DRAWING NO:** PITB-MB-MUL-04-ELE06 SHEET 2-3

**SCALE:** 1'=1/8" **SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWING TITLE:** GROUND FLOOR PLAN-C LIGHTING LAYOUT |

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|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

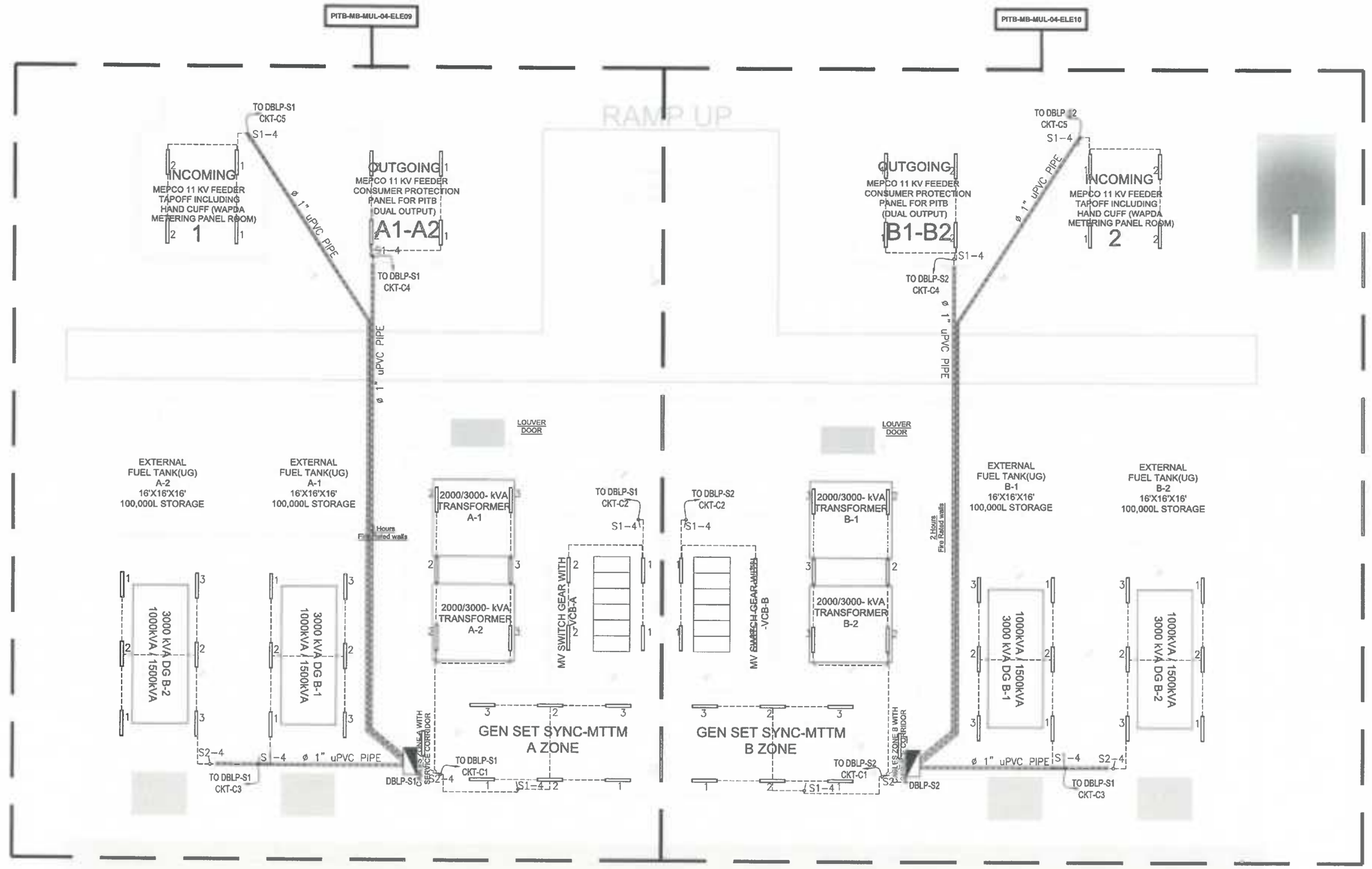
**DRAWING NO:** PITB-MB-MUL-04-ELE07 SHEET 3-3

**SCALE:** 1'=1/8"

**SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWING TITLE:** MASTER ELECTRICAL SUBSTATION LIGHTING LAYOUT |

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|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

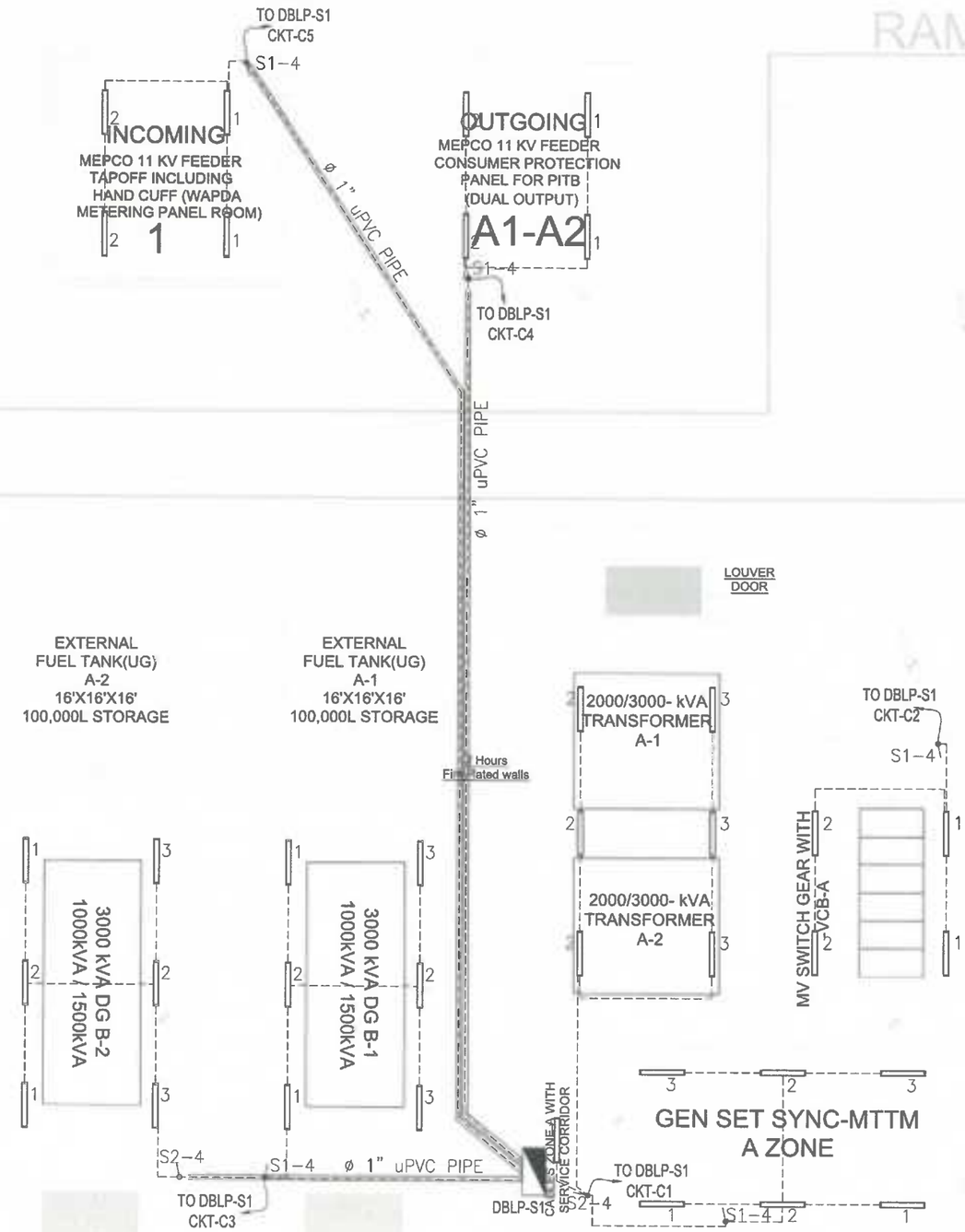
**DRAWING NO:** PITB-MB-MUL-04-ELE08

**SCALE:** 1'=3/32"

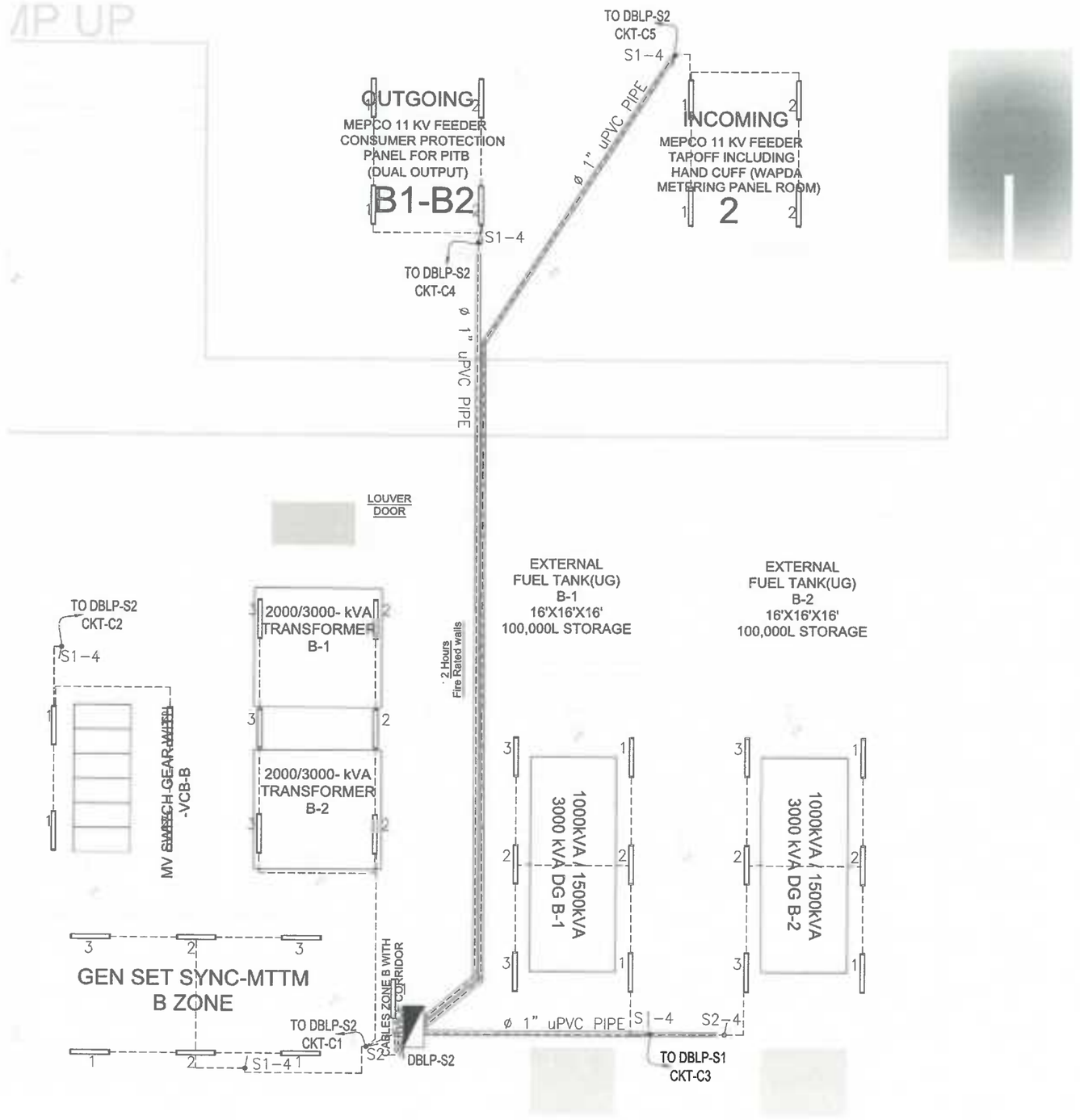
**SHEET:**

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**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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PITB-MB-MUL-04-ELE12

PITB-MB-MUL-04-ELE13

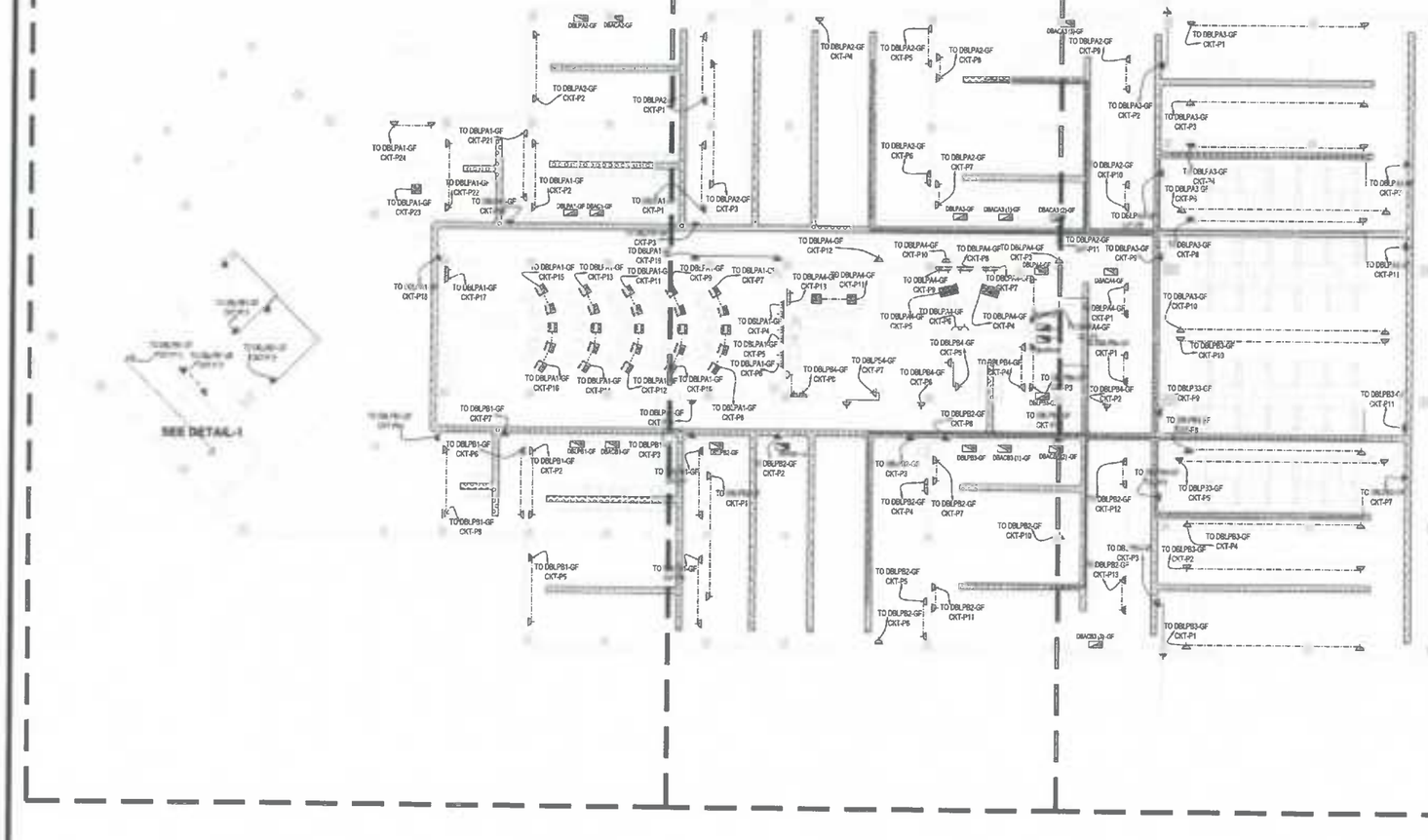
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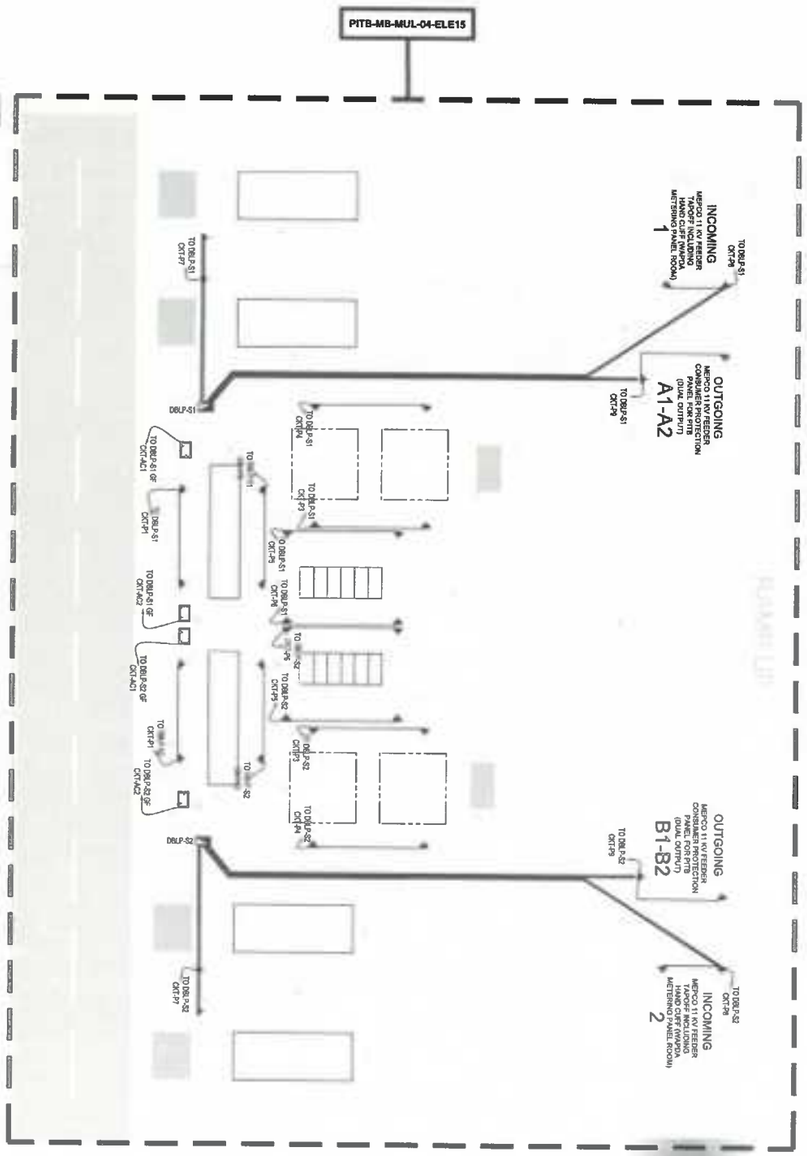
PITB-MB-MUL-04-ELE15

## GROUND FLOOR PLAN-A

## GROUND FLOOR PLAN-B

## GROUND FLOOR PLAN-C




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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** MASTER GROUND FLOOR PLAN POWER LAYOUT

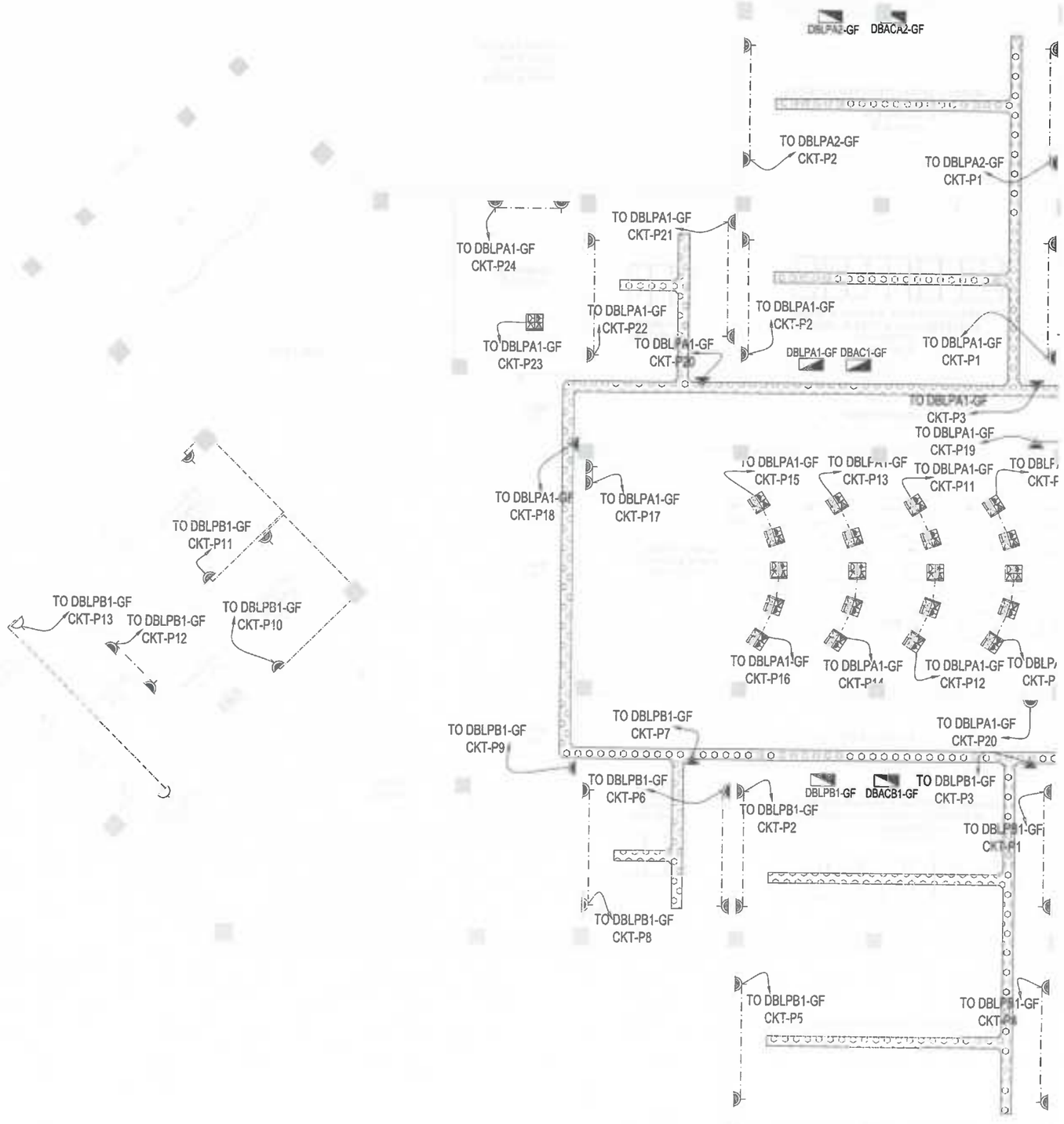
**DRAWING NO:** PITB-MB-MUL-04-ELE11

**SCALE:** 1'=1/16"

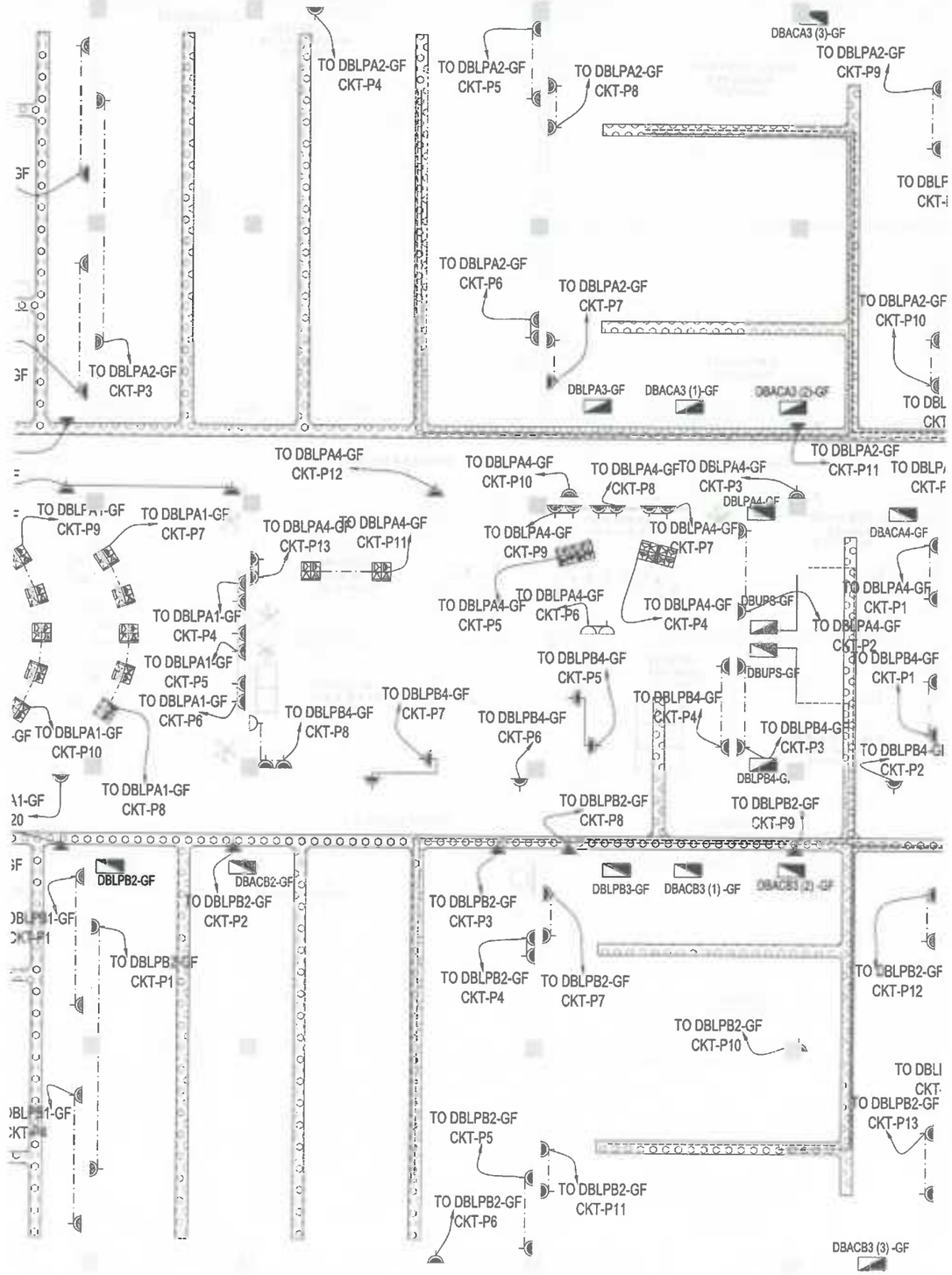
**SHEET:**

**TENDER DRAWINGS**

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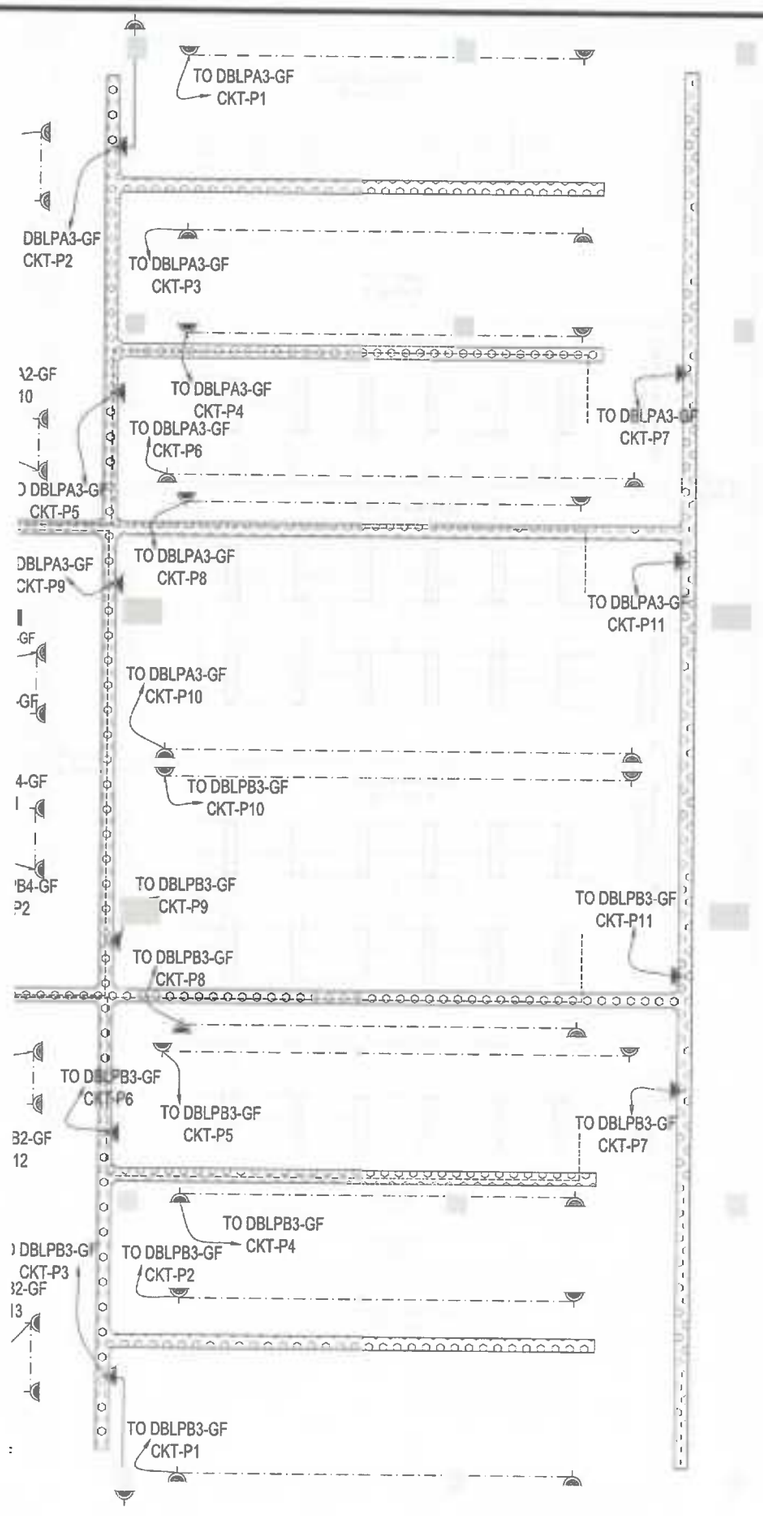

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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |
| **DRAWING TITLE:** GROUND FLOOR PLAN-A POWER LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE12 SHEET 1-3<br>**SCALE:** 1'=1/8"<br>**SHEET:** | **TENDER DRAWINGS** | REV. \| DESCRIPTION \| SIGN. \| DATE |




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|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** GROUND FLOOR PLAN-B POWER LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE13 SHEET 2-3<br>**SCALE:** 1'=1/8"<br>**SHEET:** |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** GROUND FLOOR PLAN-C POWER LAYOUT

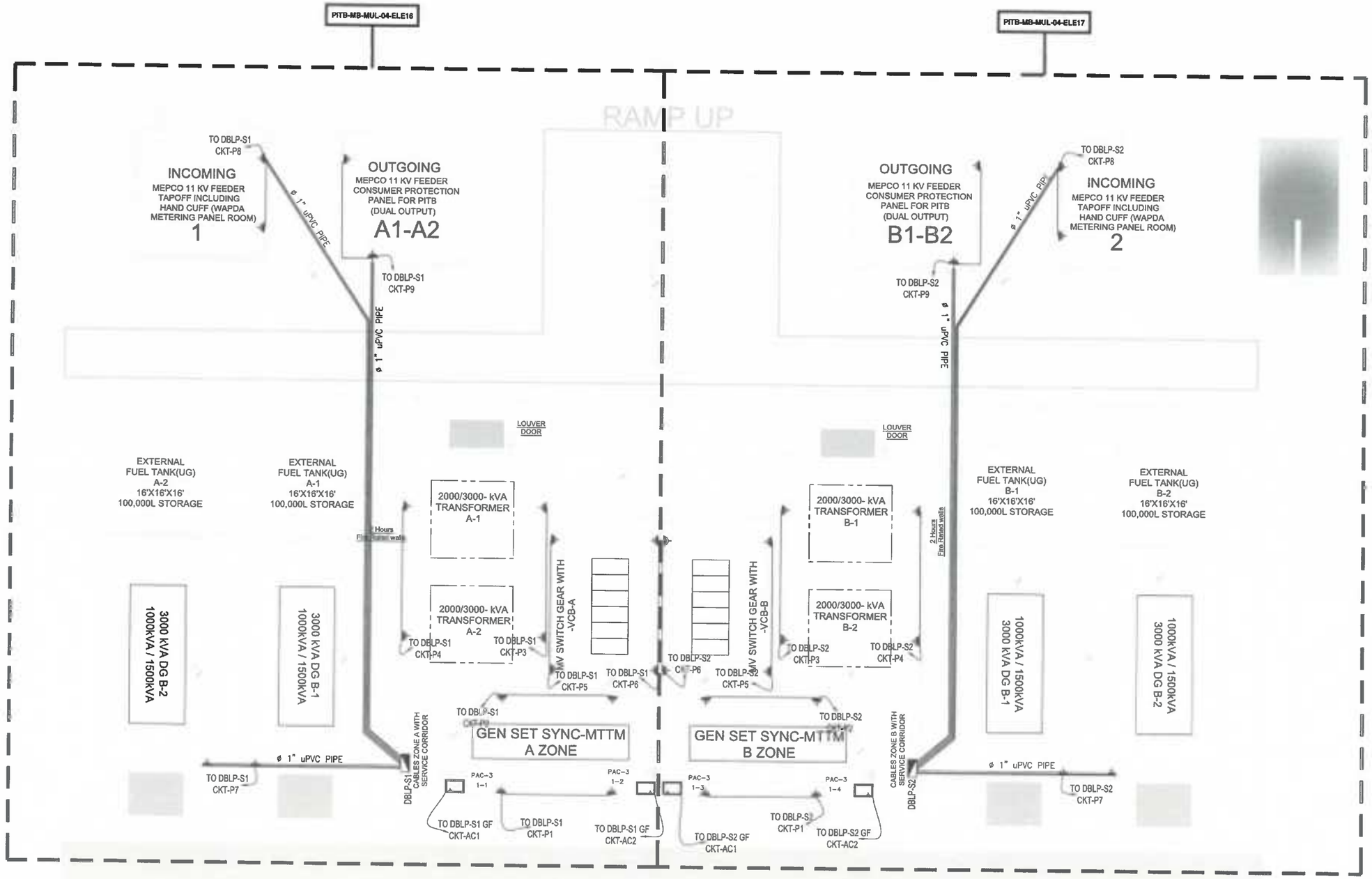
**DRAWING NO:** PITB-MB-MUL-04-ELE14 SHEET 3-3

**SCALE:** 1'=1/8"

**SHEET:**

**TENDER DRAWINGS**

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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** MASTER ELECTRICAL SUBSTATION POWER LAYOUT

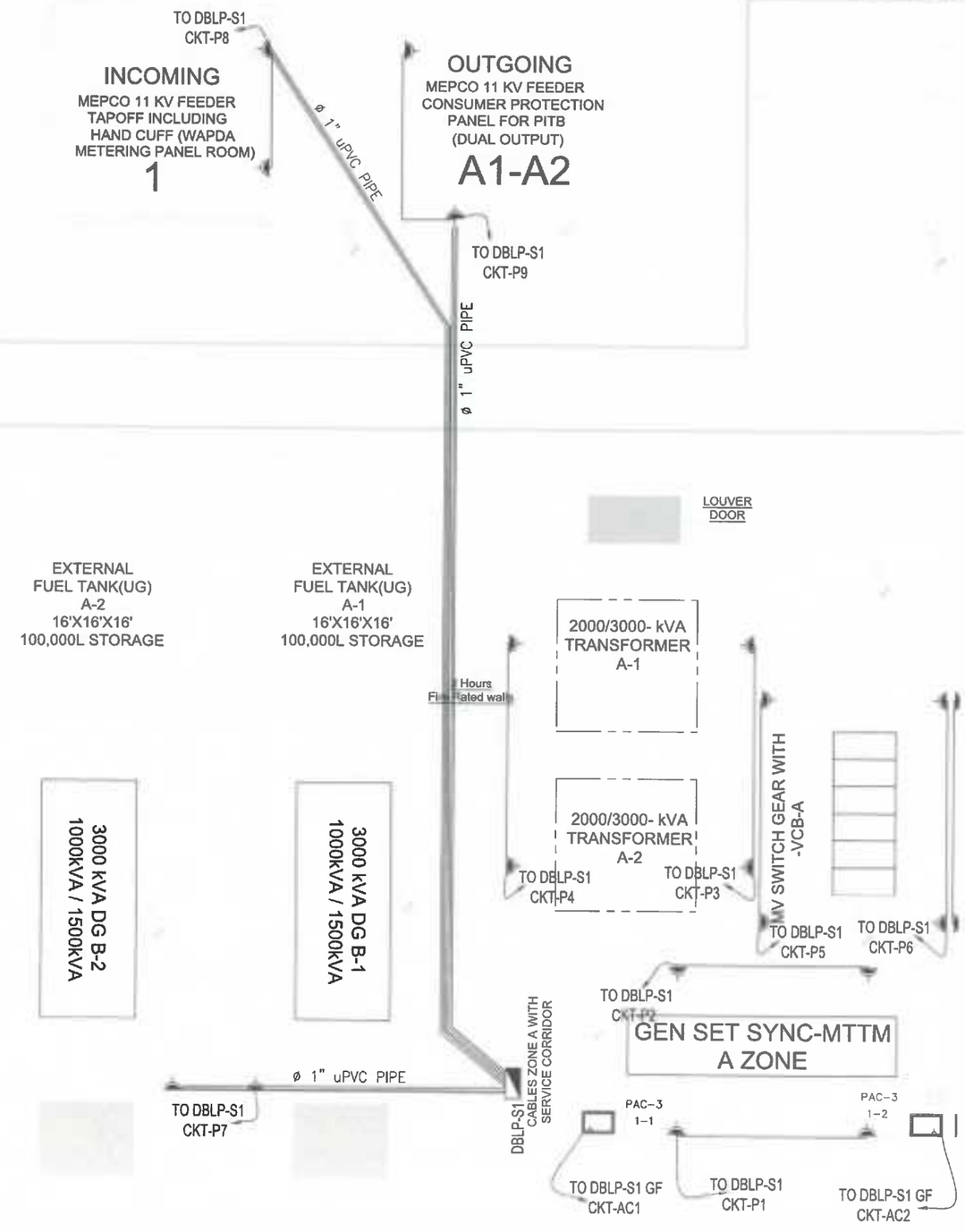
**DRAWING NO:** PITB-MB-MUL-04-ELE15

**SCALE:** 1'=3/32"

**SHEET:**

**TENDER DRAWINGS**

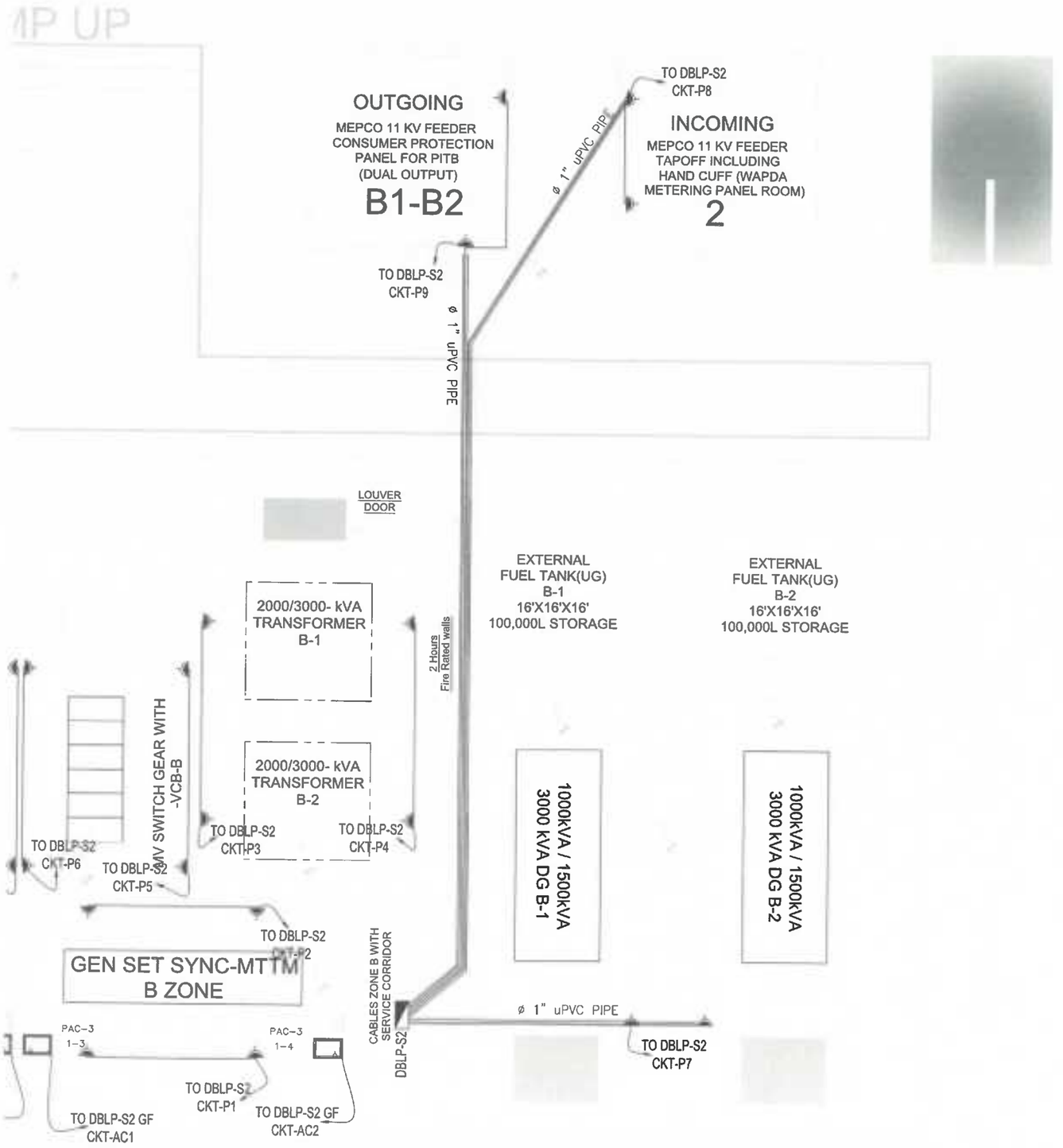
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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** ELECTRICAL SUBSTATION A POWER LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE16 SHEET 1-2<br>**SCALE:** 1'=1/8"<br>**SHEET:** |

**TENDER DRAWINGS**

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|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

**DRAWING NO:** PITB-MB-MUL-04-ELE17 SHEET 2-2

**SCALE:** 1'=1/8" **SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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PITB-MB-MUL-04-ELE19

PITB-MB-MUL-04-ELE20

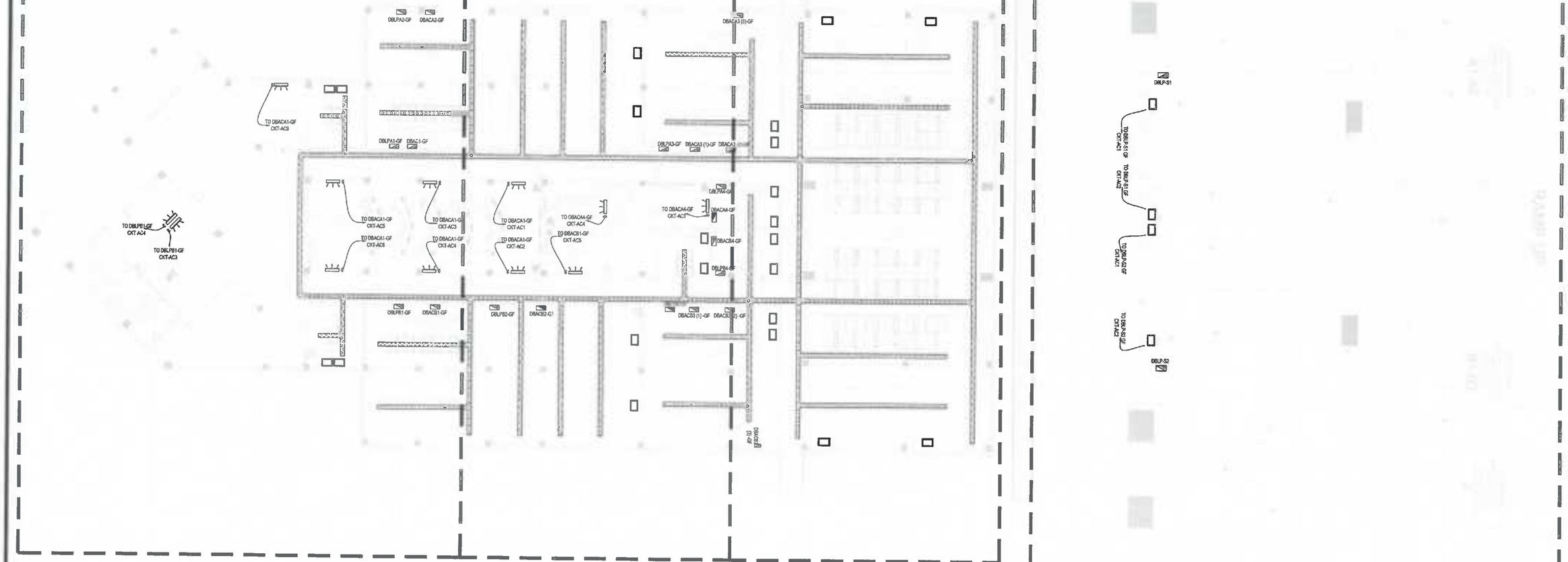
PITB-MB-MUL-04-ELE21

PITB-MB-MUL-04-ELE23

GROUND FLOOR PLAN-A

GROUND FLOOR PLAN-B

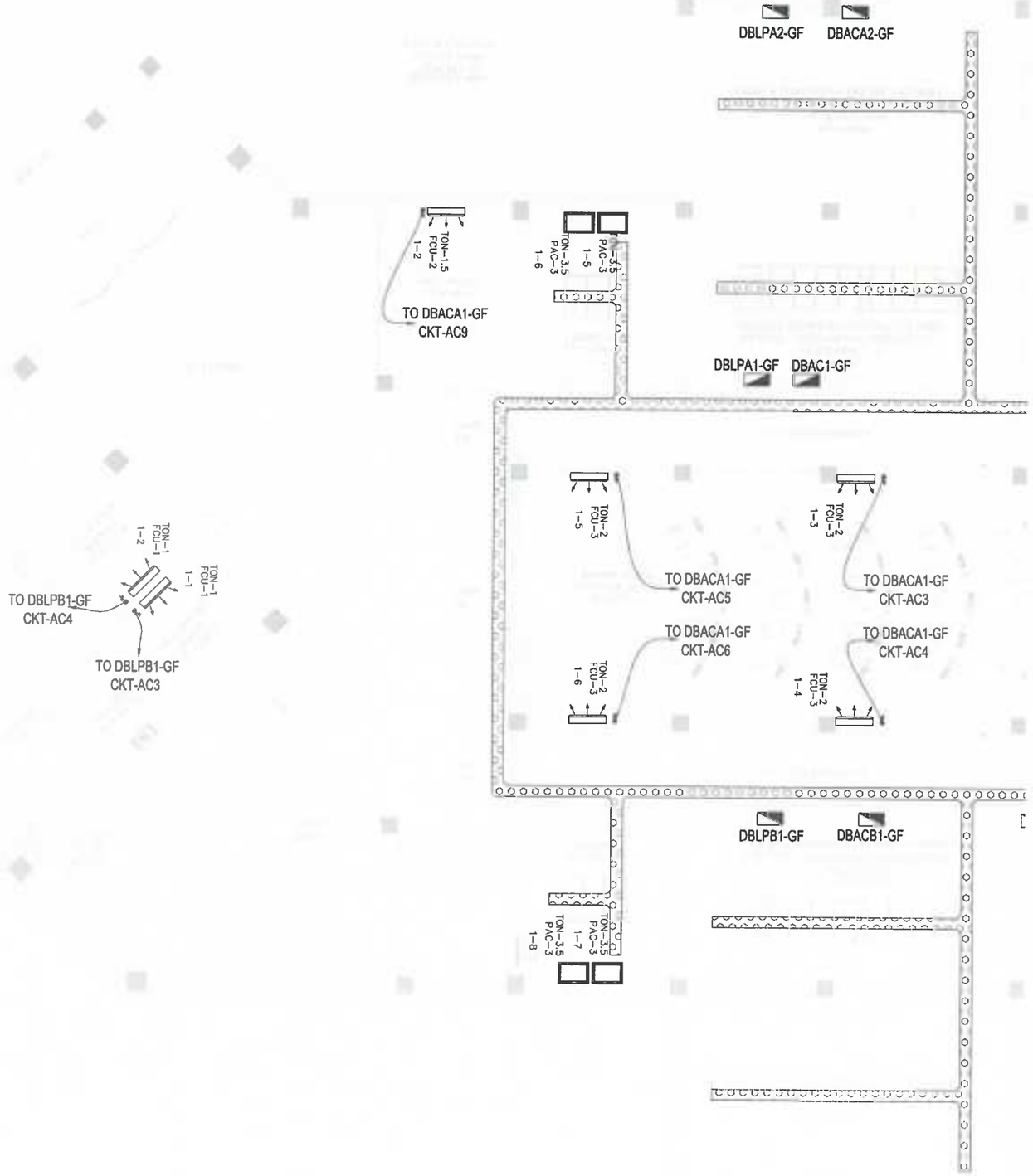
GROUND FLOOR PLAN-C



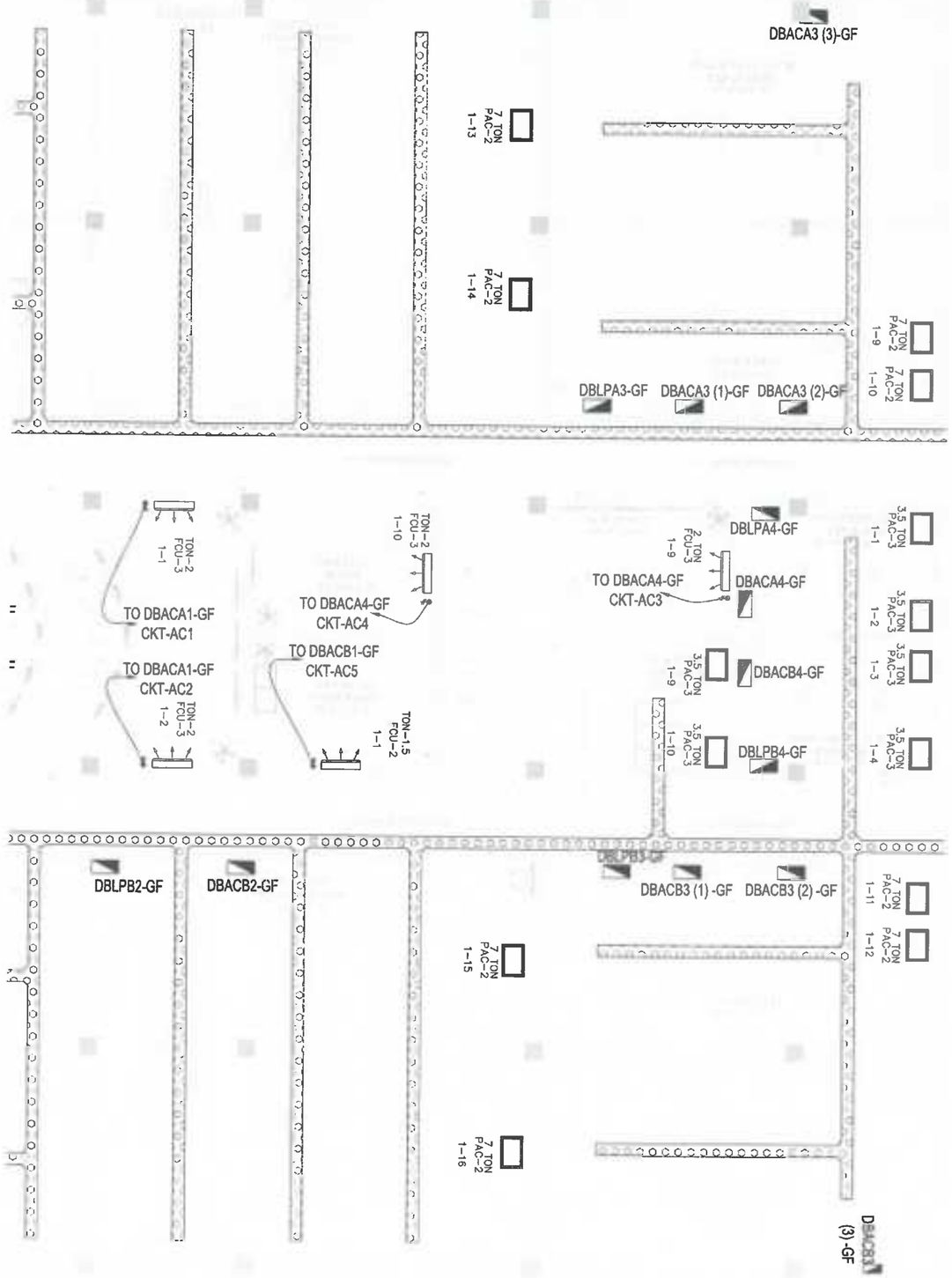

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**TENDER DRAWINGS**

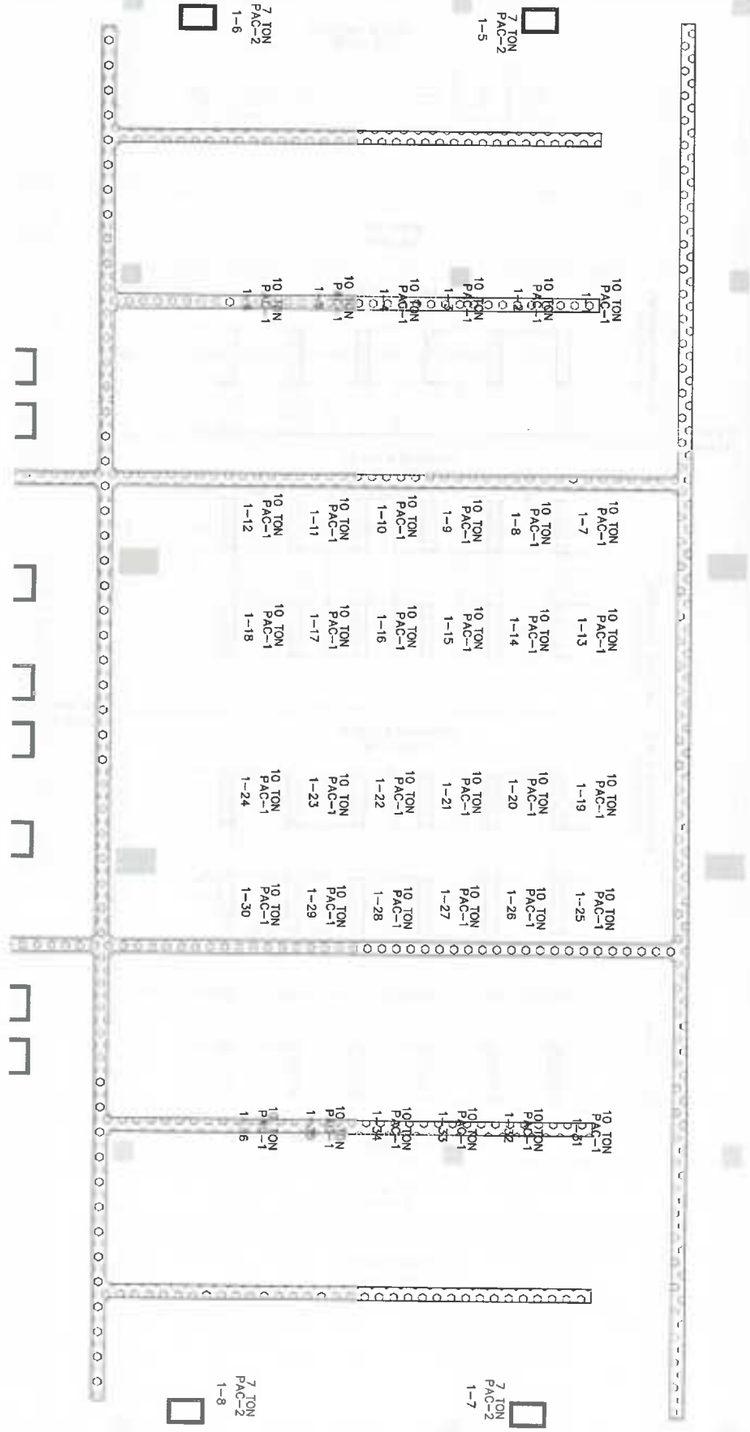
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| **CLIENT:** Punjab Information Technology Board (PITB) ¦ Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWN BY:** MUHAMMAD ALI HASSAN<br>**DESIGNED BY:** Engr. GULFAM ZIA<br>**CHECKED BY:** Engr. FAHAD SHAHID<br>**APPROVED BY:** Engr. SADAQAT HUSSAIN<br>**DATE:** 27-08-2026 |
| **DRAWING TITLE:** GROUND FLOOR PLAN-A POWER AC LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE19<br>**SCALE:** 1'=1/8"<br>**SHEET:** | **TENDER DRAWINGS** | REV. / DESCRIPTION / SIGN. / DATE |




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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |
| **DRAWING TITLE:** GROUND FLOOR PLAN-B POWER AC LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE20<br>**SCALE:** 1'=1/8"<br>**SHEET:** | **TENDER DRAWINGS** | REV. \| DESCRIPTION \| SIGN. \| DATE |




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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** GROUND FLOOR PLAN-C POWER AC LAYOUT

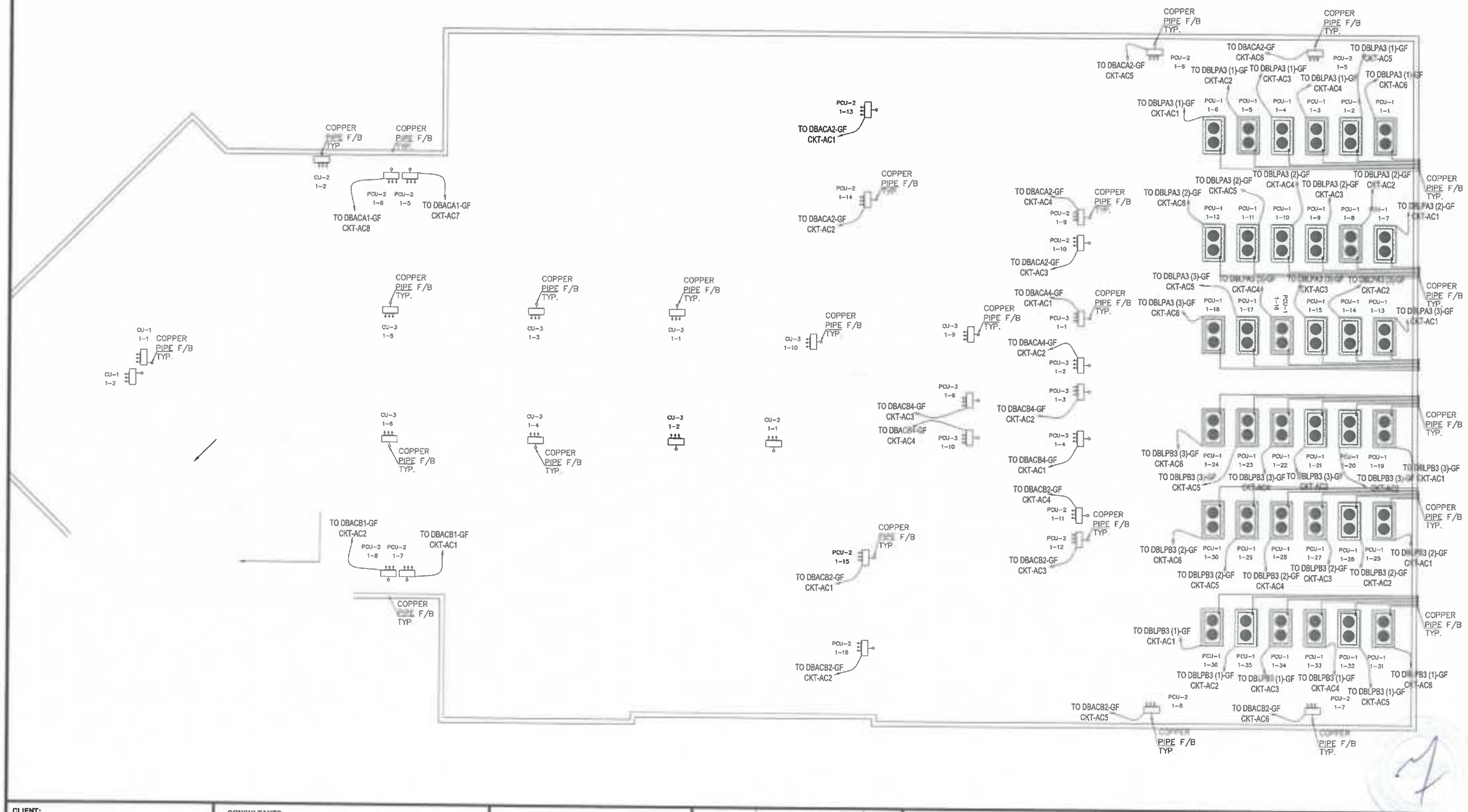
**DRAWING NO:** PITB-MB-MUL-04-ELE21

**SCALE:** 1'=1/8"

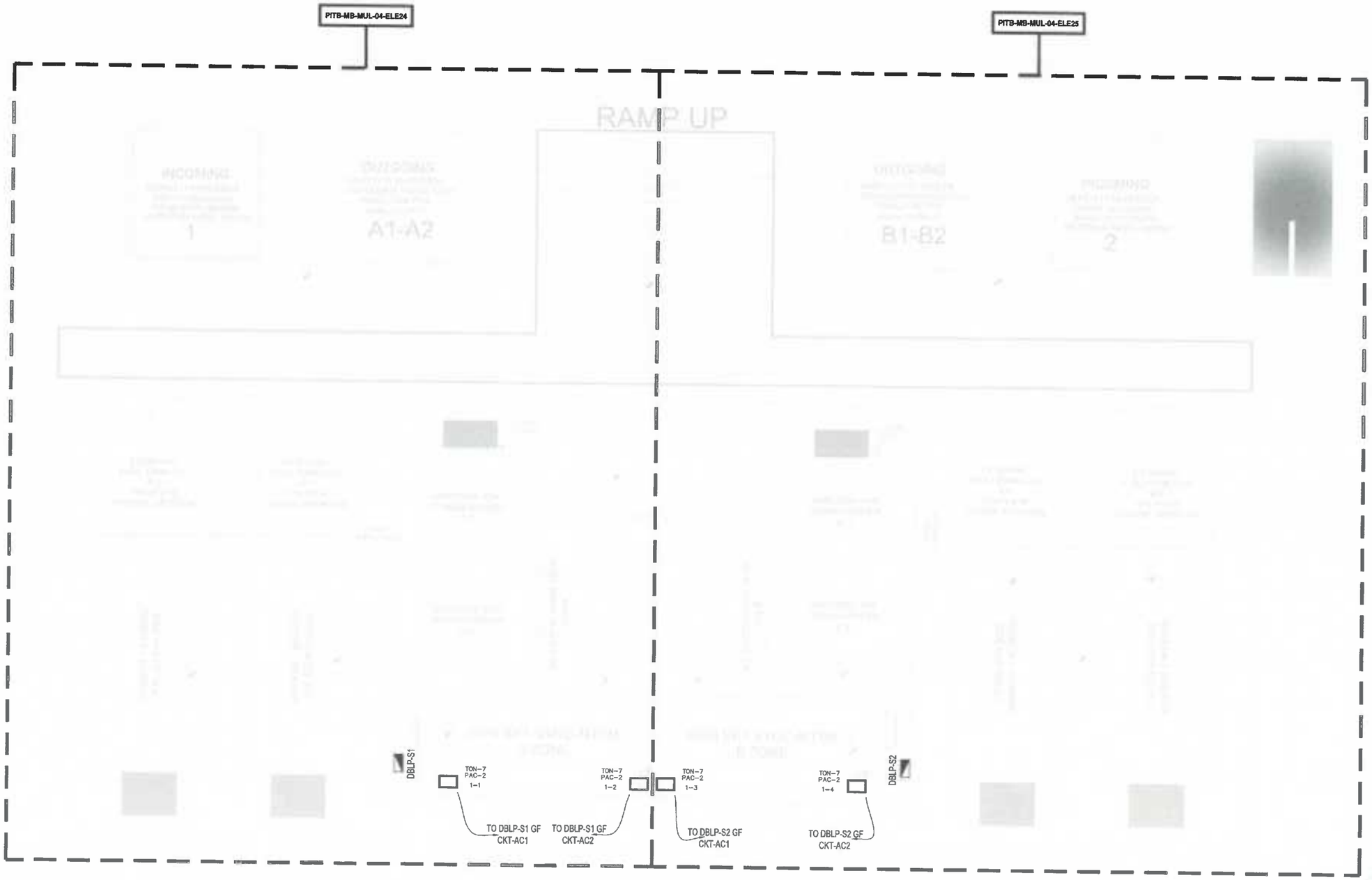
**SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |
| **DRAWING TITLE:** ROOF TOP PLAN POWER LAYOUT (AC OUTDOOR) | **DRAWING NO:** PITB-MB-MUL-04-ELE22<br>**SCALE:** 1'=3/32"<br>**SHEET:** | **TENDER DRAWINGS** | REV. \| DESCRIPTION \| SIGN. \| DATE |




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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |
| **DRAWING TITLE:** MASTER ELECTRICAL SUBSTATION POWER AC LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE23<br>**SCALE:** 1'=3/32"<br>**SHEET:** | **TENDER DRAWINGS** | |

| REV. | DESCRIPTION | SIGN. | DATE |
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RAMI

INCOMING

1

OUTGOING

A1-A2




| | |
|---|---|
| **CLIENT:** | Punjab Information Technology Board (PITB) \| Lahore |
| **CONSULTANTS:** | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk |
| **PROJECT:** | CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN |
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |
| **DRAWING TITLE:** | ELECTRICAL SUBSTATION A POWER AC LAYOUT |
| **DRAWING NO:** | PITB-MB-MUL-04-ELE24 |
| **SCALE:** | 1'=1/8" |
| **SHEET:** | |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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TON-7
PAC-2
1-3

TO DBLP-S2 GF
CKT-AC1

TON-7
PAC-2
1-4

TO DBLP-S2 GF
CKT-AC2

DBLP-S2

7

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** ELECTRICAL SUBSTATION B POWER AC LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE25<br>**SCALE:** 1'=1/8"<br>**SHEET:** |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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PITB-MB-MUL-04-ELE27

GROUND FLOOR PLAN-A

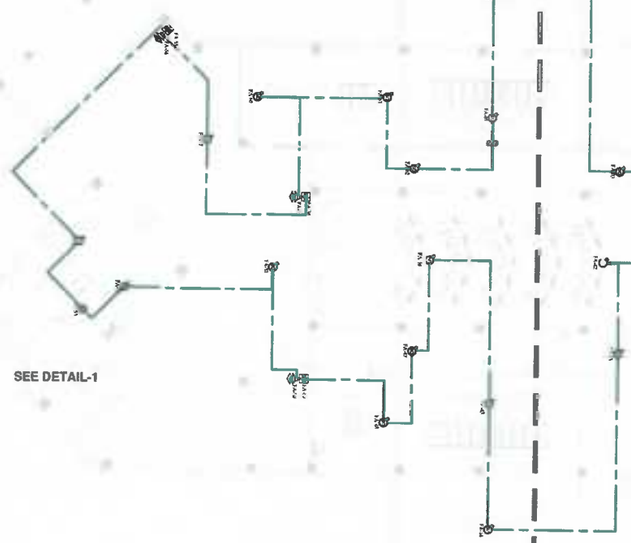
PITB-MB-MUL-04-ELE28

GROUND FLOOR PLAN-B

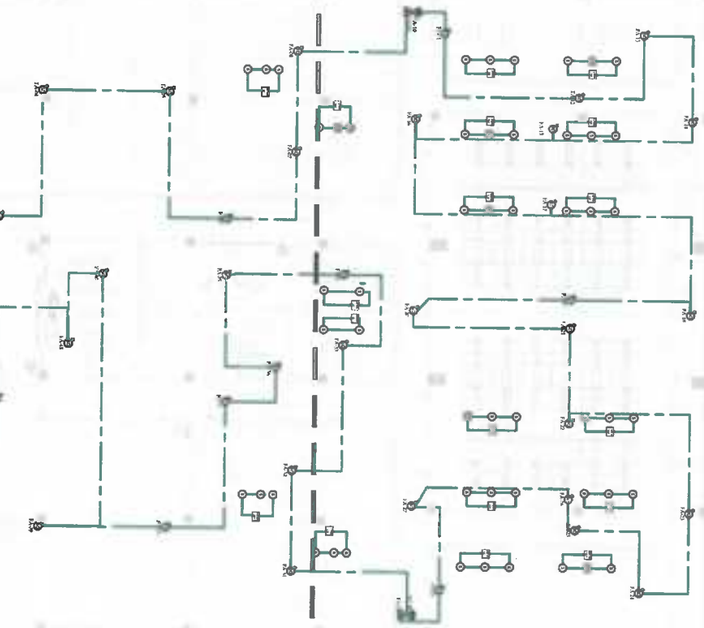
PITB-MB-MUL-04-ELE29

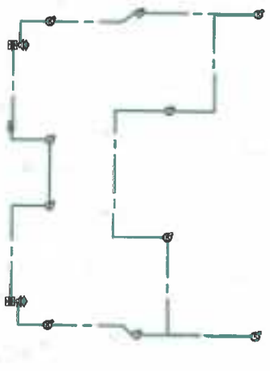
GROUND FLOOR PLAN-C

PITB-MB-MUL-04-ELE30



SEE DETAIL-1





| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** MASTER GROUND FLOOR PLAN FIRE ALARM SYSTEM LAYOUT

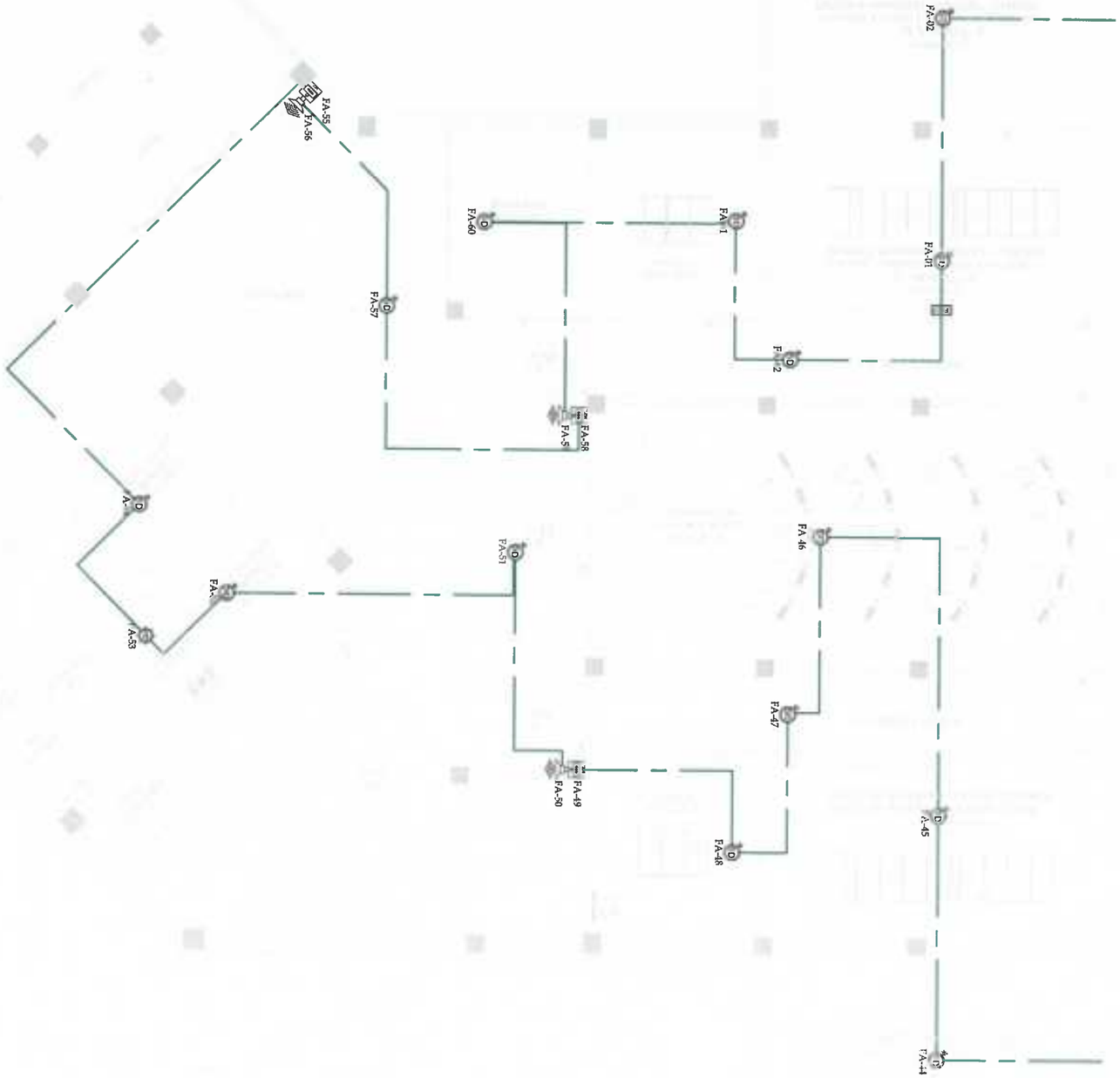
**DRAWING NO:** PITB-MB-MUL-04-ELE26

**SCALE:** 1'=1/16"

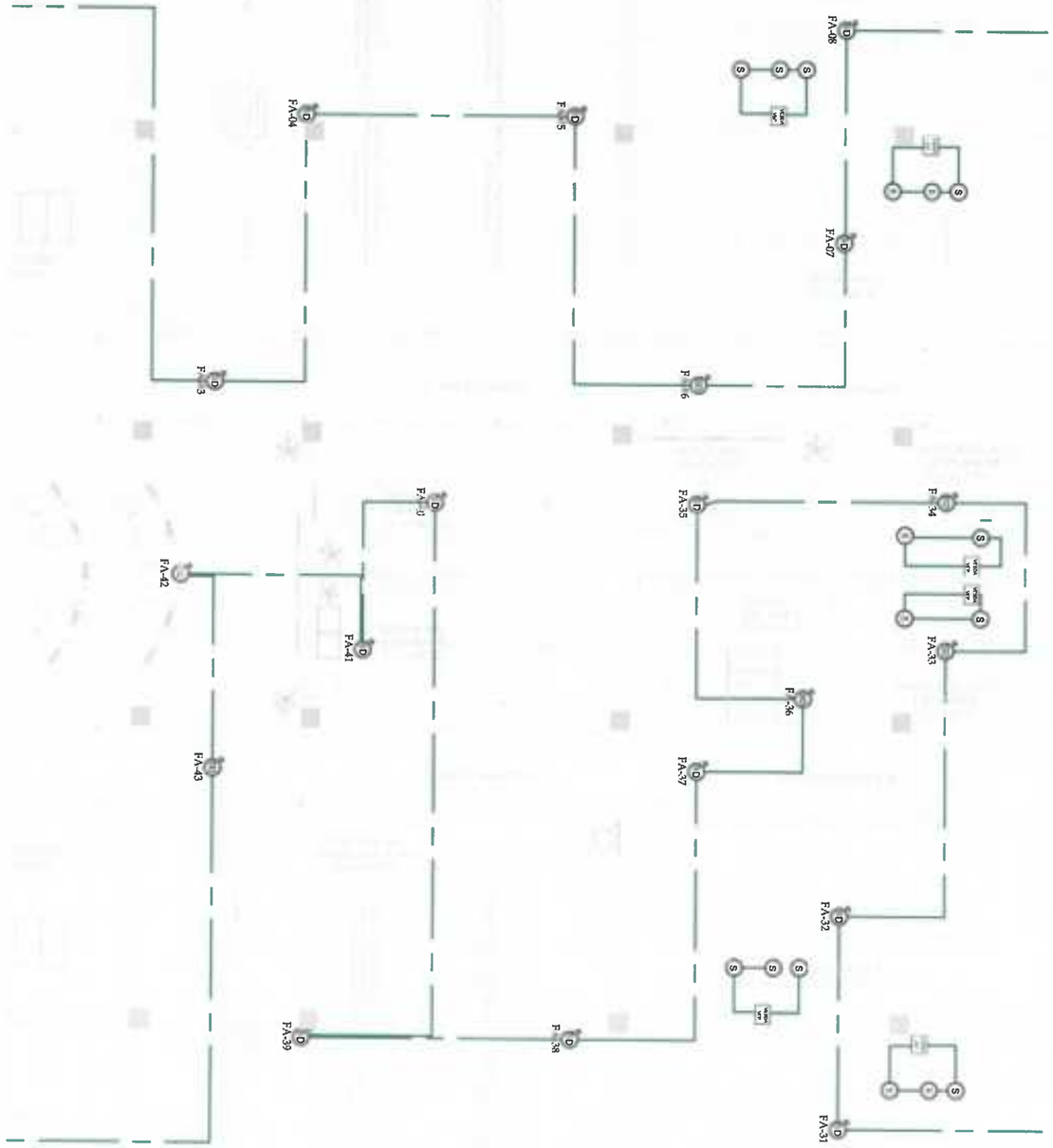
**SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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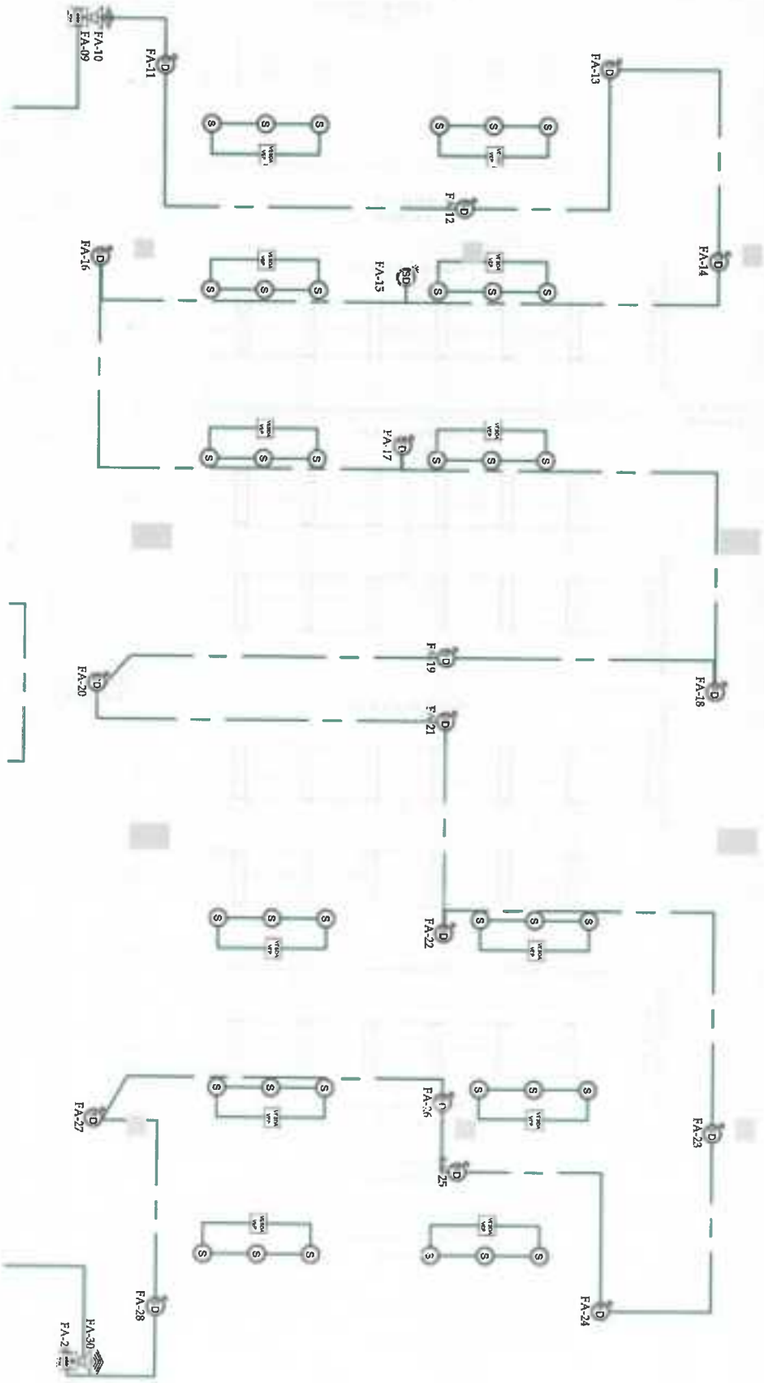

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|---|---|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** GROUND FLOOR PLAN-A FIRE ALARM SYSTEM LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE27<br>**SCALE:** 1'=1/8"<br>**SHEET:** | **TENDER DRAWINGS**<br>REV. \| DESCRIPTION \| SIGN. \| DATE | |




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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** GROUND FLOOR PLAN-B FIRE ALARM SYSTEM LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE28<br>**SCALE:** 1'=1/8"<br>**SHEET:** |

**TENDER DRAWINGS**

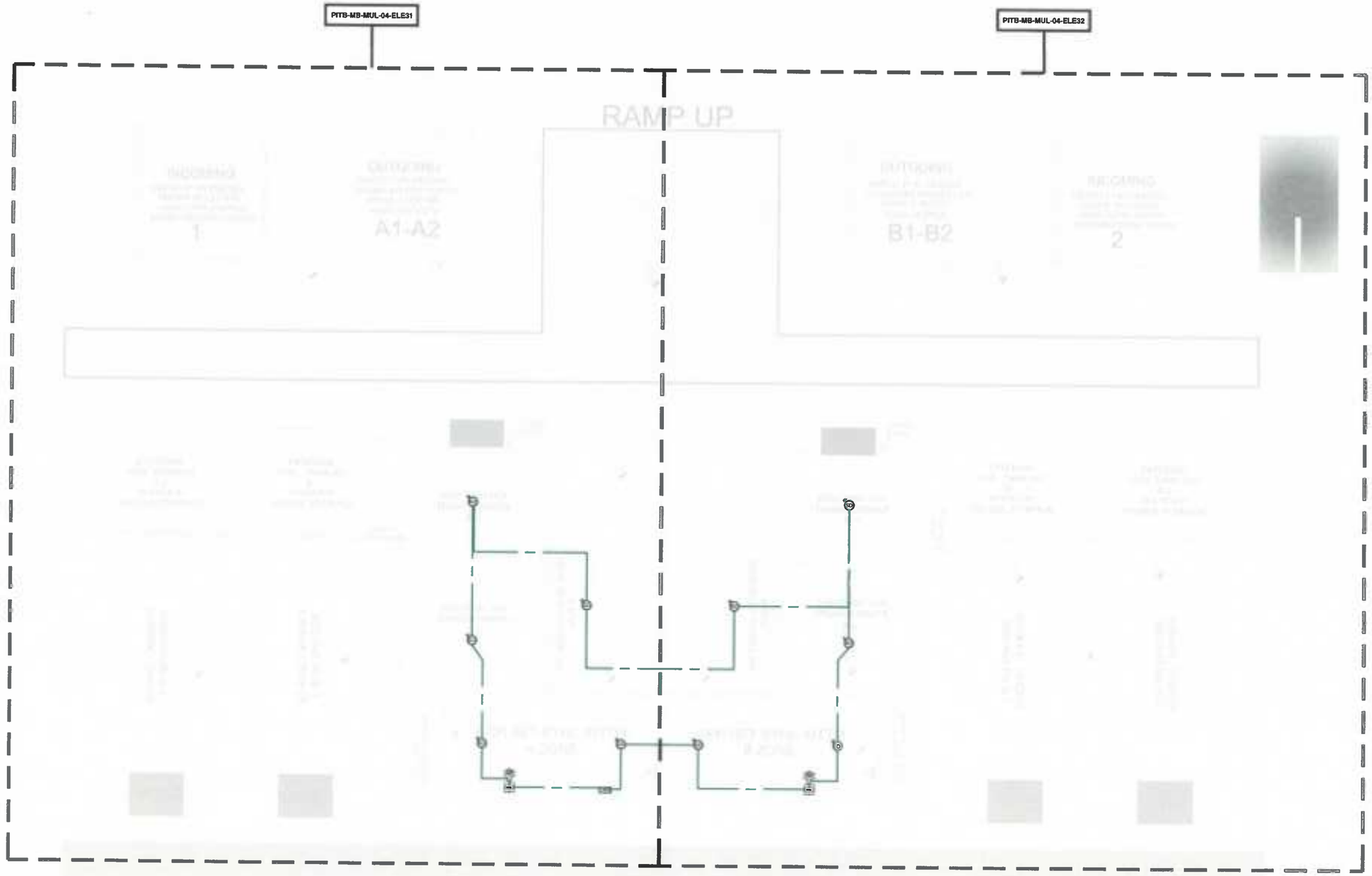
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|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** GROUND FLOOR PLAN-C FIRE ALARM SYSTEM LAYOUT | **DRAWING NO:** PITB-MB-MUL-04-ELE29<br>**SCALE:** 1'=1/8"<br>**SHEET:** |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

| | | |
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| DRAWING TITLE: MASTER ELECTRICAL SUBSTATION FIRE ALARM SYSTEM LAYOUT | DRAWING NO: PITB-MB-MUL-04-ELE30 | SCALE: 1'=3/32" SHEET: |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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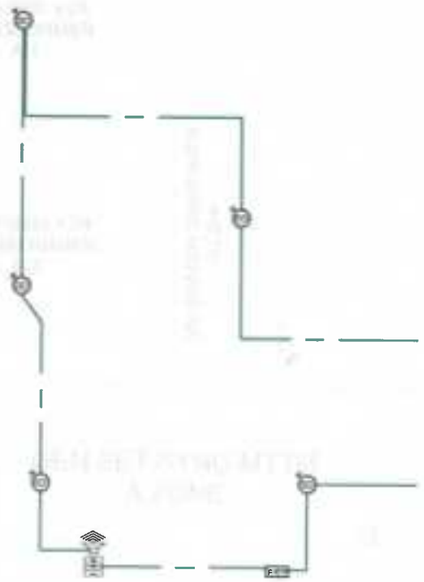
RAMP

INCOMING

1

OUTGOING

A1-A2



CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

ELECTRICAL SUBSTATION A FIRE ALARM SYSTEM LAYOUT

DRAWING NO: PITB-MB-MUL-04-ELE31 SHEET 1-2

SCALE: 1'=1/8"

SHEET:

**TENDER DRAWINGS**

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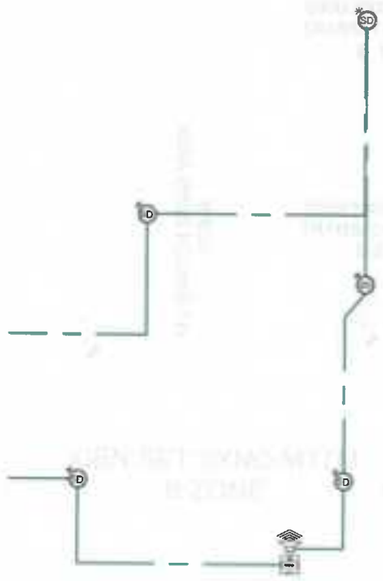
P UP

OUTGOING

B1-B2

INCOMING

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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** ELECTRICAL SUBSTATION B FIRE ALARM SYSTEM LAYOUT

**DRAWING NO:** PITB-MB-MUL-04-ELE32 SHEET 2-2

**SCALE:** 1'=1/8"

**SHEET:**

**TENDER DRAWINGS**

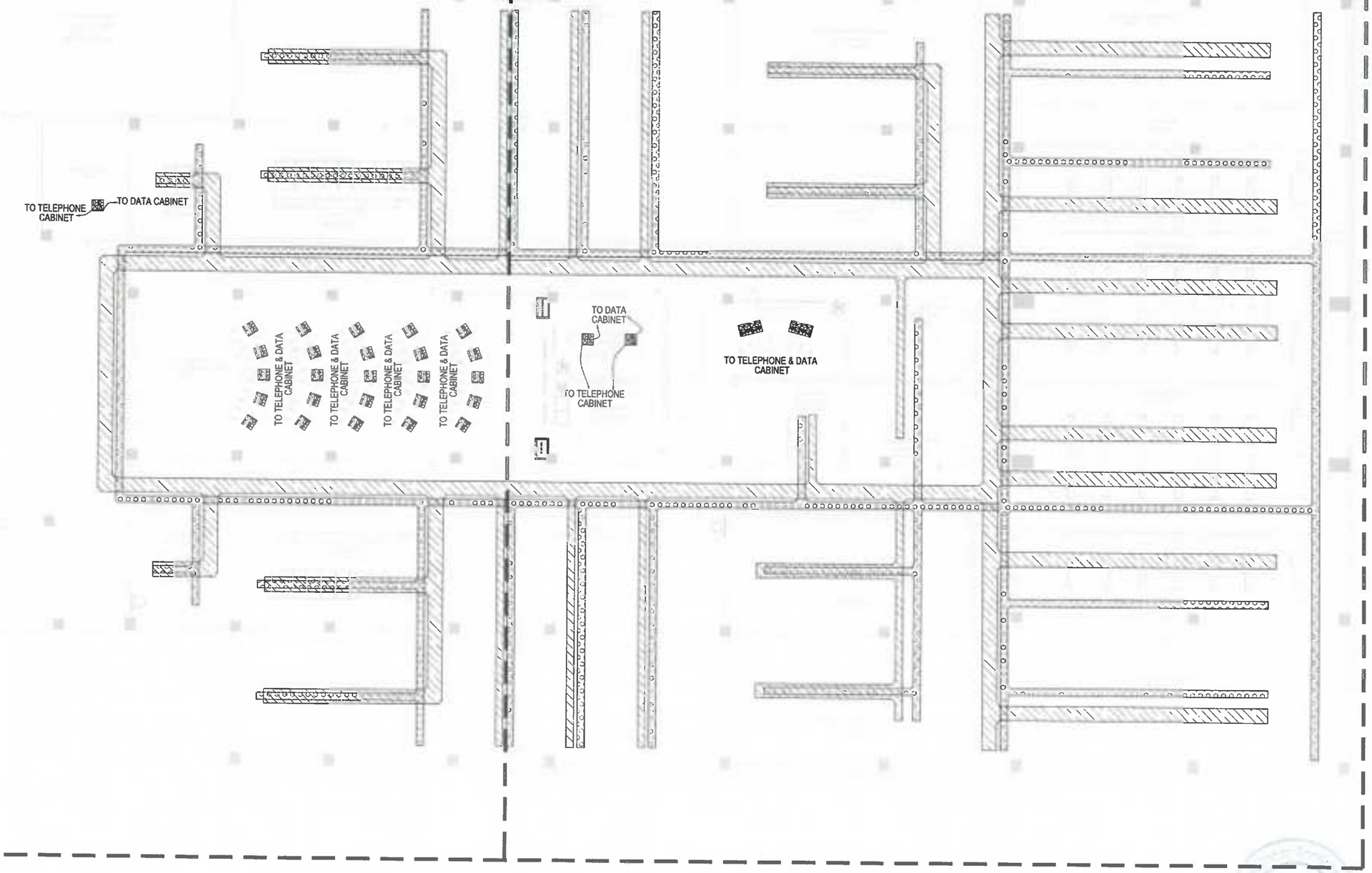
| REV. | DESCRIPTION | SIGN. | DATE |
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PITB-MB-MUL-04-ELE34

PITB-MB-MUL-04-ELE35

## GROUND FLOOR PLAN-A

## GROUND FLOOR PLAN-B




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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

**DRAWING TITLE:** MASTER GROUND FLOOR PLAN DATA & TELEPHONED LAYOUT

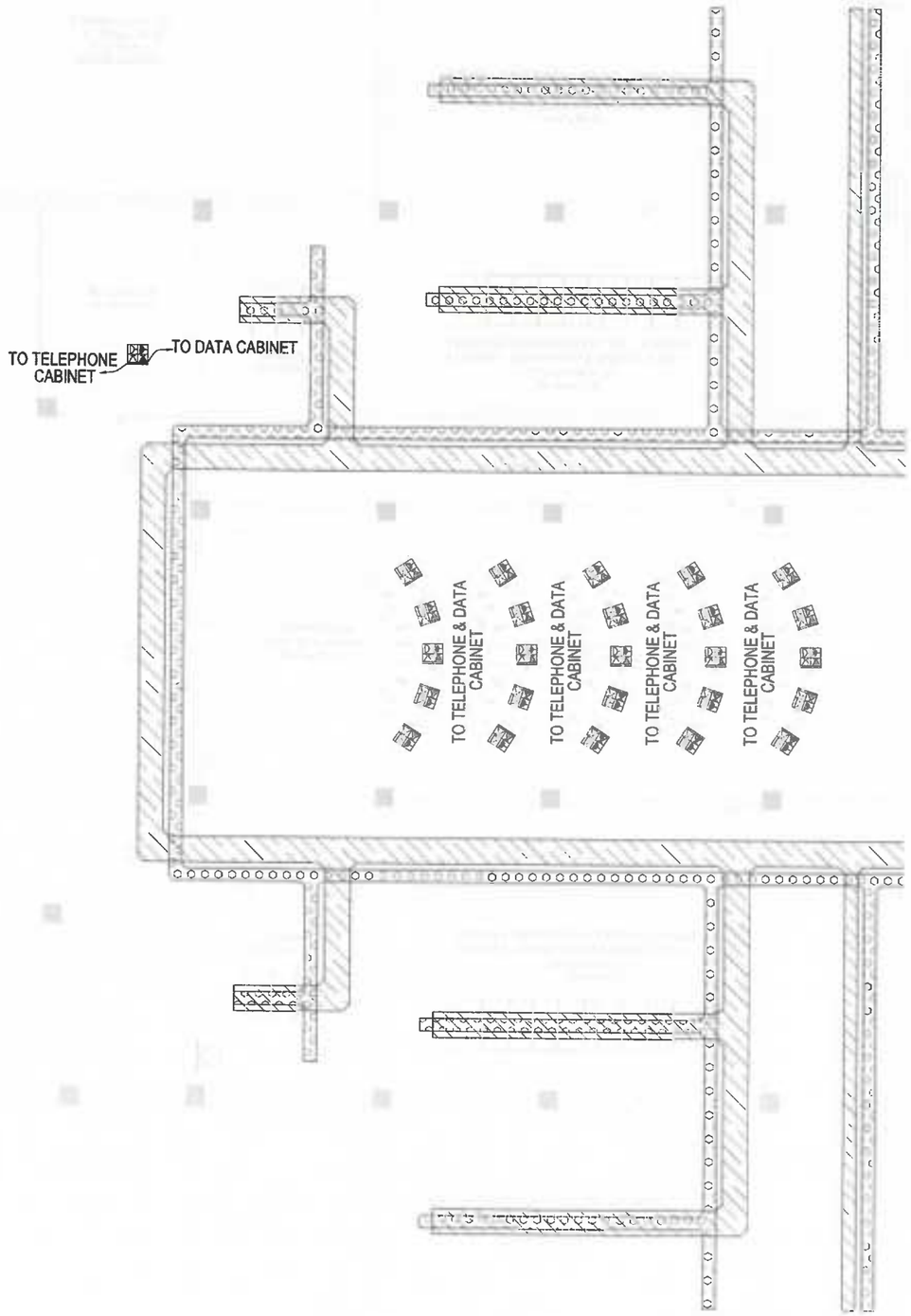
**DRAWING NO:** PITB-MB-MUL-04-ELE33

**SCALE:** 1'=3/32"

**SHEET:**

**TENDER DRAWINGS**

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**CLIENT:**

Punjab Information Technology Board (PITB) | Lahore

**CONSULTANTS:**

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2025 | |

**DRAWING TITLE:**

GROUND FLOOR PLAN-A
DATA & TELEPHONED LAYOUT

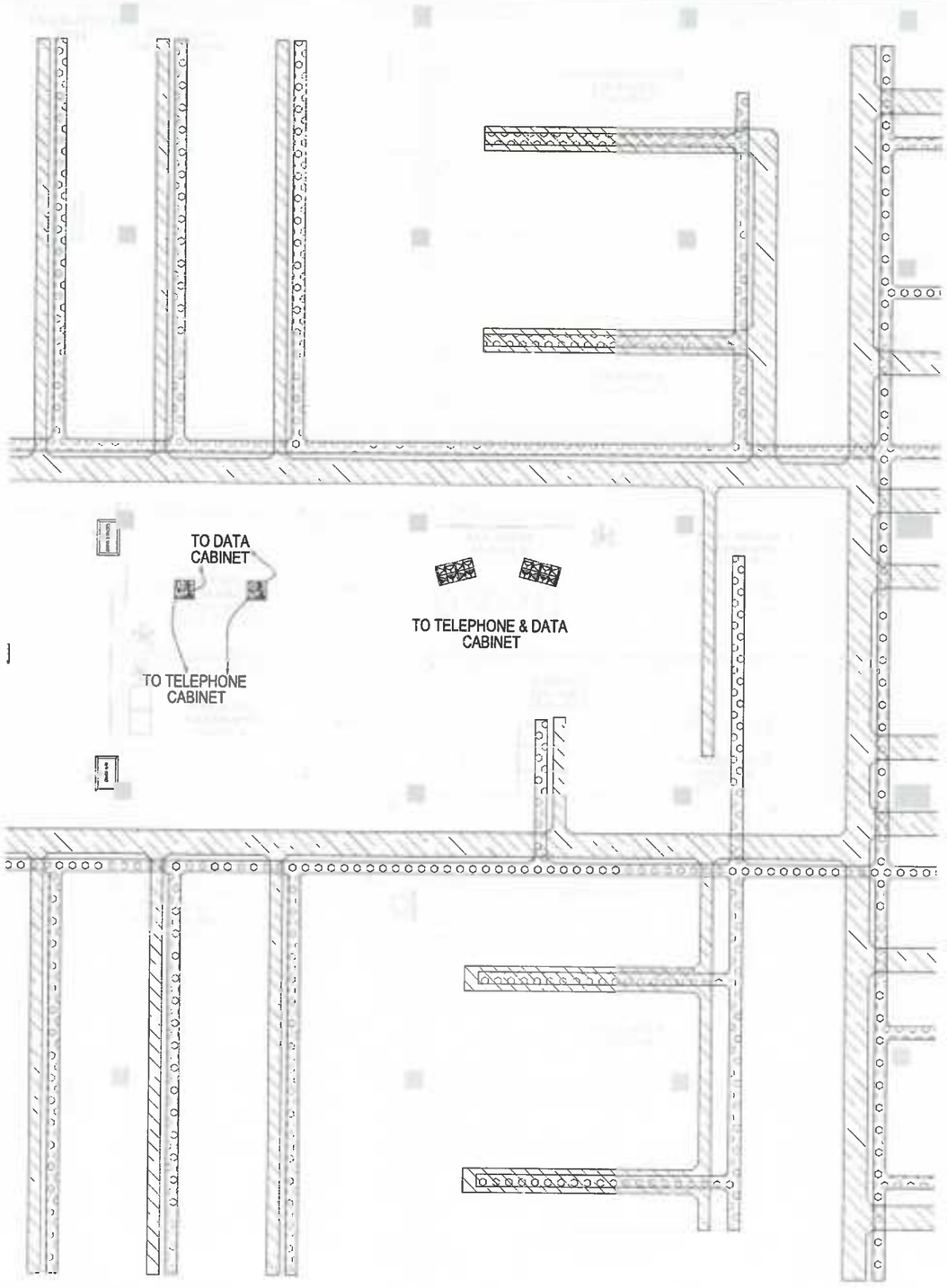
**DRAWING NO:** PITB-MB-MUL-04-ELE34

**SCALE:** 1'=1/8"

**SHEET:** SHEET 1-2

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWING TITLE:** GROUND FLOOR PLAN-B DATA & TELEPHONED LAYOUT |

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

**DRAWING NO:** PITB-MB-MUL-04-ELE35 SHEET 2-2

**SCALE:** 1'=1/8" **SHEET:**

**TENDER DRAWINGS**

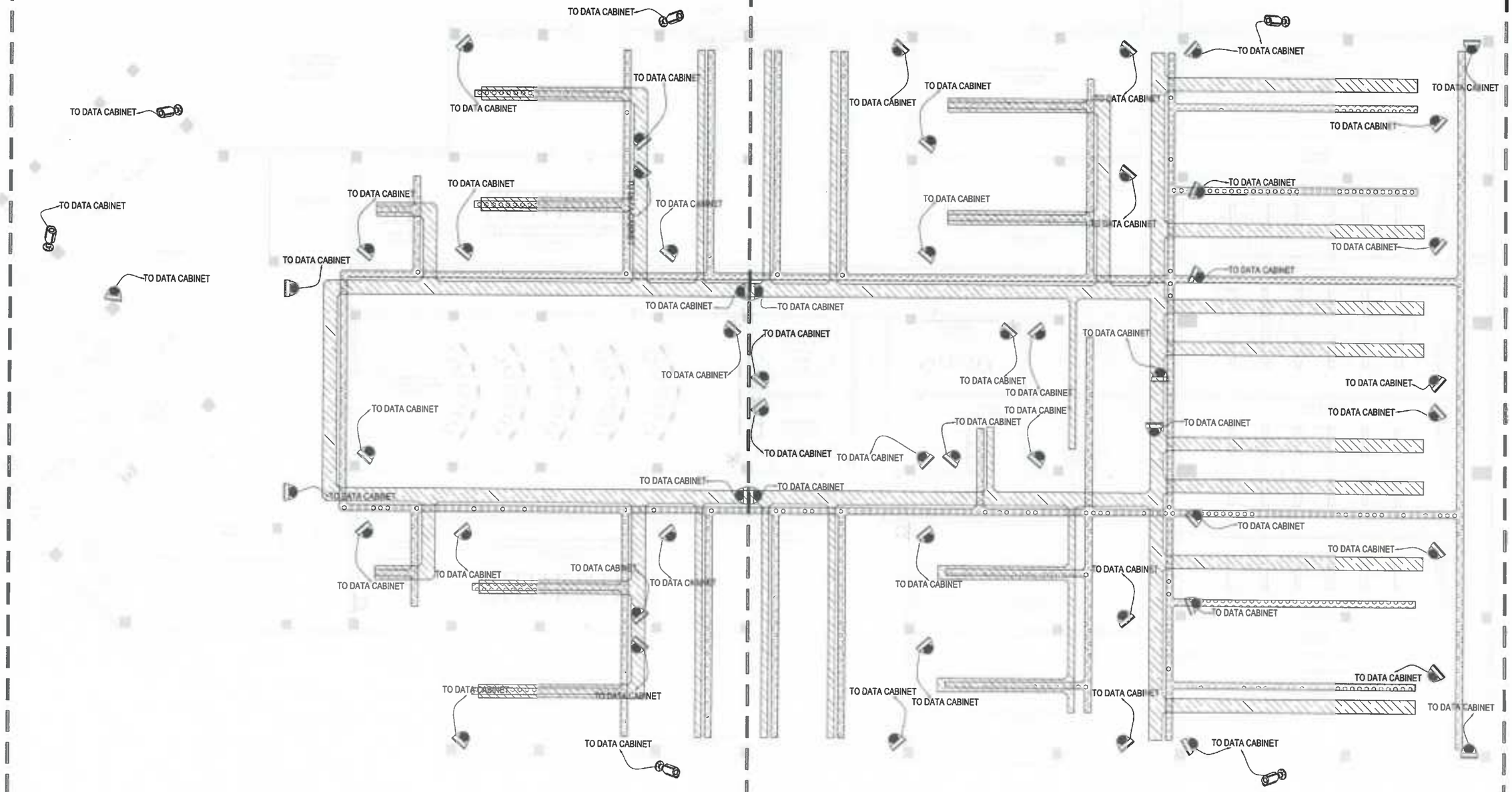
| REV. | DESCRIPTION | SIGN. | DATE |
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PITB-MB-MUL-04-ELE37

## GROUND FLOOR PLAN-A

PITB-MB-MUL-04-ELE38

## GROUND FLOOR PLAN-B




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|---|---|---|
| **CLIENT:** | **CONSULTANTS:** | **PROJECT:** |
| Punjab Information Technology Board (PITB) \| Lahore | ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).<br>83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.<br>+92-42-99333976, +92-42-5717681-4<br>info@ecsp.com.pk www.ecsp.com.pk | CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN |

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

**DRAWING TITLE:** MASTER GROUND FLOOR PLAN CCTV SYSTEM LAYOUT

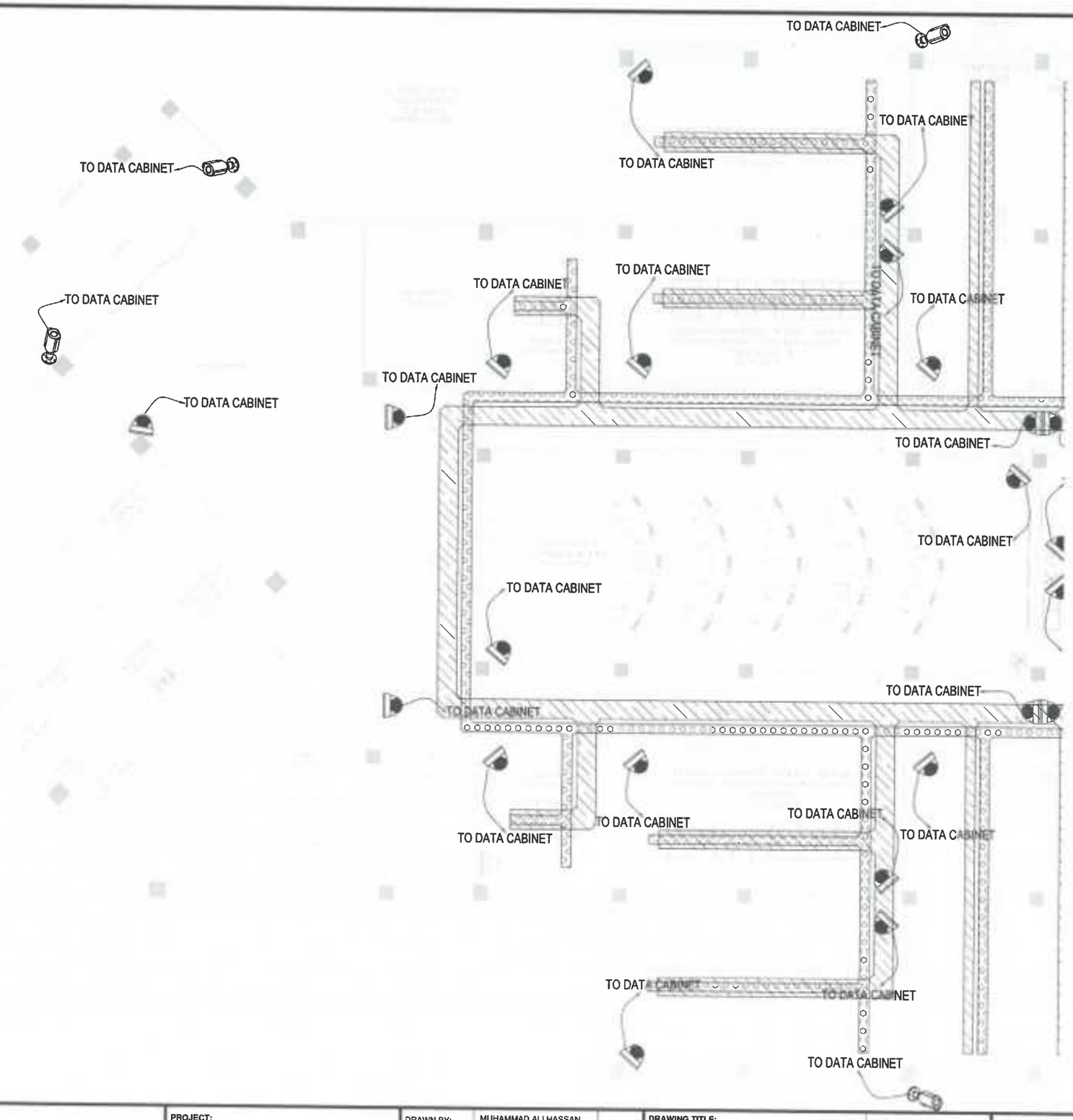
**DRAWING NO:** PITB-MB-MUL-04-ELE36

**SCALE:** 1'=3/32"

**SHEET:**

**TENDER DRAWINGS**

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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWING TITLE:** GROUND FLOOR PLAN-A CCTV SYSTEN LAYOUT |

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|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

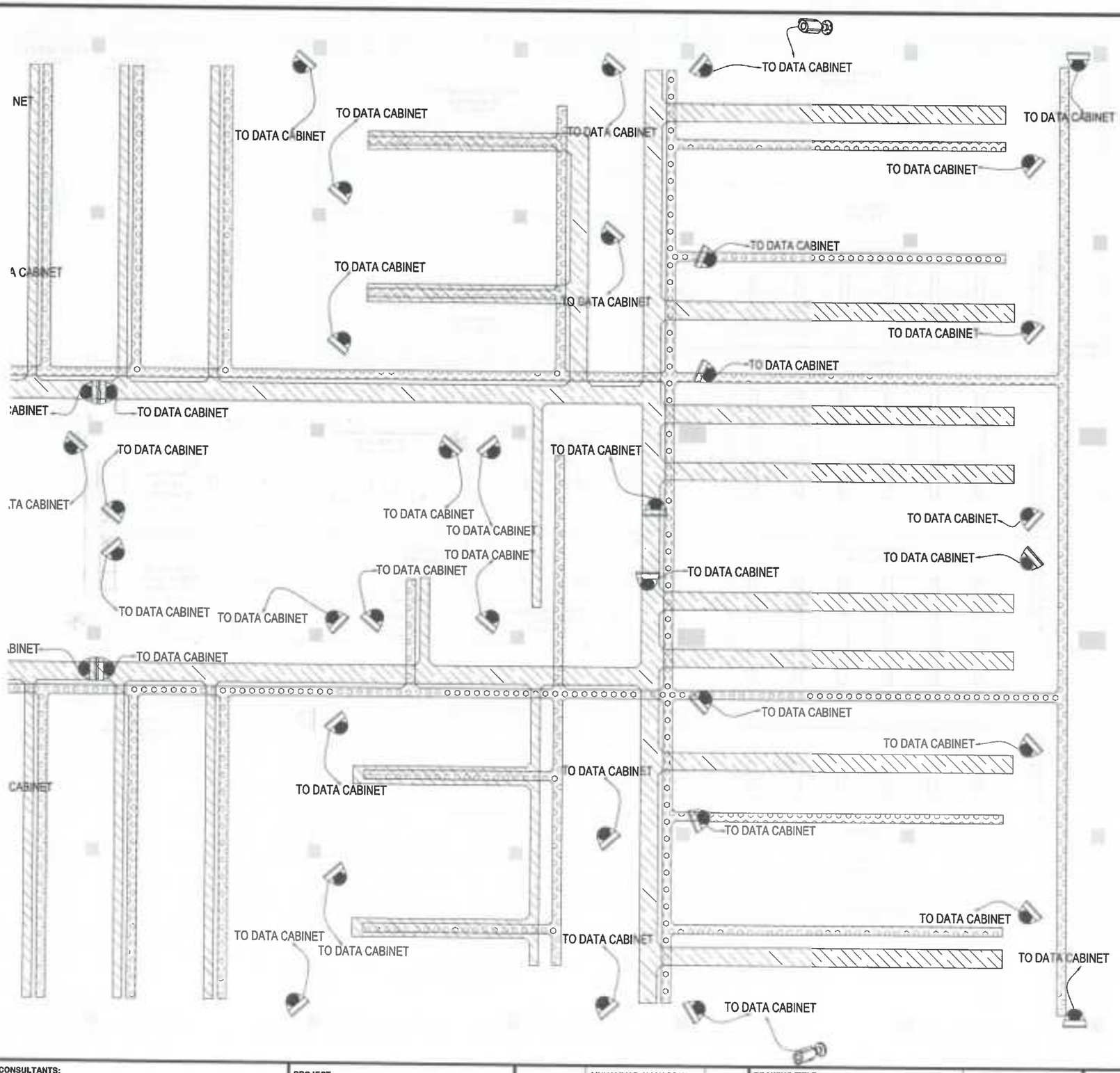
**DRAWING NO:** PITB-MB-MUL-04-ELE37 SHEET 1-2

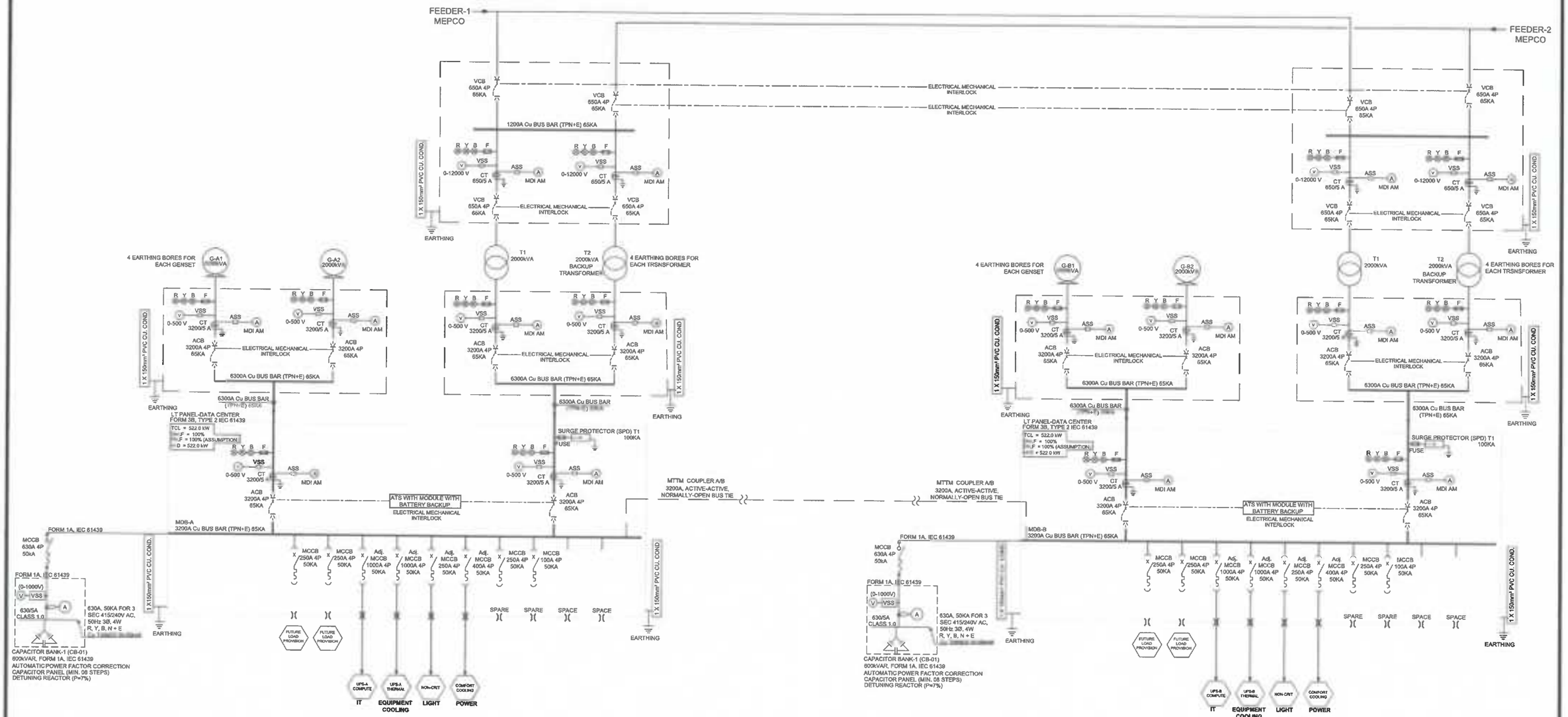
**SCALE:** 1'=1/8"

**SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWN BY:** M.MUBARAK KAZMI<br>**DESIGNED BY:** Engr.GULFAM<br>**CHECKED BY:** Engr.FAHAD<br>**APPROVED BY:** Engr.SADAQAT HUSSAIN<br>**DATE:** 27-08-2026 |

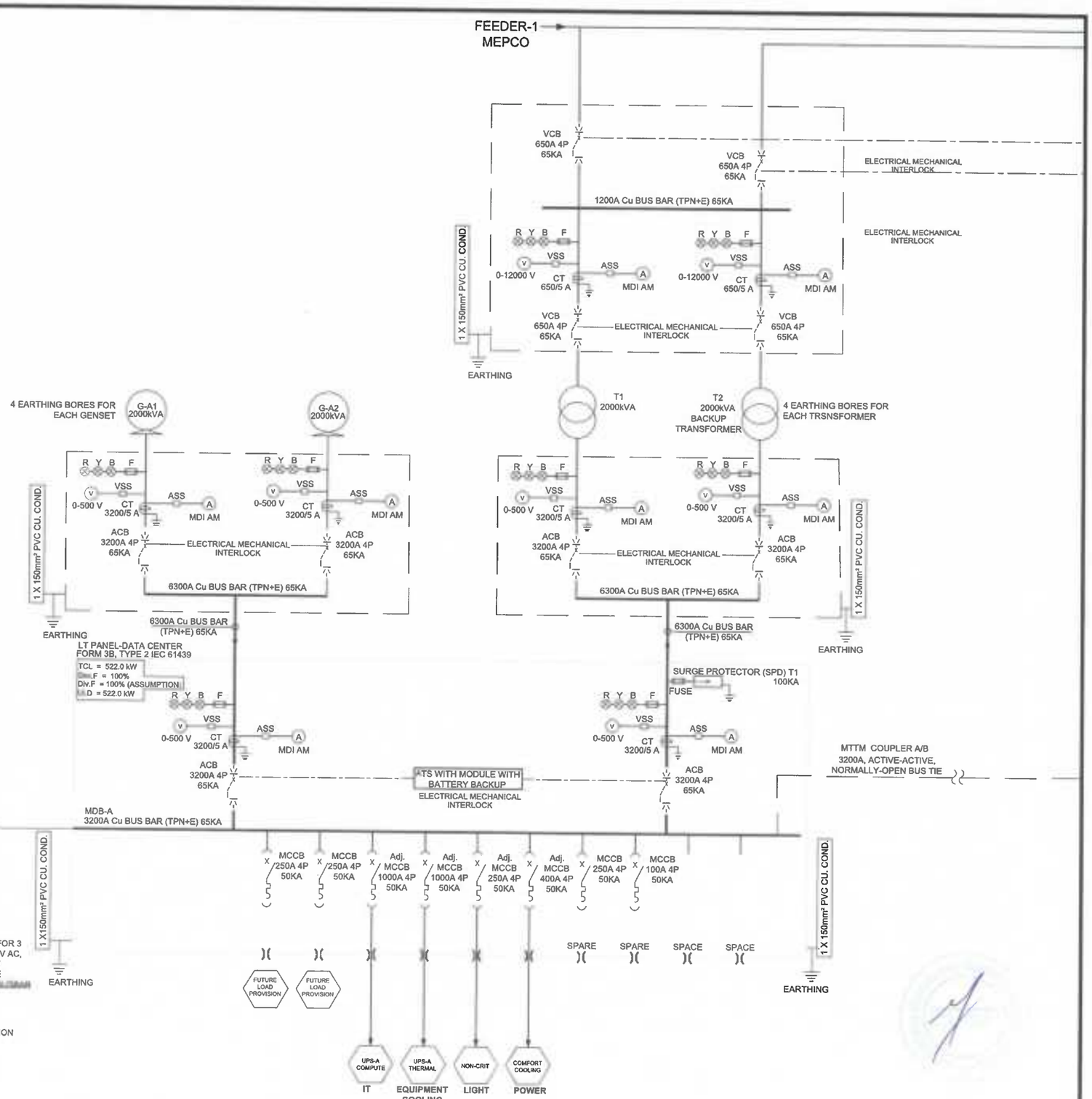
**DRAWING TITLE:** LT PANEL-DATA CENTER ZONE-A&B SINGLE LINE DIAGRAM

**DRAWING NO:** PITB-MB-MUL-04-ELE39

**SCALE:** **SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: M.MUBARAK KAZMI<br>DESIGNED BY: Engr.GULFAM<br>CHECKED BY: Engr.FAHAD<br>APPROVED BY: Engr.SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

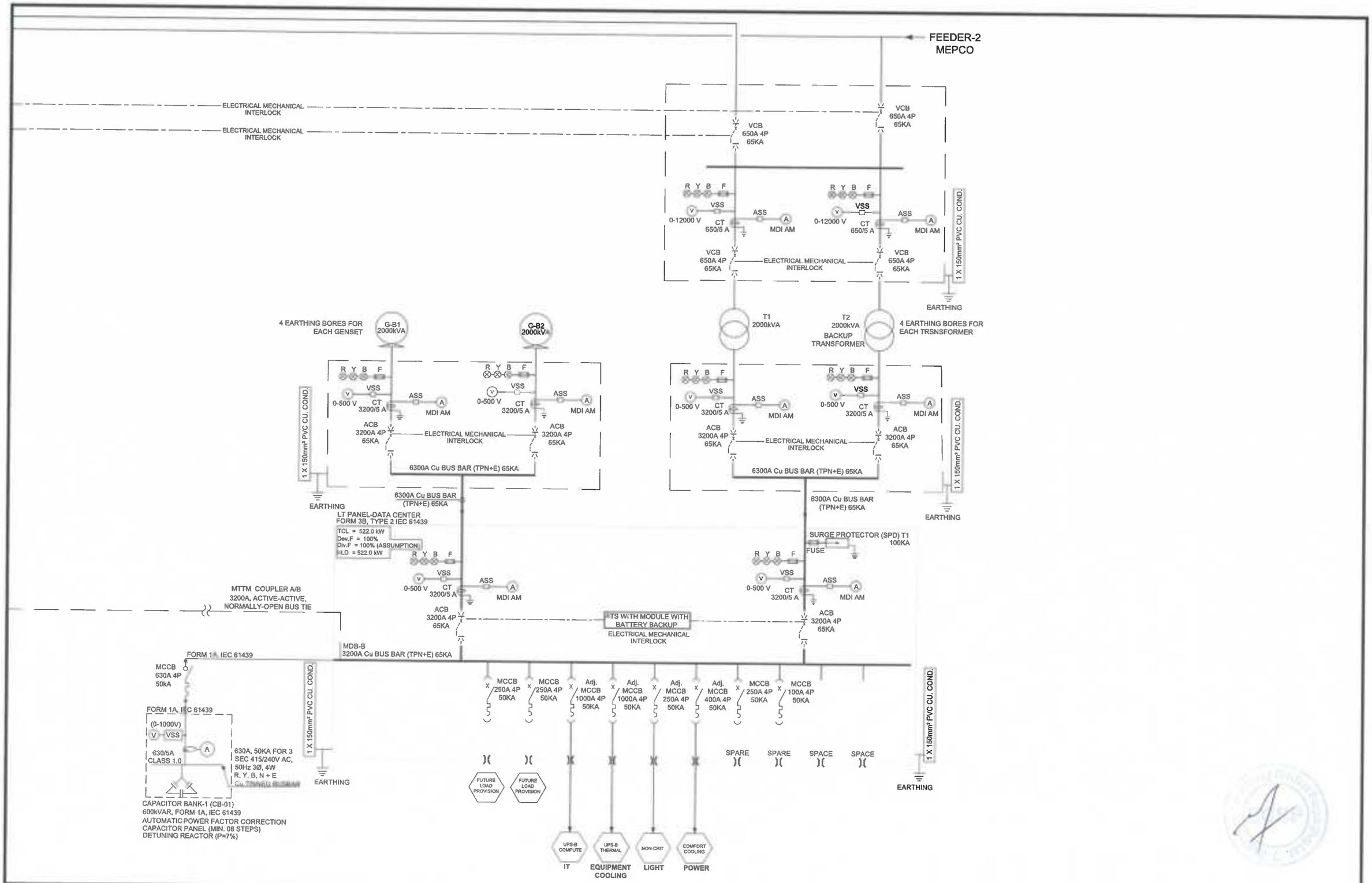
**DRAWING TITLE:** LT PANEL-DATA CENTER ZONE-A SINGLE LINE DIAGRAM

**DRAWING NO:** PITB-MB-MUL-04-ELE40

**SCALE:** **SHEET:**

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
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|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | **DRAWN BY:** M.MUBARAK KAZMI<br>**DESIGNED BY:** Engr.GULFAM<br>**CHECKED BY:** Engr.FAHAD<br>**APPROVED BY:** Engr.SADAQAT HUSSAIN<br>**DATE:** 27-08-2026 |
| **DRAWING TITLE:** LT PANEL-DATA CENTER ZONE-B SINGLE LINE DIAGRAM | **DRAWING NO:** PITB-MB-MUL-04-ELE41<br>**SCALE:** **SHEET:** | **TENDER DRAWINGS** | |

| REV. | DESCRIPTION | SIGN. | DATE |
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## PANEL BOARD NAME:DBLP-BF

PANEL BOARD TYPE: DBLP BF (3WAYS-P+N+E)

DB LOCATION: STAIR LOBBY

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-6mm² Cu/PVC/PVC CABLE + 1C-6mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | IND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 15w | 60w | 600w | 900w | | | | | | | | | |
| DBLP BF (3WAYS-P+N+E) | 1 | C1 | 180.0 | | | 8 | 1 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 1800.0 | | 0 | 0 | 0 | 2 | MCB | 10 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P1 | | | 1800.0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 2 | P2 | 1800.0 | | | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | 3 | ---- | 0.0 | | | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 8 | 1 | 0 | 6 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 1980W | 1800W | 1800W |
| TOTAL LOAD IN KW | 5.6KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 4.5KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBLP BF SCHEDULE
BASEMENT FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE42

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
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| | | | |

# PANEL BOARD NAME:DBLPA1-GF

PANEL BOARD TYPE: DBLPA1 GF (11WAYS-P+N+E)

DB LOCATION: LIQUID & IMMERSED COOLING ROOM COOLING WHITE SPACE (FOR FUTURE ) PLANNING) - A

MAIN INCOMING TRIP BREAKER: 80A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:80A

MAIN CABLE SIZE = 4C-25mm² Cu/PVC/PVC CABLE + 1C-16mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | EMT CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 8w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPA1 GF (11WAYS-P+N+E) | 1 | C1 | 320.0 | | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 240.0 | | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 220.0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 345.0 | | | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C5 | | 600.0 | | 0 | 9 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C6 | | | 600.0 | 0 | 6 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 3 | C7 | 560.0 | | | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | P1 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P3 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P4 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P6 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P7 | | 2000.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | | 3000.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | P9 | 2000.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P10 | | 3000.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | | 2000.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 7 | P12 | 3000.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P13 | | 2000.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P14 | | | 3000.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 8 | P15 | 2000.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P16 | | 3000.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P17 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 9 | P18 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P19 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P20 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 10 | P21 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P22 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P23 | | | 1000.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 11 | P24 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 14 | 33 | 11 | 0 | 23 | 0 | 0 | 0 | 23 | 26 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 15425W | 18040W | 16120W |
| TOTAL LOAD IN KW | 49.6KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 39.7KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

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+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPA1 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE43

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
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# PANEL BOARD NAME:DBLPA2-GF

PANEL BOARD TYPE: DBLPA2 GF (6WAYS-P+N+E)

DB LOCATION: LIQUID & IMMERSED COOLING ROOM COOLING WHITE SPACE (FOR FUTURE ) PLANNING) - B

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm$^2$ Cu/PVC/PVC CABLE + 1C-6mm$^2$ Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | EMT CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 8w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPA2 GF (6WAYS-P+N+E) | 1 | C1 | 320.0 | | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 560.0 | | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 320.0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 320.0 | | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | P1 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P3 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P4 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P6 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P7 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P9 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P10 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | ---- | 0.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 6040W | 6860W | 6620W |
| TOTAL LOAD IN KW | 19.5KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 15.6KW | | |

CLIENT:
Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:
DBLPA2 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE44

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
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# PANEL BOARD NAME:DBLPA3-GF

PANEL BOARD TYPE: DBLPA3 GF (6WAYS-P+N+E)

DB LOCATION: UPS ROOM A

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-6mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 8w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPA3 GF (6WAYS-P+N+E) | 1 | C1 | 320.0 | | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 480.0 | | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 360.0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 320.0 | | | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C5 | | 320.0 | | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C6 | | | 280.0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 3 | P1 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P4 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P7 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P9 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | P10 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | 6 | ---- | 0.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 8 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 6940W | 6200W | 5140W |
| TOTAL LOAD IN KW | 18.3KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 14.6KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPA3 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE45

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

# PANEL BOARD NAME:DBLPA4-GF

PANEL BOARD TYPE: DBLPA4 GF (6WAYS-P+N+E)

DB LOCATION: NON CRITICAL A UPS ROOM

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-6mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 8w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPA4 GF (6WAYS-P+N+E) | 1 | C1 | 160.0 | | | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 360.0 | | 0 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 220.0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | P1 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P4 | 3000.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | 2000.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | | 1200.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P7 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P9 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P10 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | 2000.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P12 | | | 1500.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | P13 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | -- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | -- | SPARE | |
| TOTAL SOCKETS | | | | | | 4 | 10 | 3 | 0 | 0 | 0 | 0 | 3 | 15 | 7 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 9460W | 7960W | 5620W |
| TOTAL LOAD IN KW | 23.0KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 18.4KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

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PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPA4 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE46

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBLPA S1-GF

PANEL BOARD TYPE: DBLPA S1 GF (6WAYS-P+N+E)

DB LOCATION: SUBSTATION ROOM (S1)

MAIN INCOMING TRIP BREAKER: 50A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:50A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-10mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 600w | 900w | 3600w | | | | | | | | | |
| DBLPA S1 GF (6WAYS-P+N+E) | 1 | C1 | 480.0 | | | 12 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 160.0 | | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 480.0 | 12 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 160.0 | | | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C5 | | 160.0 | | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | P1 | | | 1800.0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P2 | 1800.0 | | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | 1800.0 | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P4 | | | 1800.0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P5 | 1800.0 | | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | 1800.0 | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P7 | | | 1800.0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P8 | 1800.0 | | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P9 | | 1800.0 | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | AC1 | | | 3600.0 | 0 | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | 6 | AC2 | 3600.0 | | | 0 | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | MCB | 32 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 36 | 0 | 18 | 2 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 9640W | 5720W | 9480W | | | | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 24.8KW | | | | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 19.9KW | | | | | | | | | | | | | | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPA S1 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE47

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACA1-GF

PANEL BOARD TYPE: DBACA1 GF (5WAYS-P+N+E)

DB LOCATION: LIQUID & IMMERSED COOLING ROOM COOLING WHITE SPACE (FOR FUTURE ) PLANNING) - A

MAIN INCOMING TRIP BREAKER: 80A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:80A

MAIN CABLE SIZE = 4C-25mm² Cu/PVC/PVC CABLE + 1C-16mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 1.5TON | 2 TON | 3.5 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | EMT CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 1800w | 2400w | 3600w | | | | | | | | | |
| DBACA1 GF (5WAYS-P+N+E) | 1 | AC1 | 2400.0 | | | 0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | AC2 | | 2400.0 | | 0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 2400.0 | 0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 2400.0 | | | 0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | AC5 | | 2400.0 | | 0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 2400.0 | 0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | 3 | AC7 | 3600.0 | | | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC8 | | 3600.0 | | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC9 | | | 1800.0 | 1 | 0 | 0 | MCB | 20 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | 4 | ---- | 0.0 | | | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | 5 | ---- | 0.0 | | | 0 | 0 | 0 | MCB | 32 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | MCB | 32 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | MCB | 32 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 1 | 6 | 2 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 8400W | 8400W | 6600W |
| TOTAL LOAD IN KW | 23.4KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 18.7KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

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PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

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|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBACA1 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE48

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACA2-GF

PANEL BOARD TYPE: DBACA2 GF (3WAYS-P+N+E)

DB LOCATION: LIQUID & IMMERSED COOLING ROOM COOLING WHITE SPACE (FOR FUTURE ) PLANNING) - B

MAIN INCOMING TRIP BREAKER: 125A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:125A

MAIN CABLE SIZE = 4C-50mm² Cu/PVC/PVC CABLE + 1C-25mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 7 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 7500w | | | | | | | | | |
| DBACA2 GF (3WAYS-P+N+E) | 1 | AC1 | **7500.0** | | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 7500.0 | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | **7500.0** | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | **7500.0** | | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | **7500.0** | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | **7500.0** | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | **0.0** | | | 0 | MCB | 40 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | **0.0** | | 0 | MCB | 40 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | **0.0** | 0 | MCB | 40 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 15000W | 15000W | 15000W |
| TOTAL LOAD IN KW | 45.0KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 36.0KW | | |

**CLIENT:**
Punjab Information Technology Board (PITB) | Lahore

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**PROJECT:**
CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

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|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

**DRAWING TITLE:**
DBACA2 SCHEDULE
GROUND FLOOR PLAN

**DRAWING NO:** PITB-MB-MUL-04-ELE49

SCALE: SHEET:

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACA3 (1)-GF

PANEL BOARD TYPE: DBACA3 (1) GF (3WAYS-P+N+E)

DB LOCATION: UPS ROOM A

MAIN INCOMING TRIP BREAKER:160A,4P, MCCB, RC:36KA

MAIN COPPER BUS BARS:160A

MAIN CABLE SIZE = 4C-70mm² Cu/PVC/PVC CABLE + 1C-35mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 10 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 10000w | | | | | | | | | |
| DBACA3 (1) GF (3WAYS-P+N+E) | 1 | AC1 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 20000W | 20000W | 20000W |
| TOTAL LOAD IN KW | 60.0KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 48.0KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBACA3 (1) SCHEDULE GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE50

SCALE:

SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACA3 (2)-GF

PANEL BOARD TYPE: DBACA3 (2) GF (3WAYS-P+N+E)

DB LOCATION: UPS ROOM A

MAIN INCOMING TRIP BREAKER: 160A,4P, MCCB, RC:36KA

MAIN COPPER BUS BARS:160A

MAIN CABLE SIZE = 4C-70mm² Cu/PVC/PVC CABLE + 1C-35mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 10 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 10000w | | | | | | | | | |
| DBACA3 (2) GF (3WAYS-P+N+E) | 1 | AC1 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 20000W | 20000W | 20000W | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 60.0KW | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 48.0KW | | | | | | | | | | | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBACA3 (2) SCHEDULE GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE51

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACA3 (3)-GF

PANEL BOARD TYPE: DBACA3 (3) GF (3WAYS-P+N+E)

DB LOCATION: UPS ROOM B FUTURE

MAIN INCOMING TRIP BREAKER: 160A,4P, MCCB, RC:36KA

MAIN COPPER BUS BARS:160A

MAIN CABLE SIZE = 4C-70mm² Cu/PVC/PVC CABLE + 1C-35mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 10 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 10000w | | | | | | | | | |
| DBACA3 (3) GF (3WAYS-P+N+E) | 1 | AC1 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 4C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 4C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 4C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 4C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 4C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 4C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | --- | | | 0.0 | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 20000W | 20000W | 20000W | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 60.0KW | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 48.0KW | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |

DRAWING TITLE: **DBACA3 (3) SCHEDULE GROUND FLOOR PLAN**

DRAWING NO: PITB-MB-MUL-04-ELE52

SCALE: SHEET:

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

# PANEL BOARD NAME:DBACA4-GF

PANEL BOARD TYPE: DBACA4 GF (3WAYS-P+N+E)

DB LOCATION: NON CRITICAL A UPS ROOM

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-6mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 2 TON | 3.5 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | EMT CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 2400w | 3600w | | | | | | | | | |
| DBACA4 GF (3WAYS-P+N+E) | 1 | AC1 | 3600.0 | | | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 3600.0 | | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 2400.0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 2400.0 | | | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | AC5 | | 2400.0 | | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 2400.0 | 1 | 0 | MCB | 32 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | 0 | MCB | 32 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | MCB | 32 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | MCB | 32 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 4 | 2 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 6000W | 6000W | 4800W | | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 16.8KW | | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 13.4KW | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 |
| DRAWING TITLE: DBACA4 SCHEDULE GROUND FLOOR PLAN | DRAWING NO: PITB-MB-MUL-04-ELE53<br>SCALE: SHEET: | TENDER DRAWINGS | REV. \| DESCRIPTION \| SIGN. \| DATE |

# PANEL BOARD NAME:DBLPB1-GF

PANEL BOARD TYPE: DBLPB1 GF (7WAYS-P+N+E)

DB LOCATION: LIQUID & IMMERSED COOLING /HYBRID COOLING WHITE SPACE (FOR FUTURE PLANNING) - A

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-6mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | END WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 40w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPA1 GF (7WAYS-P+N+E) | 1 | C1 | 320.0 | | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 320.0 | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 240.0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 560.0 | | | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C5 | | 165.0 | | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C6 | | | 440.0 | 0 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 3 | C7 | 384.0 | | | 0 | 0 | 0 | 10 | 6 | 2 | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | P1 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P3 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P4 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P6 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P7 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | P9 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P10 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 7 | P12 | 1200.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 22 | 22 | 2 | 10 | 17 | 2 | 4 | 2 | 19 | 0 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 6064W | 6785W | 7880W |
| TOTAL LOAD IN KW | 20.7KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 16.6KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPB1 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE54

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

# PANEL BOARD NAME:DBLPB2-GF

PANEL BOARD TYPE: DBLPB2 GF (6WAYS-P+N+E)

DB LOCATION: ELECTRICAL ROOM

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-10mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 8w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPB2 GF (6WAYS-P+N+E) | 1 | C1 | 560.0 | | | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 320.0 | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 320.0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | P1 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P4 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P7 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P9 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P10 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P12 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | P13 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 8660W | 5720W | 4820W |
| TOTAL LOAD IN KW | 19.2KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 15.4KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPB2 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE55

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

# PANEL BOARD NAME:DBLPB3-GF

PANEL BOARD TYPE: DBLPB3 GF (7WAYS-P+N+E)

DB LOCATION: UPS ROOM B

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm$^2$ Cu/PVC/PVC CABLE + 1C-10mm$^2$ Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 40w | 40w | 60w | 12w | 15w | 7w | EXIT 8w | 600w | 900w | 1000w | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | | | | | | | | | | | | | | | | | | | |
| DBLPB3 GF (7WAYS-P+N+E) | 1 | C1 | 320.0 | | | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 480.0 | | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 360.0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 320.0 | | | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | C5 | | 320.0 | | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | C6 | | | 280.0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P1 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P4 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P7 | 900.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P9 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 6 | P10 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P11 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 7 | ---- | 0.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 8 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 6940W | 7100W | 4240W |
| TOTAL LOAD IN KW | 18.3KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 14.6KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBLPB3 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE56

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
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| | | | |

## PANEL BOARD NAME:DBACB3 (1)-GF

PANEL BOARD TYPE: DBACB3 (1) GF (3WAYS-P+N+E)

DB LOCATION: UPS ROOM B

MAIN INCOMING TRIP BREAKER: 160A,4P, MCCB, RC:36KA

MAIN COPPER BUS BARS:160A

MAIN CABLE SIZE = 4C-75mm² Cu/PVC/PVC CABLE + 1C-35mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 10 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 10000w | | | | | | | | | |
| DBACB3 (1) GF (3WAYS-P+N+E) | 1 | AC1 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 20000W | 20000W | 20000W | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 60.0KW | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 48.0KW | | | | | | | | | | | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

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PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBACB3 (1) SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE57

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBLPB4-GF

PANEL BOARD TYPE: DBLPB4 GF (5WAYS-P+N+E)

DB LOCATION: NON CRITICAL B UPS ROOM

MAIN INCOMING TRIP BREAKER: 32A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:32A

MAIN CABLE SIZE = 4C-6mm$^2$ Cu/PVC/PVC CABLE + 1C-6mm$^2$ Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIR | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 40w | 40w | 60w | 12w | 15w | 7w | 8w | 600w | 900w | 1000w | | | | | | | | | |
| DBLPB4 GF (5WAYS-P+N+E) | 1 | C1 | 160.0 | | | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 160.0 | | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 220.0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | P1 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P2 | | 900.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | | 1800.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P4 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P5 | | 1800.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | | 900.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P7 | 1800.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P8 | | 2400.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | 5 | ---- | 0.0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 8 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 14 | 0 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 5560W | 5260W | 2920W |
| TOTAL LOAD IN KW | 13.7KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 11.0KW | | |

CLIENT:

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PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | Engr. GULFAM ZIA |
| CHECKED BY: | Engr. FAHAD SHAHID |
| APPROVED BY: | Engr. SADAQAT HUSSAIN |
| DATE: | 27-08-2026 |

DRAWING TITLE:

DBLPB4 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE58

SCALE: SHEET:

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACB1-GF

PANEL BOARD TYPE: DBACB1 GF (2WAYS-P+N+E)

DB LOCATION: LIQUID & IMMERSED COOLING ROOM COOLING WHITE SPACE (FOR FUTURE ) PLANNING) - A

MAIN INCOMING TRIP BREAKER: 80A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:80A

MAIN CABLE SIZE = 4C-6mm$^2$ Cu/PVC/PVC CABLE + 1C-6mm$^2$ Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 1TON | 3.5 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | EMT CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 1200w | 3600w | | | | | | | | | |
| DBACB1 GF (2WAYS-P+N+E) | 1 | AC1 | 3600.0 | | | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 3600.0 | | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 1200.0 | 1 | 0 | MCB | 20 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 1200.0 | | | 1 | 0 | MCB | 20 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | ---- | | 0.0 | | 0 | 0 | MCB | 32 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | MCB | 32 | 3 | 10 | --- | --- | --- | SPARE | |
| | 3 | ---- | 0.0 | | | 0 | 0 | MCB | 32 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 2 | 2 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 4800W | 3600W | 1200W |
| TOTAL LOAD IN KW | 9.6KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 7.7KW | | |

CLIENT:

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PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBACB1 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE59

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACB2-GF

PANEL BOARD TYPE: DBACB2 GF (3WAYS-P+N+E)

DB LOCATION: ELECTRICAL ROOM

MAIN INCOMING TRIP BREAKER: 125A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:125A

MAIN CABLE SIZE = 4C-50mm² Cu/PVC/PVC CABLE + 1C-25mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 7 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 7500w | | | | | | | | | |
| DBACB2 GF (3WAYS-P+N+E) | 1 | AC1 | 7500.0 | | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 7500.0 | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 7500.0 | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 7500.0 | | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 7500.0 | | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 7500.0 | 1 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | 4C10mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | ---- | | 0.0 | | 0 | MCB | 32 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | MCB | 32 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 15000W | 15000W | 15000W | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 45.0KW | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 36.0KW | | | | | | | | | | | | |

CLIENT:
Punjab Information Technology Board (PITB) | Lahore

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PROJECT:
CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

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|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:
DBACB2 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO:
PITB-MB-MUL-04-ELE60

SCALE:

SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACB3 (2)-GF

PANEL BOARD TYPE: DBACB3 (2) GF (3WAYS-P+N+E)

DB LOCATION: UPS ROOM A FUTURE EXPENSION

MAIN INCOMING TRIP BREAKER: 160A,4P, MCCB, RC:36KA

MAIN COPPER BUS BARS:160A

MAIN CABLE SIZE = 4C-70mm$^2$ Cu/PVC/PVC CABLE + 1C-35mm$^2$ Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 10 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 10000w | | | | | | | | | |
| DBACB3 (2) GF (3WAYS-P+N+E) | 1 | AC1 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 20000W | 20000W | 20000W |
| TOTAL LOAD IN KW | 60.0KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 48.0KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

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PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBACB3 (2) SCHEDULE GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE61

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACB3 (3)-GF

PANEL BOARD TYPE: DBACB3 (3) GF (3WAYS-P+N+E)

DB LOCATION: NON CRITICAL B UPS ROOM

MAIN INCOMING TRIP BREAKER: 160A,4P, MCCB, RC:36KA

MAIN COPPER BUS BARS:160A

MAIN CABLE SIZE = 4C-70mm² Cu/PVC/PVC CABLE + 1C-35mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 10 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 10000w | | | | | | | | | |
| DBACB3 (3) GF (3WAYS-P+N+E) | 1 | AC1 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 10000.0 | | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 10000.0 | | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | | AC6 | | | 10000.0 | 1 | MCB | 40 | 3 | 10 | 4C16mm² | 1C10mm² | Ø25mm | POWER AC | |
| | 3 | ---- | 0.0 | | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | MCB | 40 | 3 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 6 | | | | | | | | | |
| PHASE LOAD IN WATT | | | 20000W | 20000W | 20000W | | | | | | | | | | |
| TOTAL LOAD IN KW | | | 60.0KW | | | | | | | | | | | | |
| DEMAND FACTOR | | | 80% | | | | | | | | | | | | |
| TOTAL DEMAND LOAD | | | 48.0KW | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: Engr. GULFAM ZIA<br>CHECKED BY: Engr. FAHAD SHAHID<br>APPROVED BY: Engr. SADAQAT HUSSAIN<br>DATE: 27-08-2026 | **DRAWING TITLE:** DBACB3 (3) SCHEDULE GROUND FLOOR PLAN | **DRAWING NO:** PITB-MB-MUL-04-ELE62<br>SCALE: SHEET: |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

## PANEL BOARD NAME:DBACB4-GF

PANEL BOARD TYPE: DBACB4 GF (3WAYS-P+N+E)

DB LOCATION: NON CRITICAL A UPS ROOM

MAIN INCOMING TRIP BREAKER: 40A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:40A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-6mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | 1.5TON | 2 TON | 3.5 TON | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIR | EMT CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | 1800w | 2400w | 3600w | | | | | | | | | |
| DBACB4 GF (3WAYS-P+N+E) | 1 | AC1 | 3600.0 | | | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC2 | | 3600.0 | | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC3 | | | 3600.0 | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | 2 | AC4 | 3600.0 | | | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | AC5 | | 1800.0 | | 1 | 0 | 0 | MCB | 20 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER AC | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | 3 | ---- | 0.0 | | | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | MCB | 20 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 1 | 0 | 4 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 7200W | 5400W | 3600W |
| TOTAL LOAD IN KW | 16.2KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 13.0KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBACB4 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE63

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

# PANEL BOARD NAME:DBLPA S2-GF

PANEL BOARD TYPE: DBLPA S2 GF (6WAYS-P+N+E)

DB LOCATION: SUBSTATION ROOM (S2)

MAIN INCOMING TRIP BREAKER: 50A,4P, MCCB, RC:25KA

MAIN COPPER BUS BARS:50A

MAIN CABLE SIZE = 4C-10mm² Cu/PVC/PVC CABLE + 1C-10mm² Cu/PVC/PVC

| NO. OF WAYS | S-NO | CIRC# | CIRCUIT LOAD/WATTS | | | | | | | BREAKER TYPE | TRIP AMPS | NO. POLE | RC (KA) | WIRE | GND WIRE | CONDUIT | LOAD SERVED | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R | Y | B | | | | | | | | | | | | | |
| | | | | | | 40w | 600w | 900w | 3600w | | | | | | | | | |
| DBLPA S2 GF (6WAYS-P+N+E) | 1 | C1 | 480.0 | | | 12 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C2 | | 160.0 | | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C3 | | | 480.0 | 12 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | 2 | C4 | 160.0 | | | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | C5 | | 160.0 | | 4 | 0 | 0 | 0 | MCB | 10 | 1 | 10 | 1.5mm² | 1.5mm² | Ø25mm | LIGHTING | |
| | | P1 | | | 1800.0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 3 | P2 | 1800.0 | | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P3 | | 1800.0 | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P4 | | | 1800.0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 4 | P5 | 1800.0 | | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P6 | | 1800.0 | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P7 | | | 1800.0 | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | 5 | P8 | 1800.0 | | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | P9 | | 1800.0 | | 0 | 0 | 2 | 0 | MCB | 16 | 1 | 10 | 6mm² | 6mm² | Ø25mm | POWER SOCKETS | |
| | | AC1 | | | 3600.0 | 0 | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | 6 | AC2 | 3600.0 | | | 0 | 0 | 0 | 1 | MCB | 32 | 3 | 10 | 10mm² | 10mm² | Ø25mm | POWER AC | |
| | | ---- | | 0.0 | | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| | | ---- | | | 0.0 | 0 | 0 | 0 | 0 | MCB | 16 | 1 | 10 | --- | --- | --- | SPARE | |
| TOTAL SOCKETS | | | | | | 36 | 0 | 18 | 2 | | | | | | | | | |

| | | | |
|---|---|---|---|
| PHASE LOAD IN WATT | 9640W | 5720W | 9480W |
| TOTAL LOAD IN KW | 24.8KW | | |
| DEMAND FACTOR | 80% | | |
| TOTAL DEMAND LOAD | 19.9KW | | |

CLIENT:

Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:

ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:

CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | | |
|---|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN | |
| DESIGNED BY: | Engr. GULFAM ZIA | |
| CHECKED BY: | Engr. FAHAD SHAHID | |
| APPROVED BY: | Engr. SADAQAT HUSSAIN | |
| DATE: | 27-08-2026 | |

DRAWING TITLE:

DBLPA S2 SCHEDULE
GROUND FLOOR PLAN

DRAWING NO: PITB-MB-MUL-04-ELE64

SCALE: SHEET:

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |

GROUND FLOOR PLAN-A

GROUND FLOOR PLAN-B

GROUND FLOOR PLAN-C

899'-8 1/2"

20'-0" WIDE ROAD

EXIT

GUARD

GREEN FIELD

RAMP UP

20'-0" WIDE ROAD

GEN SET SYNC.MTTM B ZONE

1000kVA / 1500kVA
3000 kVA DG B-2

1000kVA / 1500kVA
3000 kVA DG B-1

INCOMING

OUTGOING

B1-B2

A1-A2

3000 kVA DG B-1
1000kVA / 1500kVA

3000 kVA DG B-2
1000kVA / 1500kVA

CABLE TRAY 12"-12"

CABLE TRAY 24"-24"

MMR A

MMR B

ENT.

GUARD

34'-6"

67'

20'

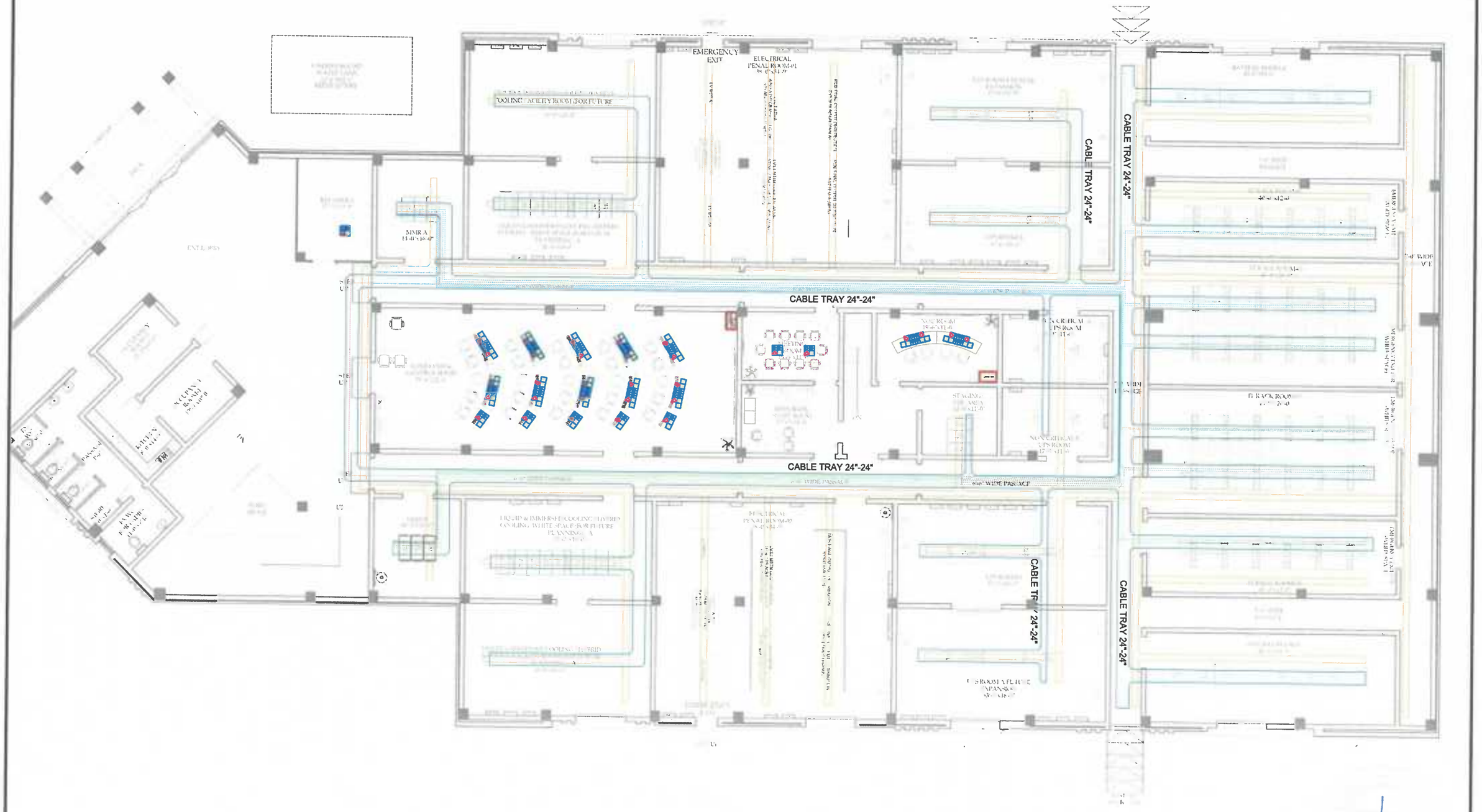
297'-4"

7'

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: Punjab Information Technology Board (PITB) \| Lahore | DESIGN CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: TALHA ISLAM<br>CHECKED BY: TANZEEL UR REHMAN<br>APPROVED BY:<br>DATE: AUGUST-2026 | DRAWING TITLE: MASTER PLAN GROUND FLOOR PLAN CCTV LAYOUT | DRAWING NO: PITB-MB-MUL-04-IT-01<br>SCALE: 1'=1/16"<br>SHEET: |

TENDER DRAWINGS

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: TALHA ISLAM<br>CHECKED BY: Engr. TANZEEL UR REHMAN<br>APPROVED BY:<br>DATE: 27-08-2026 | **DRAWING TITLE:** MASTER GROUND FLOOR PLAN OS2 24-CORE FIBER CABLE DATA FLOOR CABLE | **DRAWING NO:** PITB-MB-MUL-04-IT01<br>SCALE: SHEET: |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

NOTE:

1- BULLET CAMERA (CCTV): OUTDOOR / LONG RANGE SURVEILLANCE CAMERA FOR PERIMETER AND GENERAL AREA MONITORING.

2- DOME CAMERA (CCTV): INDOOR / CEILING-MOUNTED SURVEILLANCE CAMERA FOR OFFICES, CORRIDORS AND COMMON AREAS.

3- WIRELESS ACCESS POINT (WAP): PROVIDES WIRELESS NETWORK CONNECTIVITY FOR AUTHORIZED USERS AND DEVICES.

4- OS2 24 CORE FIBER: BACKBONE FIBER CONNECTING MMR-A AND MMR-B TO IT RACK ROOMS (PODS), PROVIDING HIGH-CAPACITY AND REDUNDANT CONNECTIVITY.

5- OM4 24-CORE FIBER: DEDICATED FIBER CONNECTIVITY FOR LIQUID-COOLED RACKS, LINKING THEM WITH MMR-A AND MMR-B FOR RESILIENT DATA PATHS.

6- CAT-7 ETHERNET CABLE: HIGH-SPEED BACKBONE CABLING CONNECTING MMR-A / MMR-B WITH IT RACK ROOMS, ENSURING FAULT TOLERANCE AND NETWORK REDUNDANCY.

7- CABLE TRAY: STRUCTURED CABLE-MANAGEMENT INFRASTRUCTURE USED TO SAFELY ROUTE AND ORGANIZE CABLES BETWEEN ROOMS, RACKS AND DESIGNATED LOCATIONS.

8- DATA CABINET: NETWORK CABINET FOR SWITCHES, PATCH PANEL, FIBER TERMINATION, CABLE MANAGEMENT AND ALSO WILL BE USED FOR OFFICE LAN

9- CAT-6 ETHERNET CABLE: DEDICATED CAT-6 ETHERNET CABLE FOR CCTV CAMERAS AND OFFICE LAN.

## NETWORK

| | | | |
|---|---|---|---|
| 01 | FIXED BULLET CAMERA |  | REFER TO DWG |
| 02 | DOME CAMERA |  | ---------- |
| 03 | CCTV CABINET |  | ---------- |
| 04 | WIRELESS ACCESS POINT (WAP) |  | ---------- |
| 05 | OS2 24-CORE FIBER CABLE | | PITB-MB-MUL-04-IT01 |
| 06 | CAT-7 10G ETHERNET CABLE | | PITB-MB-MUL-04-IT02 |
| 07 | OM4 24-CORE FIBER CABLE | | PITB-MB-MUL-04-IT03 |
| 08 | CAT-6 ETHERNET CABLE | | PITB-MB-MUL-04-IT04 |
| 09 | CABLE TRAY 24"x24" | | ---------- |
| 10 | CABLE TRAY 12"x12" | | ---------- |

CLIENT:
Punjab Information Technology Board (PITB) | Lahore

CONSULTANTS:
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

| | |
|---|---|
| DRAWN BY: | MUHAMMAD ALI HASSAN |
| DESIGNED BY: | TALHA ISLAM |
| CHECKED BY: | Engr. TANZEEL UR REHMAN |
| APPROVED BY: | |
| DATE: | 27-08-2026 |

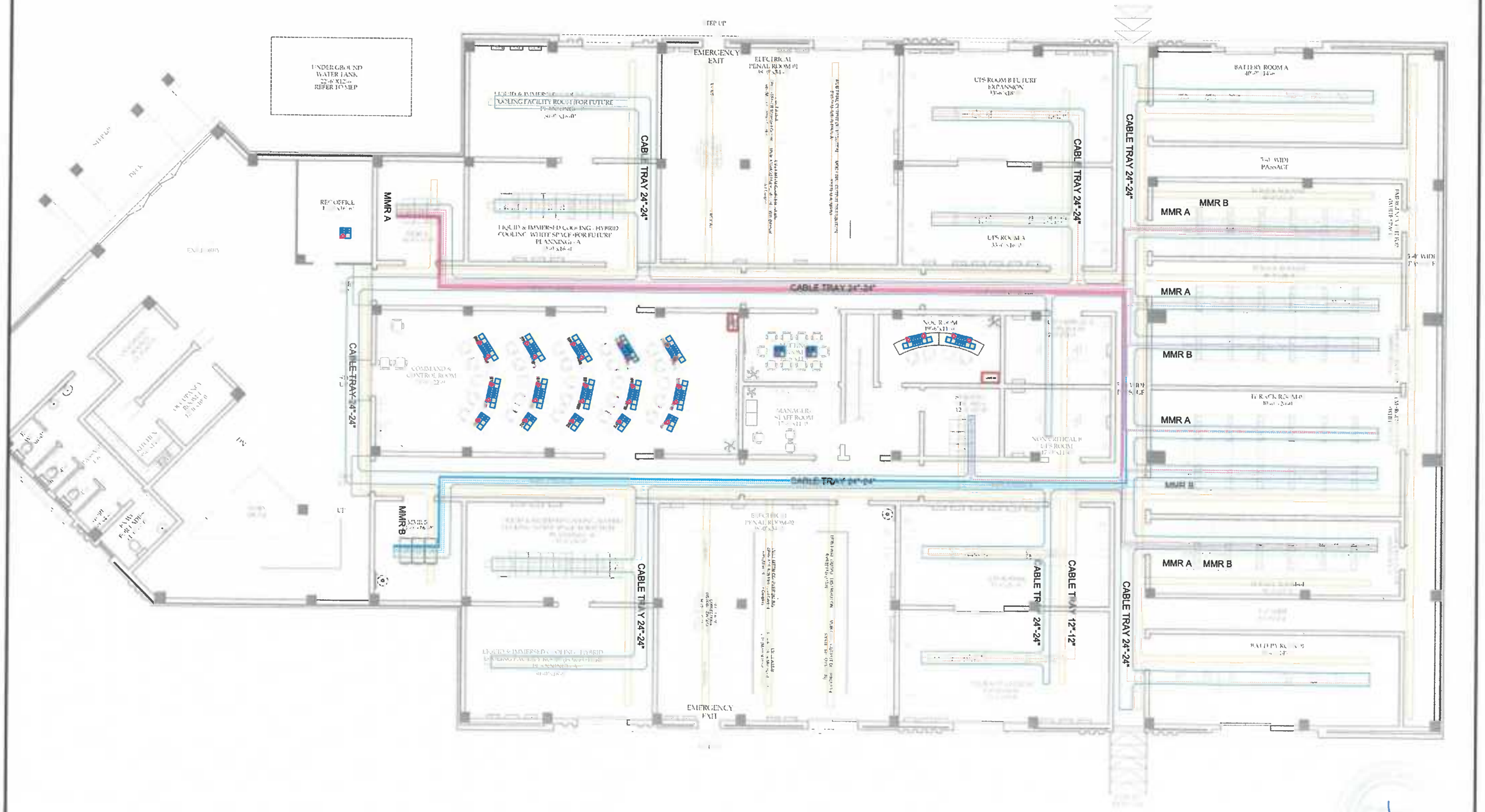
DRAWING TITLE:
LEGEND

DRAWING NO:
PITB-MB-MUL-04-IT00

SCALE: SHEET:

TENDER DRAWINGS

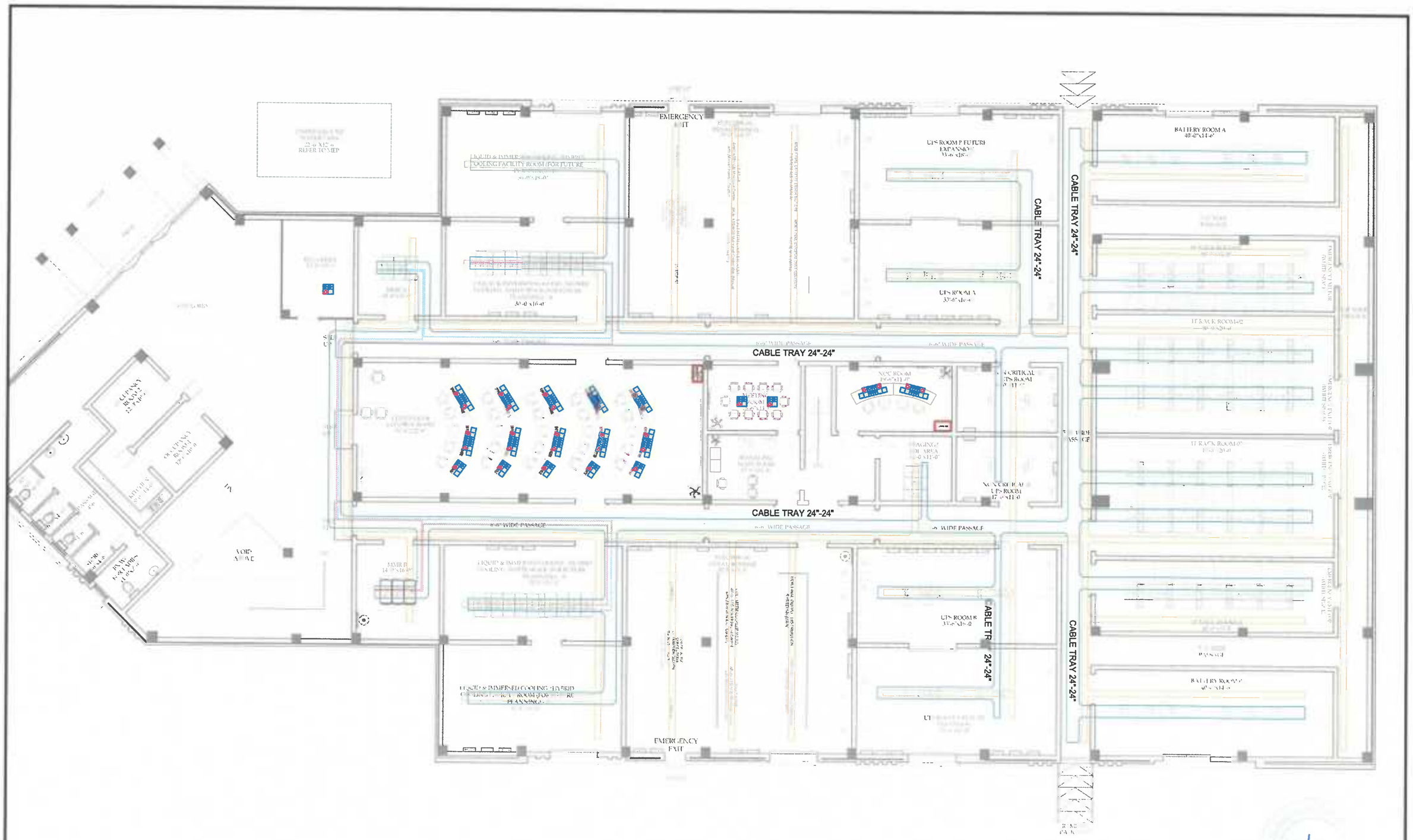
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




| | | | | | |
|---|---|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: TALHA ISLAM<br>CHECKED BY: Engr. TANZEEL UR REHMAN<br>APPROVED BY:<br>DATE: 27-08-2026 | **DRAWING TITLE:** MASTER GROUND FLOOR PLAN CAT-7 10G ETHERNET CABLE DATA FLOOR CABLE | **DRAWING NO:** PITB-MB-MUL-04-IT02<br>SCALE: SHEET: |

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




| | | | |
|---|---|---|---|
| **CLIENT:** Punjab Information Technology Board (PITB) \| Lahore | **CONSULTANTS:** ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | **PROJECT:** CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN | DRAWN BY: MUHAMMAD ALI HASSAN<br>DESIGNED BY: TALHA ISLAM<br>CHECKED BY: Engr. TANZEEL UR REHMAN<br>APPROVED BY:<br>DATE: 27-08-2026 |

**DRAWING TITLE:** MASTER GROUND FLOOR PLAN OM4 24-CORE FIBER CABLE DATA FLOOR CABLE

**DRAWING NO:** PITB-MB-MUL-04-IT03

SCALE: SHEET:

**TENDER DRAWINGS**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|

# PUNJAB INFORMATION TECHNOLOGYBOARD (PITB)
# LAHORE

# CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

## SEWERAGE WORKS

## TENDER DRAWING

**AUGUST, 2026**


**CONSULTANTS:**

**ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).**
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# LIST OF DRAWINGS

| S.NO. | TITLE OF DRAWING | DRAWING NO. |
|---|---|---|
| **LIST OF DRAWING** | | |
| 1 | LIST OF DRAWING | LOD-01 |
| **SEWER LINE LAYOUT PLAN** | | |
| 2 | SEWER LINE LAYOUT PLAN | SS-LP-01 |
| **SEWER LINE PROFILE** | | |
| 3 | SEWER LINE PROFILE-1<br>00+00 TO 7+61 (MH-01 TO EXISTING MH) | SS-PR1-01 |
| **MISCELLANEOUS DETAILS** | | |
| 4 | MANHOLE DETAIL | SS-MD-01 |
| 5 | HOUSE CONNECTION DETAIL | SS-MD-02 |
| 6 | RAIN WATER COLLECTING CHAMBER DETAIL | SS-MD-03 |
| 7 | TRENCH DETAIL | SS-MD-04 |
| 8 | R.C.C PIPE REINFORCEMENT DETAIL | SS-MD-05 |

**CLIENT:**
PUNJAB INFORMATION TECHNOLOGY BOARD (PITB)
LAHORE

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
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info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | | |
|---|---|---|
| DRAWN BY: | USMAN MUSTAFA | |
| DESIGNED BY: | ENGR. HASEEB ASHRAF | |
| CHECKED BY: | ENGR. BILAL | |
| APPROVED BY: | ENGR. KAMRAN | |
| DATE: | AUGUST, 2026 | |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

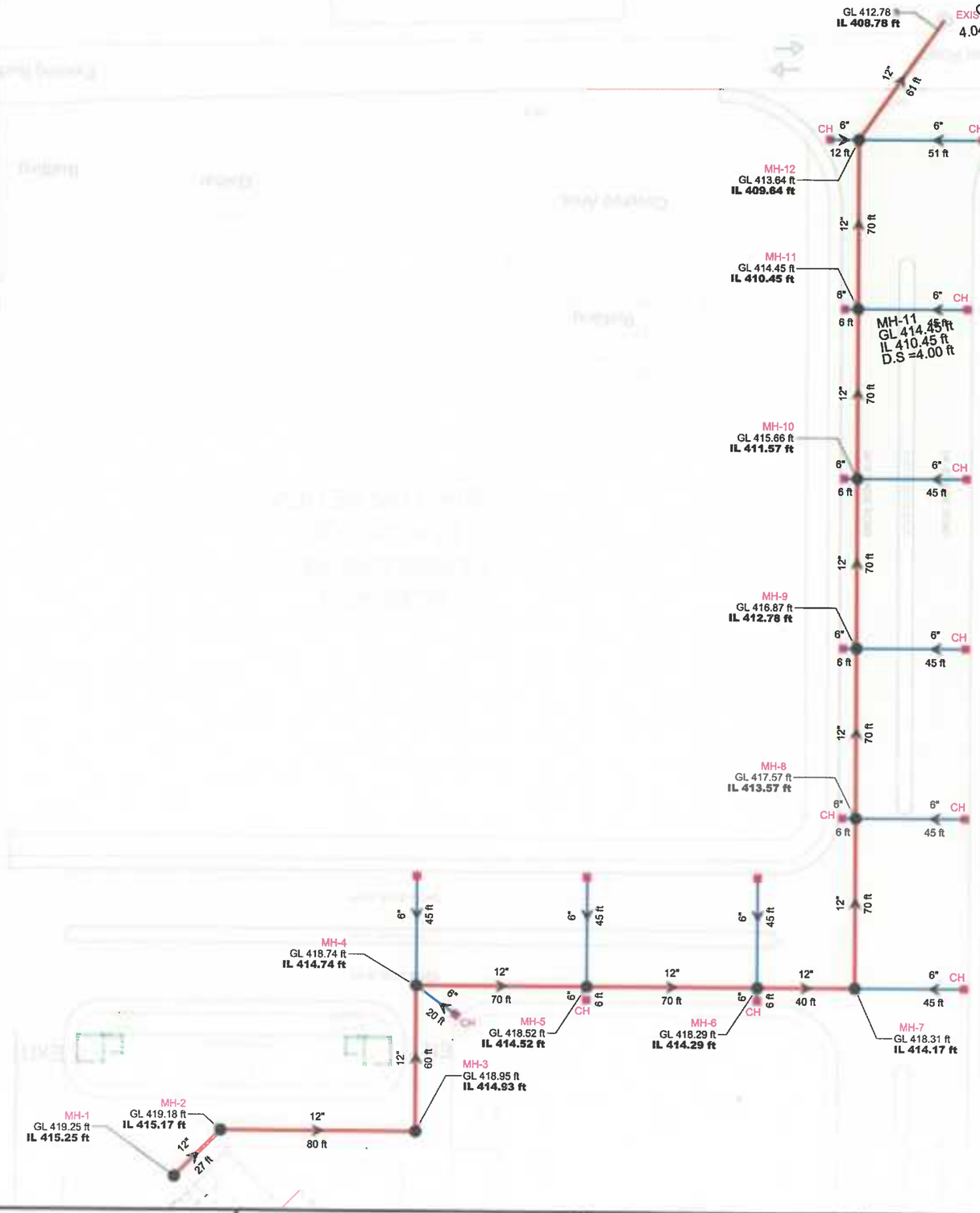
**DRAWING TITLE:**
SEWERAGE SYSTEM
LIST OF DRAWINGS

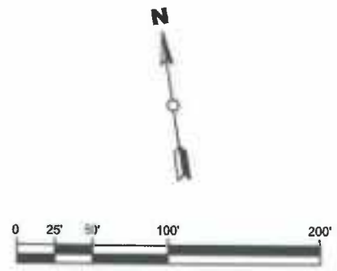
**DRAWING NO:** LOD-01

**SCALE:**

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |




**NOTE**

1. ALL DIMENSION ARE IN FEET UNLESS OTHERWISE SPECIFIED.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.

**LEGEND**

| | |
|---|---|
| PROPOSED SEWERAGE | |
| FLOW DIRECTION | |
| DISTANCE | 163.3 ft |
| SEWER DIA | 9" |
| MANHOLE | |
| CATCH PIT CHAMBER | CH |
| MANHOLE NUMBER | MH-1 |
| GROUND LEVEL | GL 417.57 ft |
| INVERT LEVEL | **GL 417.57 ft** |

**PROPOSED SEWERAGE PIPE SLOPE TABLE**

| SR NO. | PIPE DIA (in.) | PIPE COLOR | MINIMUM SLOPE |
|---|---|---|---|
| 1 | Ø6" | | 0.02 |
| 2 | Ø12" | | 0.003 |

**CLIENT:**
PUNJAB INFORMATION TECHNOLOGY BOARD (PITB)
LAHORE

**CONSULTANTS:**
ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP).
83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan.
+92-42-99333976, +92-42-5717681-4
info@ecsp.com.pk www.ecsp.com.pk

**PROJECT:**
**ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN**

| | |
|---|---|
| DRAWN BY: | USMAN MUSTAFA |
| DESIGNED BY: | ENGR. HASEEB ASHRAF |
| CHECKED BY: | ENGR. BILAL |
| APPROVED BY: | ENGR. KAMRAN |
| DATE: | AUGUST, 2026 |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

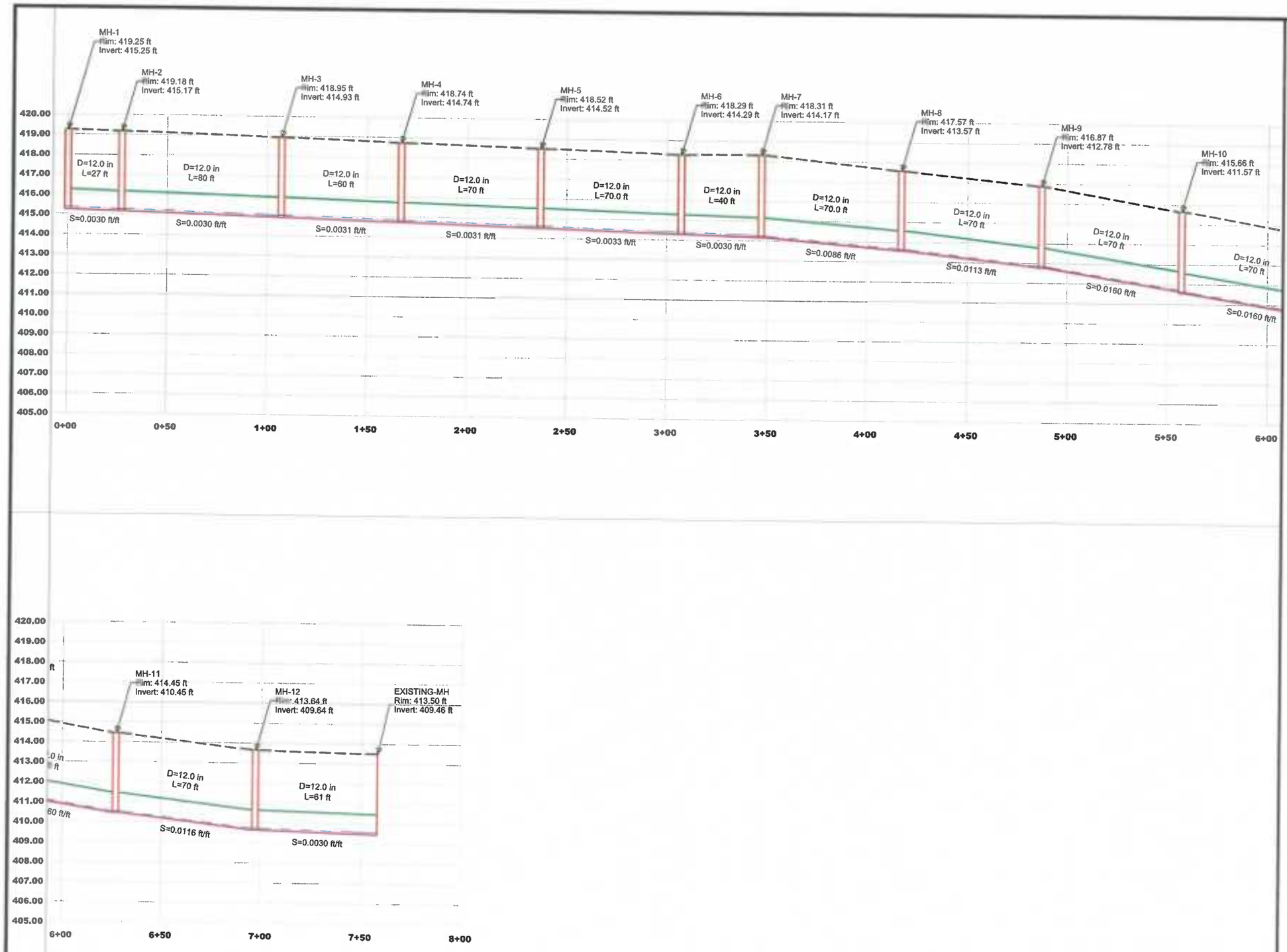
**DRAWING TITLE:**
**SEWERAGE SYSTEM**
LAYOUT PLAN

**DRAWING NO:** SS-LP-01

**SCALE:** 1" = 50'

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |







**NOTE :-**

1. ALL DIMENSION ARE IN FEET UNLESS OTHERWISE SPECIFIED.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.

**LEGEND:**

MANHOLE

GROUND ELEVATION

CROWN

HYDRAULIC GRADE

INVERT

| | | | |
|---|---|---|---|
| CLIENT: PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: USMAN MUSTAFA<br>DESIGNED BY: ENGR. HASEEB ASHRAF<br>CHECKED BY: ENGR. BILAL<br>APPROVED BY: ENGR. KAMRAN<br>DATE: AUGUST, 2026 |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

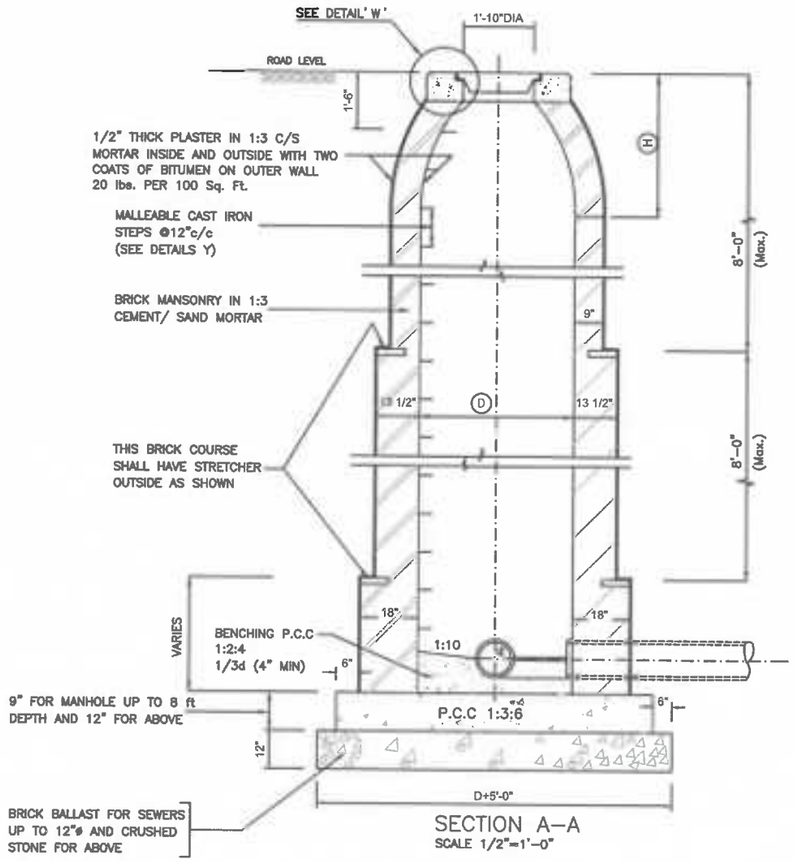
DRAWING TITLE:
**SEWERAGE SYSTEM**
PROFILE-1
00+00 TO 7+61
(MH-1 TO EXISTING MH)

DRAWING NO: SS-PR1-01

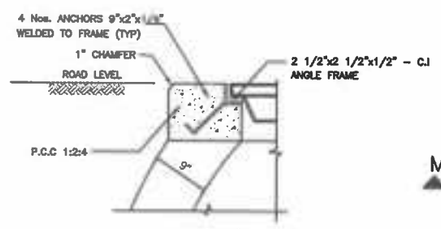
SCALE: V : 1"=5' H : 1"=50'

SHEET: A3

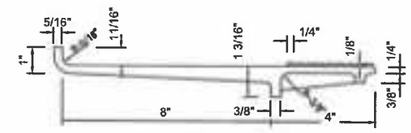
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |



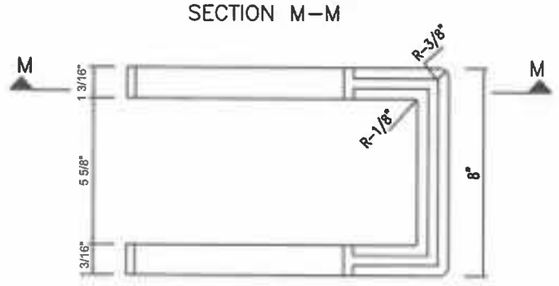

SECTION A–A
SCALE 1/2"=1'–0"




DETAIL–W '
SCALE 1"=1'–0"

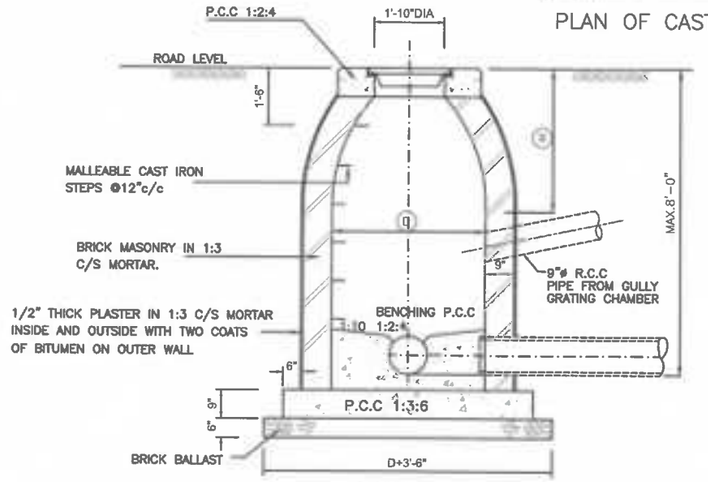



SECTION M–M

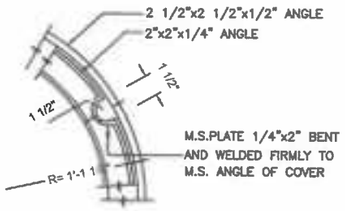



PLAN OF CAST IRON STEP (Y)

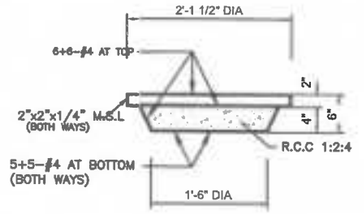
| TABLE –1 | | | |
|---|---|---|---|
| SEHEDULE OF MANHOLE | | | |
| SR. NO. | PIPE DIA. (inch) | Ⓓ | Ⓗ |
| 1 | 9 TO 15 | 4'–0" | 3'–6" |
| 2 | 18 TO 30 | 5'–0" | 4'–0" |
| 3 | 33 TO 36 | 6'–0" | 4'–6" |
| 4 | 42 TO 54 | 7'–6" | 5'–0" |



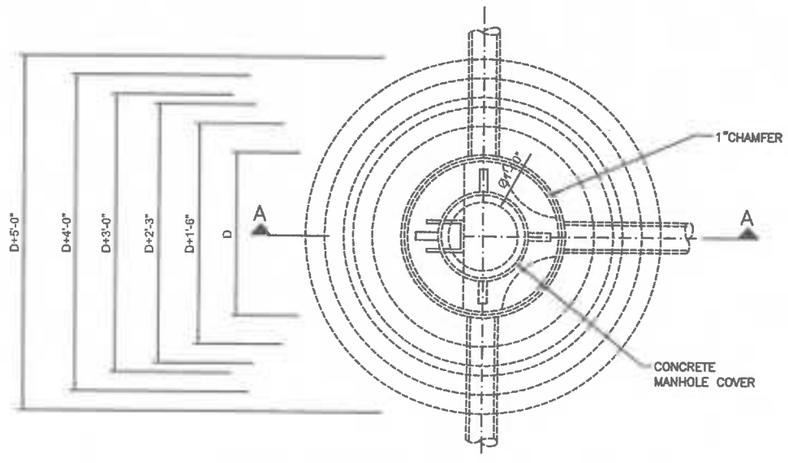

SECTION B–B
SCALE 1/2"=1'–0"



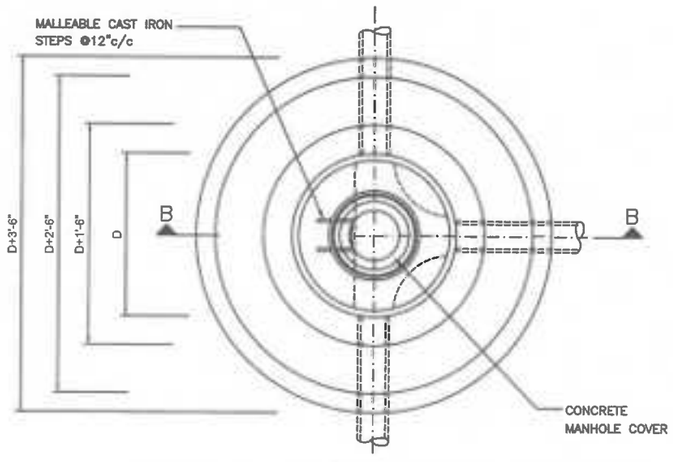

DETAIL–Z
SCALE:3"=1'–0"



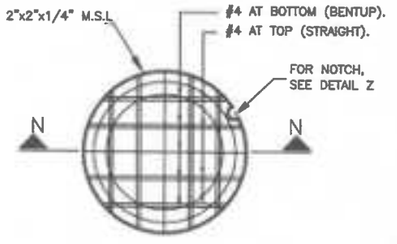

SECTION N–N
SCALE:1"=1'–0"




TYPICAL SEWER MANHOLE PLAN ( TYPE B )
( FOR DEPTH ≥ 8.Ft.)
SCALE 1/2"=1'–0"

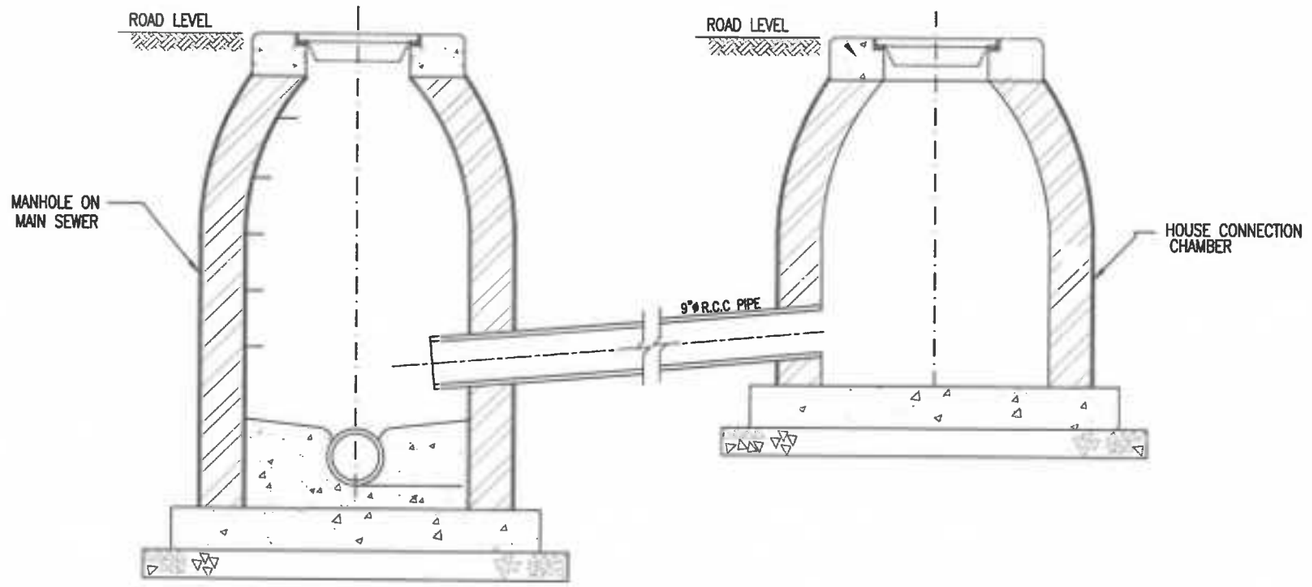



TYPICAL SEWER MANHOLE PLAN ( TYPE A )
( FOR DEPTH ≤ 8.Ft.)
SCALE 1/2"=1'–0"

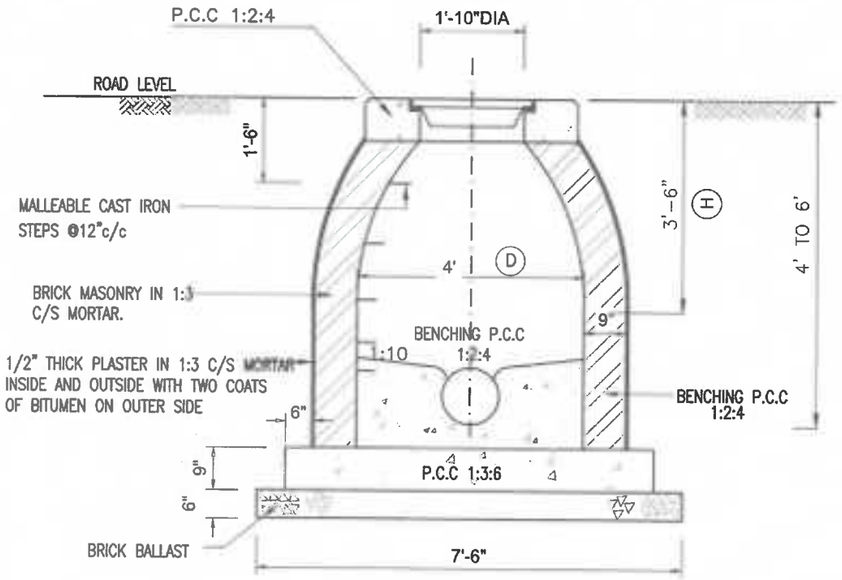



DETAIL D
MANHOLE COVER PLAN
SCALE:1"=1'–0"

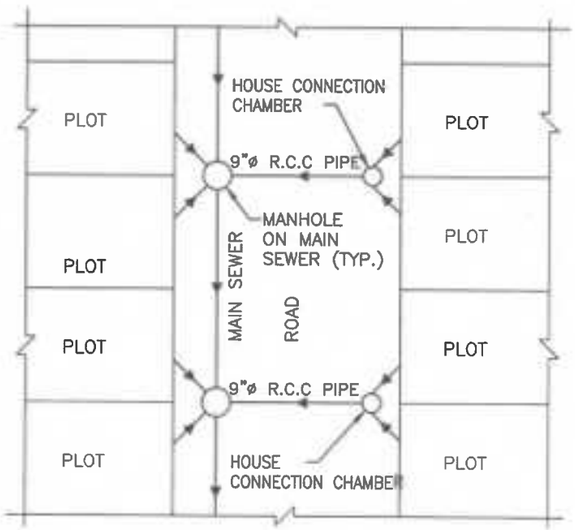
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CLIENT: PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: USMAN MUSTAFA<br>DESIGNED BY: ENGR. HASEEB ASHRAF<br>CHECKED BY: ENGR. BILAL<br>APPROVED BY: ENGR. KAMRAN<br>DATE: AUGUST, 2026 | TENDER DRAWING NOT FOR CONSTRUCTION<br>DRAWING TITLE: MISCELLANEOUS DETAILS MANHOLE DETAIL | DRAWING NO: SS-MD-01<br>SCALE: N.T.S<br>SHEET: A3 | REV. | DESCRIPTION | SIGN. | DATE |




CONNECTION OF HOUSE CONNECTION CHAMBER"
WITH THE MANHOLE ON MAIN SEWER"




SECTIONAL VIEW OF
HOUSE CONNECTION CHAMBER




TYPICAL HOUSE CONNECTION DETAIL

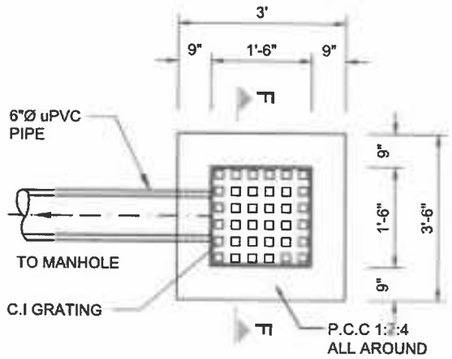
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|---|---|---|---|
| CLIENT: PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: USMAN MUSTAFA<br>DESIGNED BY: ENGR. HASEEB ASHRAF<br>CHECKED BY: ENGR. BILAL<br>APPROVED BY: ENGR. KAMRAN<br>DATE: AUGUST, 2026 |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

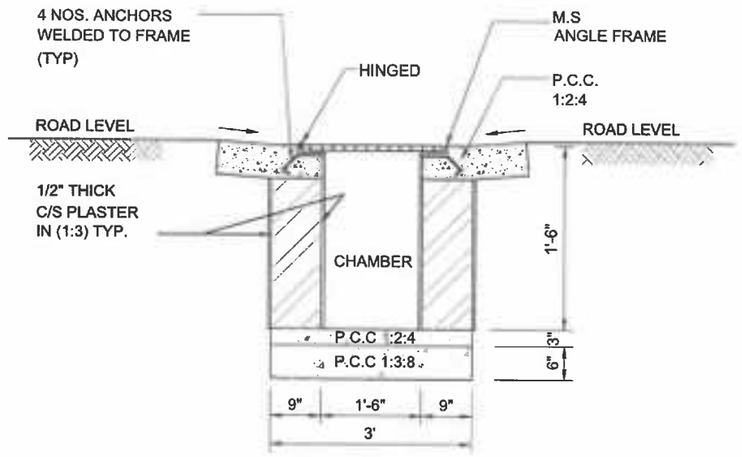
DRAWING TITLE:
**MISCELLANEOUS DETAILS**
HOUSE CONNECTION DETAIL

DRAWING NO: SS-MD-02
SCALE: N.T.S
SHEET: A3

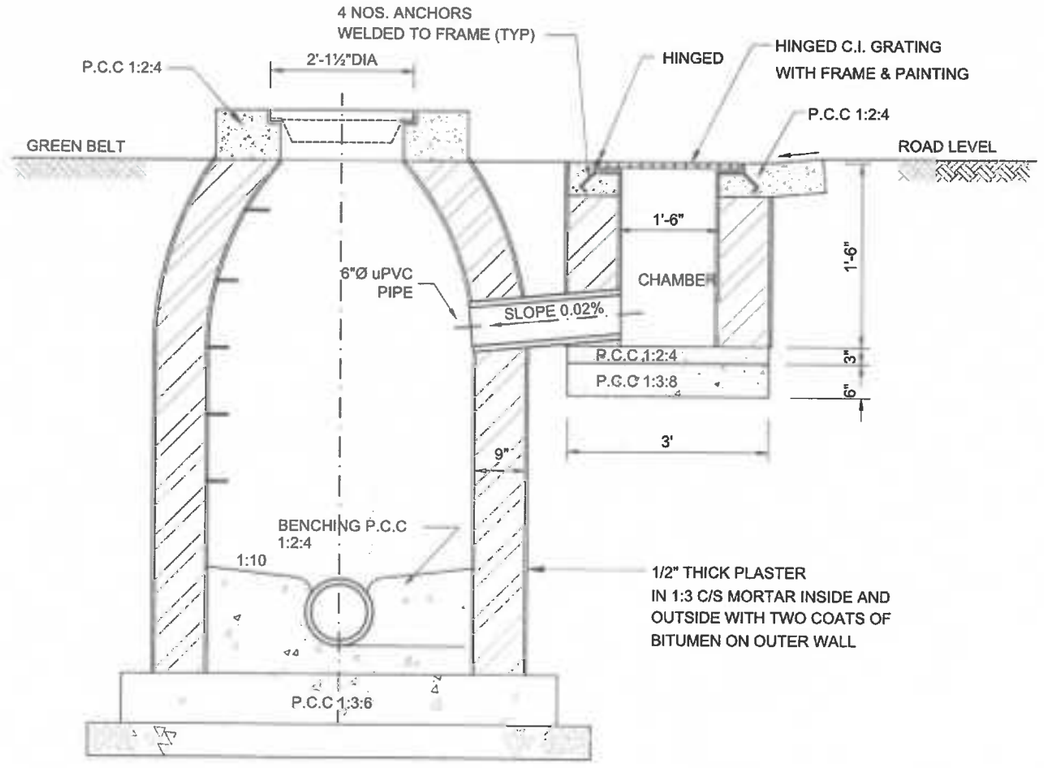
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




PLAN GULLY GRATING



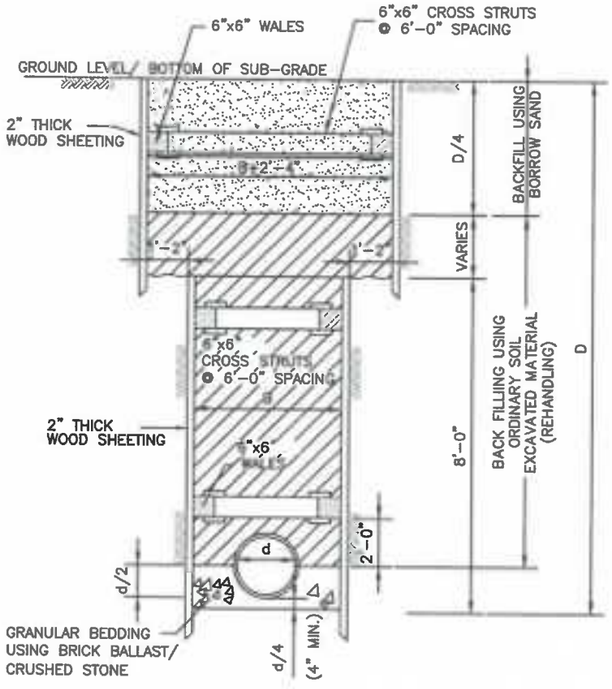

SECTION F-F



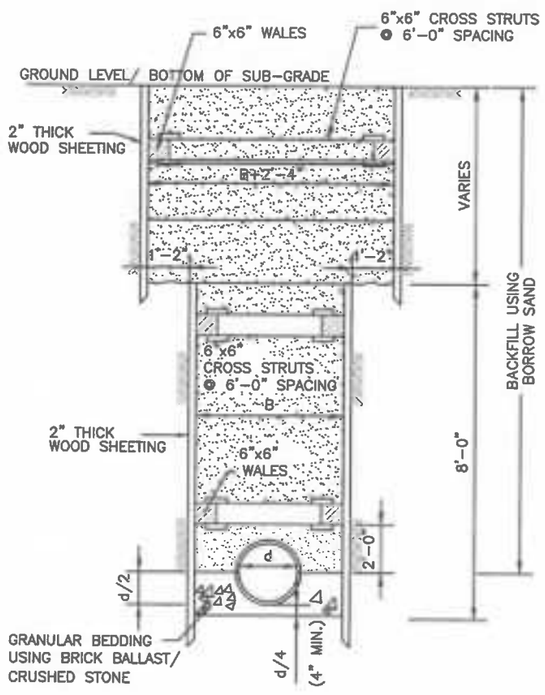

CONNECTION OF PROPOSED
COLLECTING CHAMBER INCLUDING GRATING
WITH EXISTING MANHOLE

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) LAHORE | CONSULTANTS: ENGINEERING CONSULTANCY SERVICES PUNJAB (PVT) LTD (ECSP). 83-A, E/1, Main Boulevard, Gulberg III, Lahore, Pakistan. +92-42-99333976, +92-42-5717681-4 info@ecsp.com.pk www.ecsp.com.pk | PROJECT: ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN | DRAWN BY: USMAN MUSTAFA<br>DESIGNED BY: ENGR. HASEEB ASHRAF<br>CHECKED BY: ENGR. BILAL<br>APPROVED BY: ENGR. KAMRAN<br>DATE: AUGUST, 2026 | TENDER DRAWING<br>NOT FOR CONSTRUCTION<br>DRAWING TITLE:<br>MISCELLANEOUS DETAILS<br>RAIN WATER COLLECTING CHAMBER DETAIL | DRAWING NO: SS-MD-03<br>SCALE: N.T.S<br>SHEET: A3 |

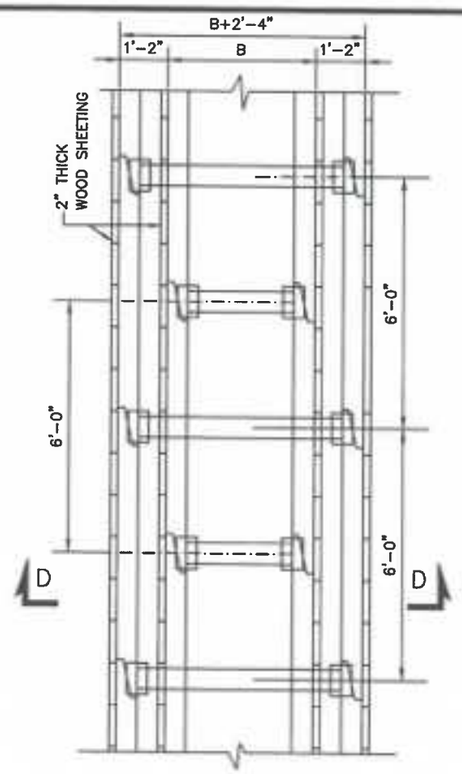
| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
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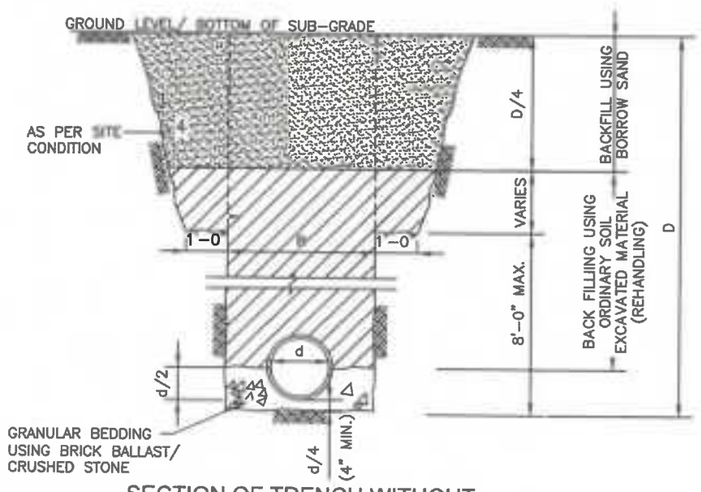

SECTION D-D
(FOR SEWERS TO BE LAID UNDER ROADS AND STREETS)



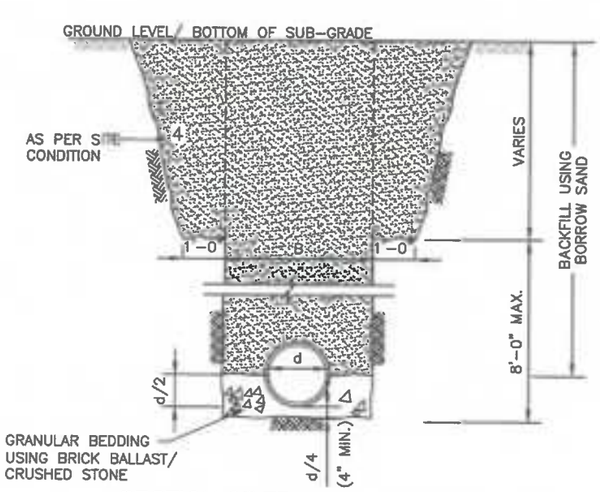

SECTION D-D
(FOR SEWERS TO BE LAID UNDER MAJOR ROADS)




PLAN
TRENCH WITH TIMBERING AND BRACING




SECTION OF TRENCH WITHOUT TIMBERING AND BRACING
(FOR SEWERS TO BE LAID UNDER ROADS AND STREETS)




SECTION OF TRENCH WITHOUT TIMBERING AND BRACING
(FOR SEWERS TO BE LAID UNDER MAJOR ROADS)

TABLE – 1

SCHEDULE OF TRENCH

| SR. NO. | PIPE INSIDE DIA. mm(Inches) | TRENCH (B) WITH TIMBERING | WIDTH (B) WITHOUT TIMBERING |
|---|---|---|---|
| 1 | 230 (9") | 2'-3" | 3'-0" |
| 2 | 305 (12") | 2'-8" | 3'-6" |
| 3 | 460 (18") | 3'-3" | 4'-2" |
| 4 | 610 (24") | 3'-10" | 4'-10" |
| 5 | 780 (30") | 4'-5" | 5'-7" |
| 6 | 915 (36") | 5'-8" | 6'-3" |
| 7 | 1067 (42") | 6'-3" | 7'-3" |
| 8 | 1219 (48") | 6'-10" | 7'-10" |
| 9 | 1372 (54") | 7'-5" | 8'-5" |
| 10 | 1524 (60") | 8'-0" | 9'-0" |
| 11 | 1677 (66") | 8'-7" | 9'-7" |
| 12 | 1829 (72") | 9'-2" | 10'-0" |

**CLIENT:**
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**PROJECT:**
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | | |
|---|---|---|
| DRAWN BY: | USMAN MUSTAFA | |
| DESIGNED BY: | ENGR. HASEEB ASHRAF | |
| CHECKED BY: | ENGR. BILAL | |
| APPROVED BY: | ENGR. KAMRAN | |
| DATE: | AUGUST, 2026 | |

**TENDER DRAWING**
NOT FOR CONSTRUCTION

**DRAWING TITLE:**
MISCELLANEOUS DETAILS
TRENCH DETAIL

**DRAWING NO:** SS-MD-04

**SCALE:** N.T.S

**SHEET:** A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**TABLE -3 (CLASS-IV)**

CONCRETE STRENGTH, 4000 P.S.I

| SR. No. | INTERNAL DIA. (D) INCHES | WALL THICKNESS (T) INCHES | CIRCULAR REINFORCEMENT | | | | LONGITUDINAL REINFORCEMENT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | INNER CAGE | | OUTER CAGE | | INNER CAGE | | OUTER CAGE | |
| | | | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" |
| 1 | 12 | 2 | 3/16 | 25+3 | - | - | 3/16 | 4 | - | - |
| 2 | 18 | 2½ | 1/4 | 25+3 | - | - | 3/16 | 5 | - | - |
| 3 | 24 | 3 | 3/8 | 25+3 | - | - | 3/16 | 5 | - | - |
| 4 | 30 | 3½ | 3/8 | 27+3 | - | - | 1/4 | 6 | - | - |
| 5 | 36 | 4 | 3/8 | 24+1 | 1/4 | 36+1 | 1/4 | 6 | 1/4 | 8 |
| 6 | 42 | 4½ | 3/8 | 26+1 | 3/8 | 22+1 | 1/4 | 8 | 1/4 | 8 |
| 7 | 48 | 5 | 1/2 | 19+1 | 3/8 | 24+1 | 3/8 | 8 | 1/4 | 8 |
| 8 | 54 | 5½ | 1/2 | 21+1 | 1/2 | 18+1 | 3/8 | 8 | 3/8 | 8 |
| 9 | 60 | 6 | 1/2 | 25+1 | 1/2 | 19+1 | 3/8 | 10 | 3/8 | 10 |
| 10 | 66 | 6½ | 5/8 | 18+1 | 1/2 | 22+1 | 3/8 | 10 | 3/8 | 10 |
| 11 | 72 | 7 | 5/8 | 21+1 | 1/2 | 25+1 | 3/8 | 10 | 3/8 | 10 |

**TABLE -2 (CLASS-III)**

CONCRETE STRENGTH, 4000 P.S.I

| SR. No. | INTERNAL DIA. (D) INCHES | WALL THICKNESS (T) INCHES | CIRCULAR REINFORCEMENT | | | | LONGITUDINAL REINFORCEMENT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | INNER CAGE | | OUTER CAGE | | INNER CAGE | | OUTER CAGE | |
| | | | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" |
| 1 | 12 | 2 | 3/16 | 25+3 | - | - | 3/16 | 4 | - | - |
| 2 | 18 | 2½ | 3/16 | 25+3 | - | - | 3/16 | 5 | - | - |
| 3 | 24 | 3 | 3/16 | 25+3 | - | - | 3/16 | 5 | - | - |
| 4 | 30 | 3½ | 1/4 | 31+3 | - | - | 1/4 | 6 | - | - |
| 5 | 36 | 4 | 1/4 | 28+1 | 1/4 | 22+1 | 1/4 | 7 | 1/4 | 8 |
| 6 | 42 | 4½ | 1/4 | 35+1 | 1/4 | 27+1 | 1/4 | 8 | 1/4 | 8 |
| 7 | 48 | 5 | 3/8 | 19+1 | 1/4 | 30+1 | 1/4 | 9 | 1/4 | 9 |
| 8 | 54 | 5½ | 3/8 | 22+1 | 3/8 | 18+1 | 1/4 | 10 | 1/4 | 10 |
| 9 | 60 | 6 | 3/8 | 25+1 | 3/8 | 19+1 | 1/4 | 10 | 1/4 | 10 |
| 10 | 66 | 6½ | 3/8 | 30+1 | 3/8 | 23+1 | 1/4 | 10 | 1/4 | 12 |
| 11 | 72 | 7 | 1/2 | 20+1 | 1/2 | 17+1 | 3/8 | 10 | 3/8 | 12 |

**CONFORMING TO B.S. 5911: PART I: 1981, CLASS "L"**

CONCRETE STRENGTH, 4000 P.S.I

| SR. No. | INTERNAL DIA. (D) INCHES | WALL THICKNESS (T) INCHES | CIRCULAR REINFORCEMENT | | | | LONGITUDINAL REINFORCEMENT | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | INNER CAGE | | OUTER CAGE | | INNER CAGE | | OUTER CAGE | |
| | | | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" | SIZE OF BAR INCHES | "NOS OF RINGS + BELLS" |
| 1 | 9 | 2 | 5/32 | 28+2 | - | - | 5/32 | 6 | - | - |

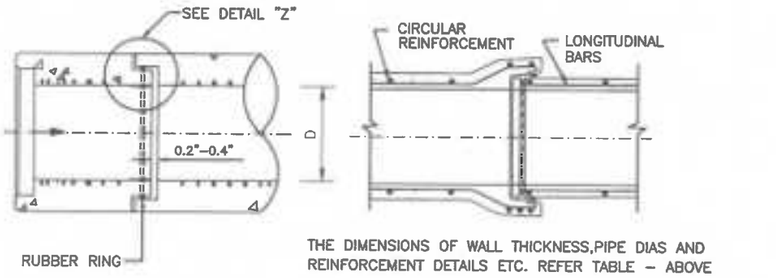
REMARKS:

1. BELL & SPIGOT JOINTS WILL BE USED FROM 310 MM(12") DIA TO 610 MM(24") DIA SIZE WITH RUBBER GASKETS.
2. TONGUE AND GROOVE JOINTS WILL BE USED FROM 690 MM(27") I/D AND ABOVE
3. WHERE ONE LINE OF CIRCULAR REINFORCEMENT IS USED, IT SHALL BE PLACED FROM 35 TO 50 PERCENT OF THE SHELL THICKNESS FROM THE INNER SURFACE OF THE PIPE EXCEPT THAT FOR WALL THICKNESS LESS THAN 65 MM(2–1/2"), THE NOMINAL PROTECTIVE COVER OF THE CONCRETE OVER THE CIRCUMFERENTIAL REINFORCEMENT IN THE BARREL OF THE PIPE SHALL BE 20 MM(3/4").
4. IN THE CASE OF DOUBLE CAGE REINFORCEMENT, THE CONCRETE COVER SHALL BE 25 MM(1") FROM INNER AND OUTER SURFACE OF THE PIPE
5. THE NUMBER OF CIRCULAR RINGS HAVE BEEN CALCULATED FROM THE SPECIFIED CROSS SECTIONAL AREA OR FOR MINIMUM SPECIFIED SPACING, THE SPACING CENTER TO CENTER OF ADJACENT RINGS OF CIRCUMFERENTIAL REINFORCEMENT IN A CAGE SHALL EXCEED 100 MM (4") FOR PIPE UPTO AND I/C PIPE HAVING 100 MM(4") WALL THICKNESS NOR EXCEED THE WALL THICKNESS FOR LARGER PIPE, AND SHALL IN NO CASE EXCEED 150 MM(6"). THE CONTINUITY OF THE CIRCUMFERENTIAL REINFORCED STEEL SHALL NOT BE DESTROYED DURING THE MANUFACTURING OF THE PIPE.
6. THE SPLICES ARE TO BE WELDED AND PULL TESTS OF REPRESENTATIVE SPECIMEN SHALL DEVELOP AT LEAST 50% OF THE MINIMUM SPECIFIED STRENGTH OF THE STEEL AND THERE SHALL BE A MINIMUM LAP OF 50MM(2").
7. MINIMUM NO. OF STRAIGHT BARS SHALL BE FOUR AND ABOVE THE NUMBER OF STRAIGHT BARS ARE FIXED IN SUCH A MANNER THAT THE CIRCUMFERENTIAL SPACING BETWEEN STRAIGHT BARS DOES NOT EXCEED 460 MM(18") FOR SINGLE CAGE REINFORCEMENT AND 915MM (36") FOR DOUBLE CAGE REINFORCEMENT. THE STRAIGHT BARS IN CASE OF DOUBLE CAGE REINFORCEMENT SHALL BE PLACED IN SUCH A MANNER THAT THE SPACING OF STRAIGHT BARS IS STAGGERED BETWEEN INNER CAGE AND OUTER CAGE THEREBY LEAVING THE HORIZONTAL DISTANCE OF NOT MORE THAN 460 MM(18").
8. SPACERS SHALL BE USED TO LINK UP THE INNER AND OUTER CAGE WITH ONE ANOTHER. THE CIRCUMFRENTIAL SPACING BETWEEN THE SPACERS SHALL BE KEPT 610 MM(24") SO AS TO FORM A SINGLE SET.
9. THE PIPES ARE TO BE MANUFACTURED ACCORDING TO THE A.S.T.M SPECIFICATION C–76–79.

**TABLE -4**

CLASSIFICATION OF CONCRETE PIPE
W.R.T CONCRETE CRADLE BEDDING

| SR. NO. | PIPE DIA. (IN) | DEPTH OF SEWER CROWN (ft) | | |
|---|---|---|---|---|
| | | CLASS-II | CLASS-III | CLASS-IV |
| 1 | 15 | UPTO 13' | >13' - 18' | >18' - 27' |
| 2 | 18 | UPTO 13' | >13' - 18' | >18' - 27' |
| 3 | 21 | UPTO 13' | >13' - 18' | >18' - 27' |
| 4 | 24 | UPTO 13' | >13' - 18' | >18' - 27' |
| 5 | 27 | UPTO 13' | >13' - 18' | >18' - 27' |
| 6 | 30 | UPTO 13' | >13' - 18' | >18' - 28' |
| 7 | 33 | UPTO 13' | >13' - 18' | >18' - 28' |
| 8 | 36 | UPTO 13' | >13' - 18' | >18' - 28' |
| 9 | 42 | UPTO 13' | >13' - 18' | >18' - 28' |
| 10 | 48 | UPTO 13' | >13' - 18' | >18' - 28' |
| 11 | 54 | UPTO 13' | >13' - 18' | >18' - 27' |
| 12 | 60 | UPTO 13' | >13' - 18' | >18' - 27' |
| 13 | 66 | UPTO 12' | >12' - 18' | >18' - 27' |
| 14 | 72 | UPTO 12' | >12' - 17' | >17' - 27' |




THE DIMENSIONS OF WALL THICKNESS,PIPE DIAS AND REINFORCEMENT DETAILS ETC. REFER TABLE – ABOVE

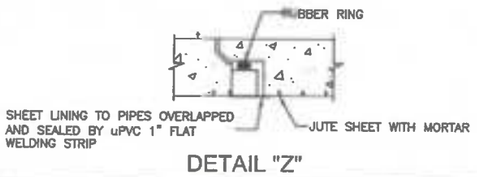
SPECIFIC SOCKET, SPIGOT JOINT DETAIL

RCC PIPE-TONGUE & GROOVE TYPE JOINT

**TABLE -5**

CLASSIFICATION OF CONCRETE PIPE
W.R.T CRUSH STONE BEDDING

| SR. NO. | PIPE DIA. (IN) | DEPTH OF SEWER CROWN (ft) | | |
|---|---|---|---|---|
| | | CLASS-II | CLASS-III | CLASS-IV |
| 1 | 12 | UPTO 8' | >8' - 11' | >11' - 16' |
| 2 | 15 | UPTO 8' | >8' - 11' | >11' - 16' |
| 3 | 18 | UPTO 8' | >8' - 11' | >11' - 17' |
| 4 | 21 | UPTO 8' | >8' - 11' | >11' - 17' |
| 5 | 24 | UPTO 8' | >8' - 11' | >11' - 17' |
| 6 | 27 | UPTO 8' | >8' - 11' | >11' - 17' |
| 7 | 30 | UPTO 8' | >8' - 11' | >11' - 17' |
| 8 | 33 | UPTO 8' | >8' - 11' | >11' - 17' |
| 9 | 36 | UPTO 8' | >8' - 11' | >11' - 17' |
| 10 | 42 | UPTO 8' | >8' - 11' | >11' - 17' |
| 11 | 48 | UPTO 7' | >7' - 11' | >11' - 17' |
| 12 | 54 | UPTO 7' | >7' - 11' | >11' - 17' |
| 13 | 60 | UPTO 7' | >7' - 10' | >10' - 16' |
| 14 | 66 | UPTO 7' | >7' - 10' | >10' - 16' |
| 15 | 72 | UPTO 7' | >7' - 10' | >10' - 16' |




DETAIL "Z"

CLIENT:
PUNJAB INFORMATION TECHNOLOGY BOARD (PITB)
LAHORE

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PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | USMAN MUSTAFA |
| DESIGNED BY: | ENGR. HASEEB ASHRAF |
| CHECKED BY: | ENGR. BILAL |
| APPROVED BY: | ENGR. KAMRAN |
| DATE: | AUGUST, 2026 |

TENDER DRAWING
NOT FOR CONSTRUCTION

DRAWING TITLE:
MISCELLANEOUS DETAILS
R.C.C PIPE REINFORCEMENT DETAIL

DRAWING NO: SS-MD-05

SCALE: N.T.S

SHEET: A3

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

# TENDER DRAWINGS

## MECHANICAL DRAWINGS

## CONSTRUCTION OF DISASTER RECOVERY (DR) CENTER AT MULTAN

**CLIENT:**

**PUNJAB INFORMATION TECHNOLOGY BOARD (PITB) | LAHORE**

**CONSULTANTS:**

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| LIST OF DRAWINGS (MECHANICAL) | | |
|---|---|---|
| SR NO. | DRAWING NO. | DRAWING TITLE |
| | DATA CENTER MAIN BUILDING | |
| 1 | PITB-MB-MUL-04-PL-01 | LIST OF DRAWINGS |
| 2 | PITB-MB-MUL-04-PL-02 | PLUMBING ABBREVIATIONS, SYMBOLS & LEGEND |
| 3 | PITB-MB-MUL-04-PL-03 | GROUND FLOOR PLAN DRAINAGE LAYOUT |
| 4 | PITB-MB-MUL-04-PL-04 | GROUND FLOOR PLAN ENLARGED-A DRAINAGE LAYOUT |
| 5 | PITB-MB-MUL-04-PL-05 | ROOF FLOOR PLAN DRAINAGE LAYOUT |
| 6 | PITB-MB-MUL-04-PL-06 | GROUND FLOOR ENLARGED-B PLAN WATER SUPPLY LAYOUT |
| 7 | PITB-MB-MUL-04-PL-07 | GROUND FLOOR PLAN WATER SUPPLY LAYOUT |
| 8 | PITB-MB-MUL-04-PL-08 | ROOF FLOOR PLAN WATER SUPPLY LAYOUT |
| 9 | PITB-MB-MUL-04-HVAC-01 | GROUND FLOOR PLAN HVAC LAYOUT |
| 10 | PITB-MB-MUL-04-HVAC-02 | ENLARGED GROUND FLOOR PLAN-A HVAC LAYOUT |
| 11 | PITB-MB-MUL-04-HVAC-03 | ENLARGED GROUND FLOOR PLAN-B HVAC LAYOUT |
| 12 | PITB-MB-MUL-04-HVAC-04 | ENLARGED GROUND FLOOR PLAN-C HVAC LAYOUT |
| 13 | PITB-MB-MUL-04-HVAC-05 | ENLARGED GROUND FLOOR PLAN-D HVAC LAYOUT |
| 14 | PITB-MB-MUL-04-HVAC-06 | ROOF FLOOR PLAN HVAC LAYOUT |
| 15 | PITB-MB-MUL-04-HVAC-07 | GROUND FLOOR PLAN PODS SMOKE EXTRACTION SYSTEM |
| 16 | PITB-MB-MUL-04-FF-01 | FIREFIGHTING ABBREVIATIONS, SYMBOLS & LEGEND |
| 17 | PITB-MB-MUL-04-FF-02 | BASEMENT AND MASTER GROUND FLOOR PLAN FIREFIGHTING LAYOUT |
| 18 | PITB-MB-MUL-04-FF-03 | GROUND FLOOR PLAN -A FIREFIGHTING LAYOUT |
| 19 | PITB-MB-MUL-04-FF-03 | GROUND FLOOR PLAN -B FIREFIGHTING LAYOUT |

CLIENT:
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.SALEEM SAEED |
| DESIGNED BY: | Engr.ABDUL QADEER |
| CHECKED BY: | Engr.FAHAD HASSAN |
| APPROVED BY: | Engr.SADAQAT HUSSAIN |
| DATE: | AUGUST-2026 |

DRAWING TITLE: LIST OF DRAWING
DRAWING NO: PITB-MB-MUL-04-PL-01
SCALE: N.T.S
SHEET: A3

TENDER DRAWING

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |

GENERAL NOTES:

1. ALL EXPOSED WATER SUPPLY PIPES SHALL BE ANTI-UV WRAPPED
2. ALL WATER SUPPLY PIPES ARE PPRC in mm
3. ALL PLUMBING INSTALLATIONS SHALL CONFORM WITH INTERNATIONAL PLUMBING CODE (IPC) AND UNIFORM PLUMBING CODE (UPC) LATEST EDITION.
4. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATIONS.
5. MINIMUM SLOPE OF ALL DRAINAGE PIPE SHALL BE 1%
6. VENT PIPES SHALL TERMINATE NOT LESS THAN 12 INCH(300 MM) ABOVE THE ROOF .
7. ALL PIPE PENETRATION THROUGH ROOF AND EXTERIOR WALLS SHALL BE FULLY WATERPROOFED.
8. STANDARD GRADE u-PVC PIPES SHALL BE USED FOR DRAINAGE AS PER SPECIFICATIONS.
9. CONTRACTOR TO CO-ORDINATE ALL BUILDING SERVICES.
10. CONTRACTOR TO MAKE SHOP DRAWINGS AS PER CONTRACT DOCUMENTS AND ACCORDING TO STIPULATED REQUIREMENTS MENTIONED IN THE RESPECTIVE SECTION IN SPECIFICATIONS.
11. ONLY PLUG SANITARY TEE SHALL BE USED WHEN A HORIZONTAL DRAIN CONNECT TO STACK. SEPARATE CLEAN OUT SHALL BE PROVIDED AT UPSTREAM SIDE OF STACK, WHERE PLUG FITTING IS NOT POSSIBLE OR ACCESSIBLE
12. ONLY COMBO OR LONG SWEEP FITTING SHALL BE USED WHERE A STACK CONNECT TO BUILDING DRAIN. A CLEAN OUT SHALL BE PROVIDED AT UPSTREAM SIDE OF STACK.
13. ALL GAS LINE PIPES ARE G.I IN INCH

LEGEND:

| | |
|---|---|
| AFC | ABOVE FALLS CEILING |
| BFS | BELOW FLOOR SLAB |
| CDP | CONDENSATE DRAIN PIPE |
| CO | CLEAN OUT/ WALL CLEAN OUT |
| CV | CHECK VALVE |
| DN. | DOWN |
| EWH | ELECT WATER HEATER |
| F/A | FROM ABOVE |
| F/B | FROM BELOW |
| FCO | FLOOR CLEAN LAYOUT |
| FD | FLOOR DRAIN |
| GPM | GALLONS PER MINUTE |
| GV | GATE VALVE |
| GI | GREASE INTERCEPTOR |
| H/L | HIGH LEVEL |
| HB | HOSE BIBB |
| IV | ISOLATING VALVE |
| IWL | IN WALL |
| RVC | ROOF VENT CAP |
| SP | SOIL PIPE |
| SS | SOIL STACK |
| WP | WASTE PIPE |
| WS | WASTE STACK |
| T/A | TO ABOVE |
| T/B | TO BELOW |
| U/G | UNDER GROUND |
| U/T | UNDER TILE |
| VB | VALVE BOX |
| VP | VENT PIPE |

LEGEND:

| | |
|---|---|
| | SEWAGE PIT OR MAN HOLE |
| | CATCH BASIN PIT |
| | GULLY TRAP |
| | FLOOR DRAIN |
| | FLOOR DRAIN-1 |
| | FLOOR DRAIN-2 |
| | FLOOR DRAIN-3 |
| | BALCONY DRAIN (BD) |
| FCO | FLOOR CLEAN LAYOUT |
| SP | SOIL PIPE (U-PVC) |
| WP | WASTE PIPE (U-PVC) |
| VP | VENT PIPE (U-PVC) |
| RWP | RAIN WATER PIPE (U-PVC) |
| CDP | CONDENSATE DRAIN PIPE (U-PVC) |
| CWS | COLD WATER SUPPLY (PPRC) |
| HWS | HOT WATER SUPPLY (PPRC) |
| | GAS PIPE (G.I) |
| | CEILING CLEAN OUT |
| FCU | FAN COIL UNITS |
| CU | CONDENSING UNIT |
| PAC | PRECISION AIR CONDITIONING |
| PCU | PRECISION CONDENSING UNIT |

| | |
|---|---|
| | HOSE BIBB |
| | BIBB COCK |
| | MUSLIM SHOWER |
| | CONCEALED VALVE |
| | GATE VALVE |
| | CHECK VALVE |
| | STRAINER |
| | BALL VALVE |
| | FLOAT VALVE |
| | PIPE DN. |
| | PIPE UP. |
| | CONCEALED VALVE |
| GV CV GV | BACK FLOW PREVENTER |

CLIENT:
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info@ecsp.com.pk www.ecsp.com.pk

PROJECT:
ESTABLISHMENT OF DISASTER RECOVERY (DR) DATA CENTER AT PITB MULTAN

| | |
|---|---|
| DRAWN BY: | M.SALEEM SAEED |
| DESIGNED BY: | Engr.ABDUL QADEER |
| CHECKED BY: | Engr.FAHAD HASSAN |
| APPROVED BY: | Engr.SADAQAT HUSSAIN |
| DATE: | AUGUST-2026 |

DRAWING TITLE: **LEGEND AND NOTES**

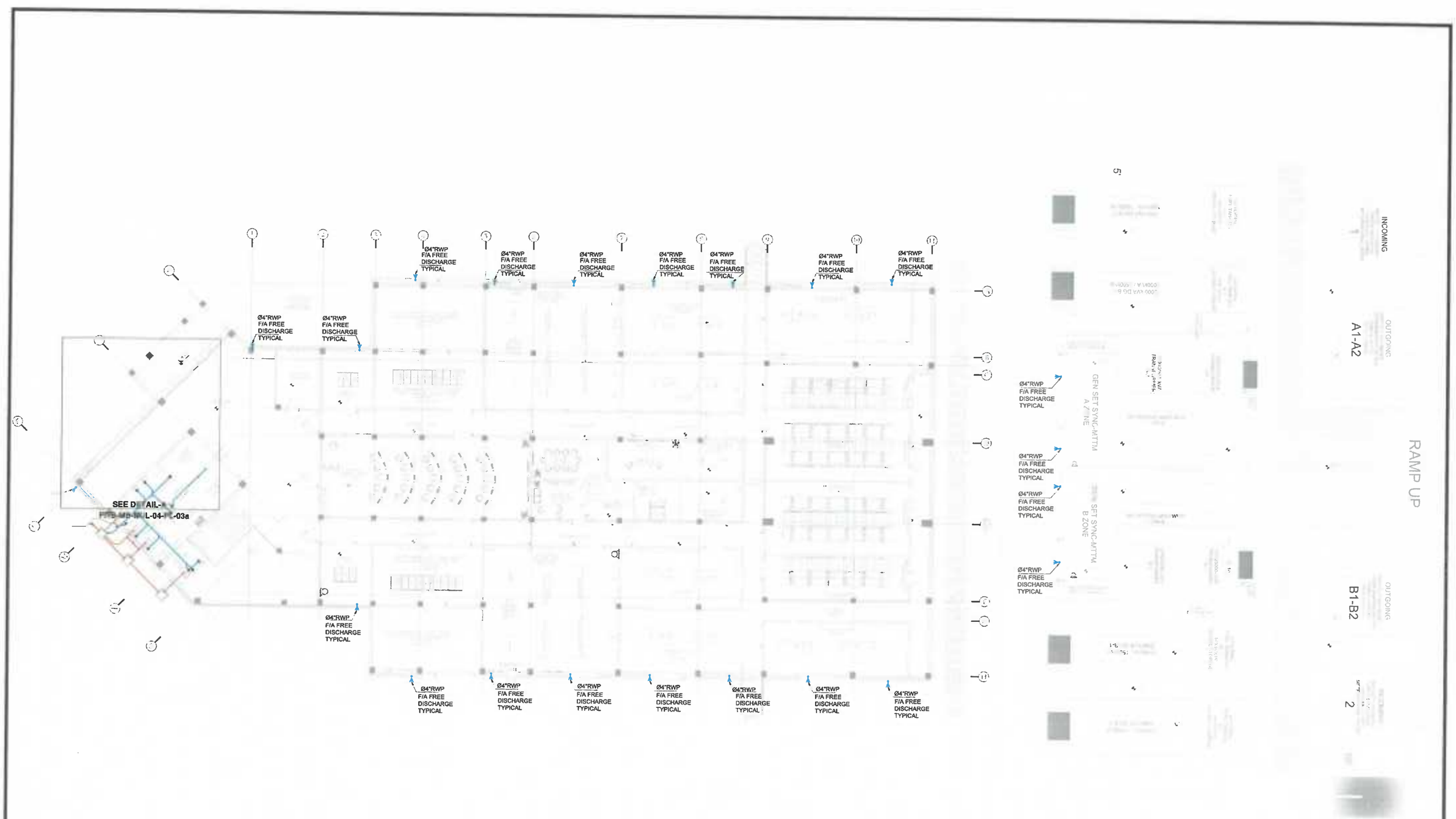
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SCALE: N.T.S

SHEET: A3

**TENDER DRAWING**

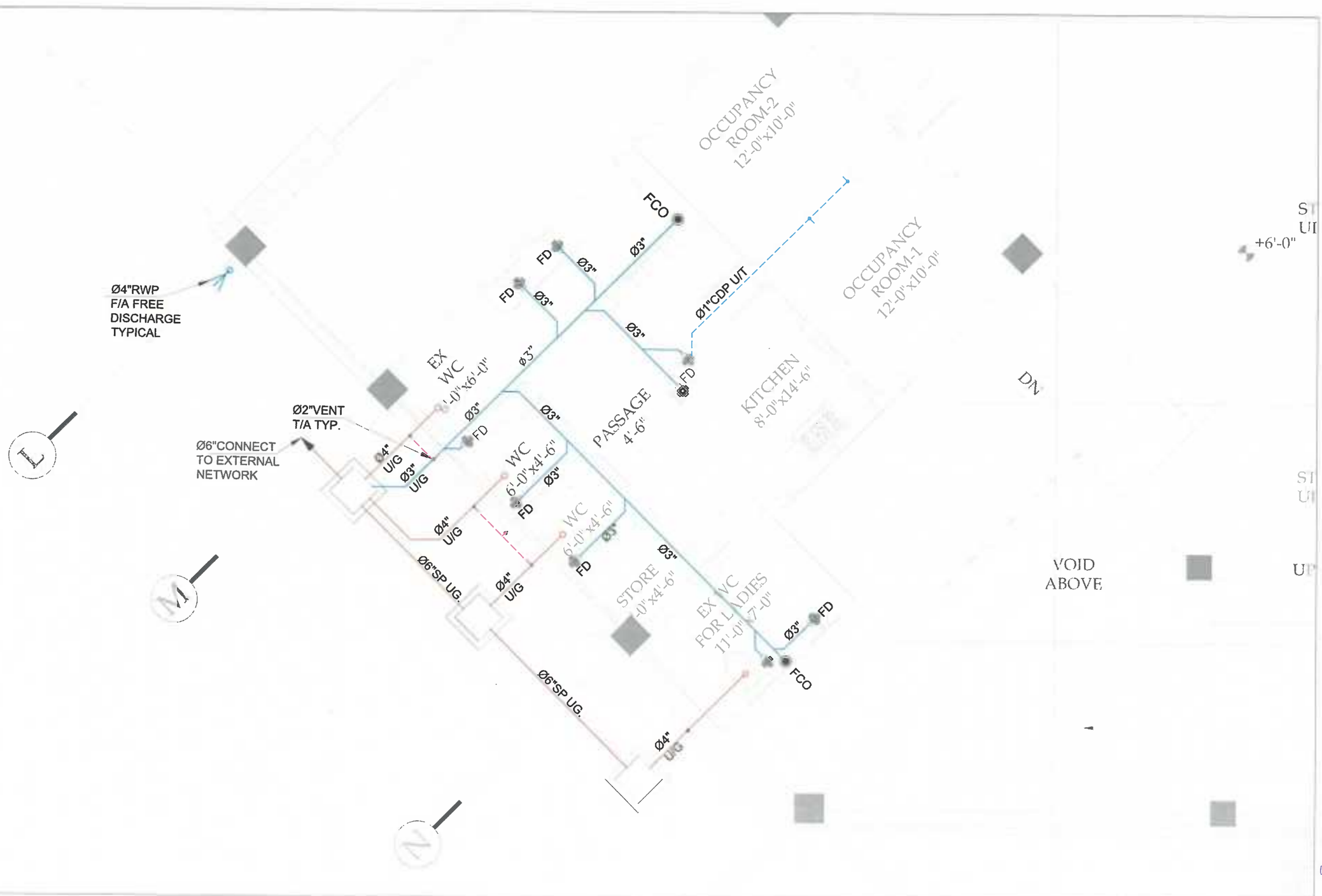
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TENDER DRAWING

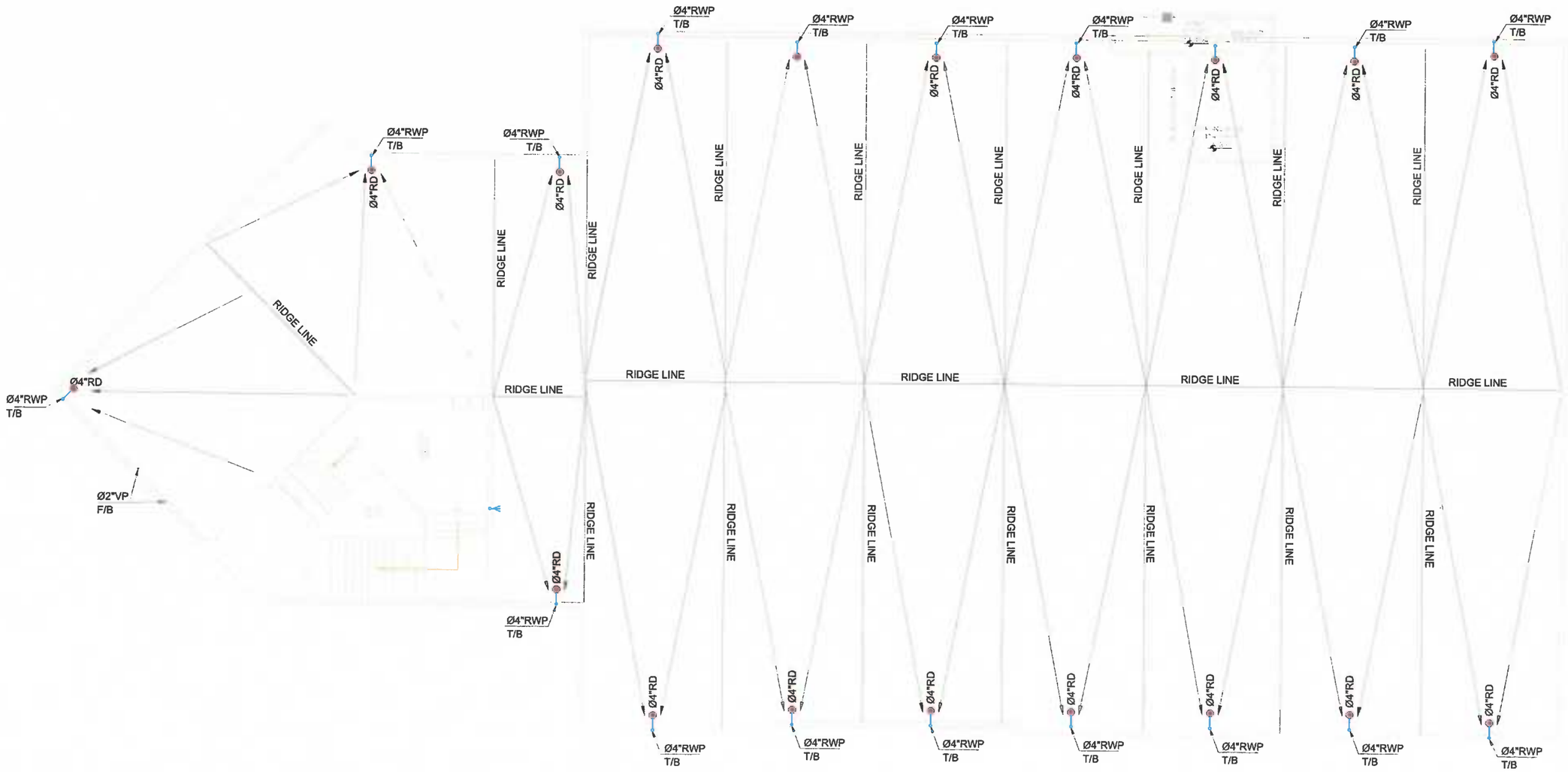
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**TENDER DRAWING**

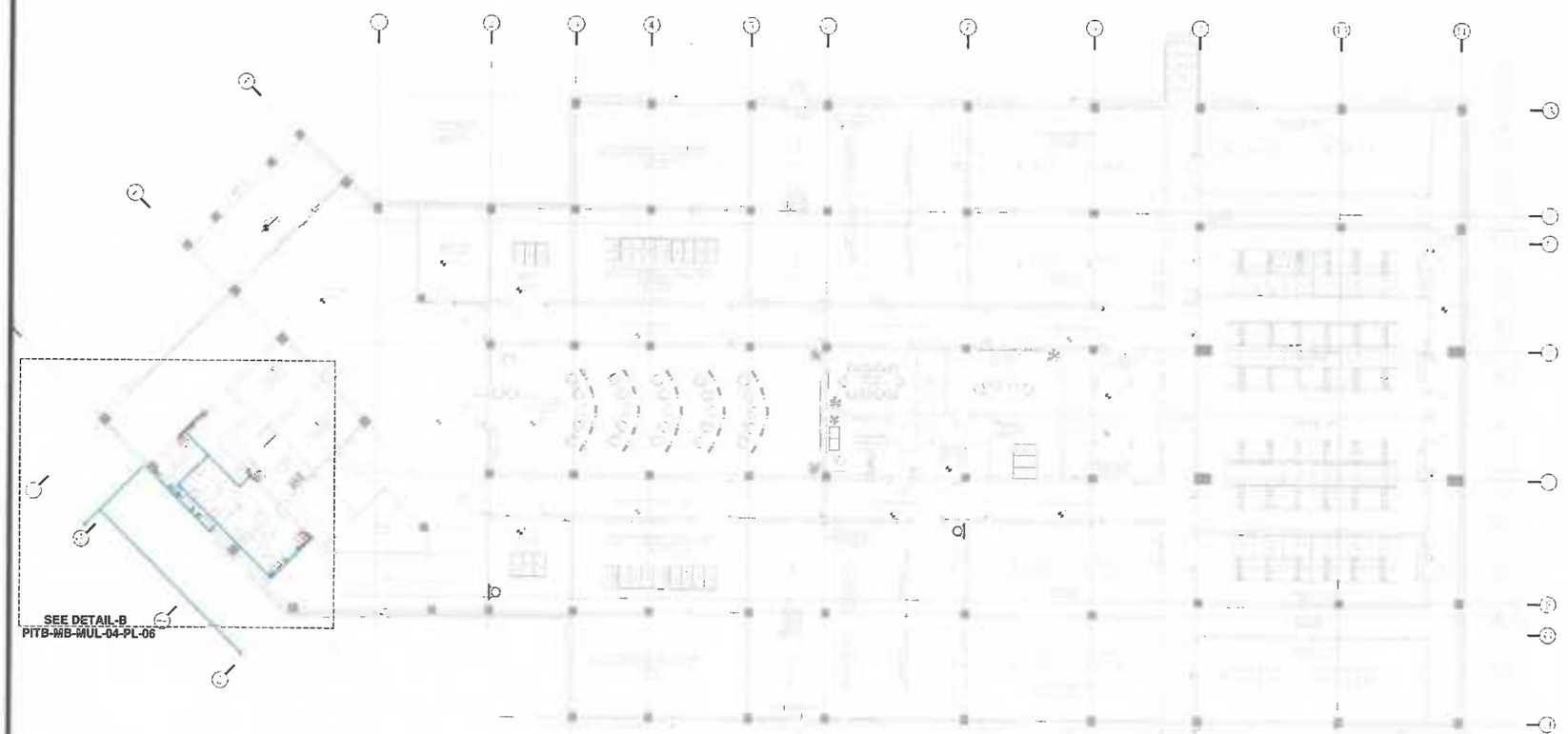
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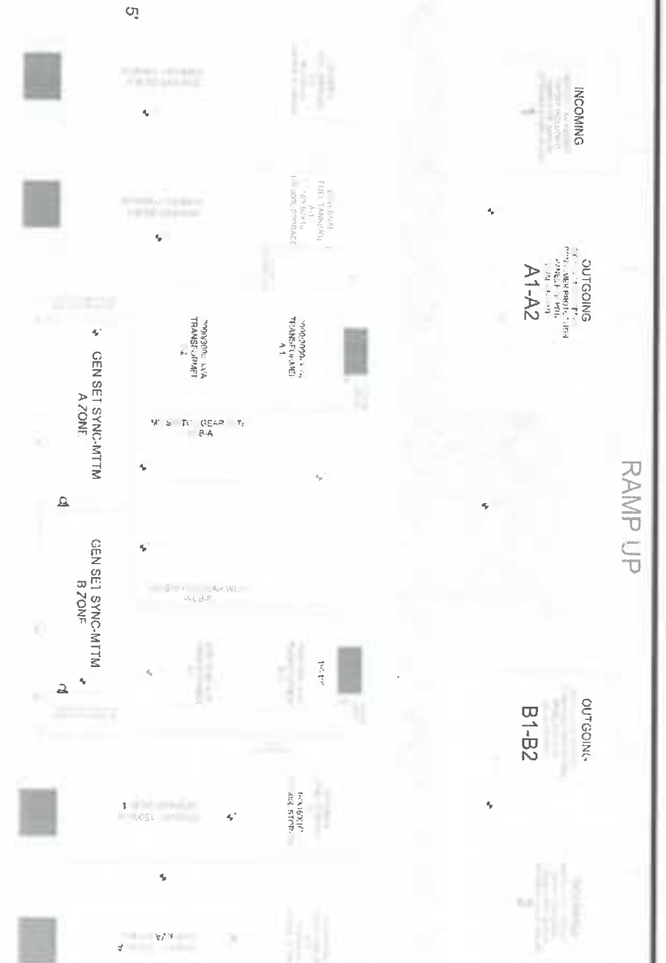



| | | | | | |
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**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
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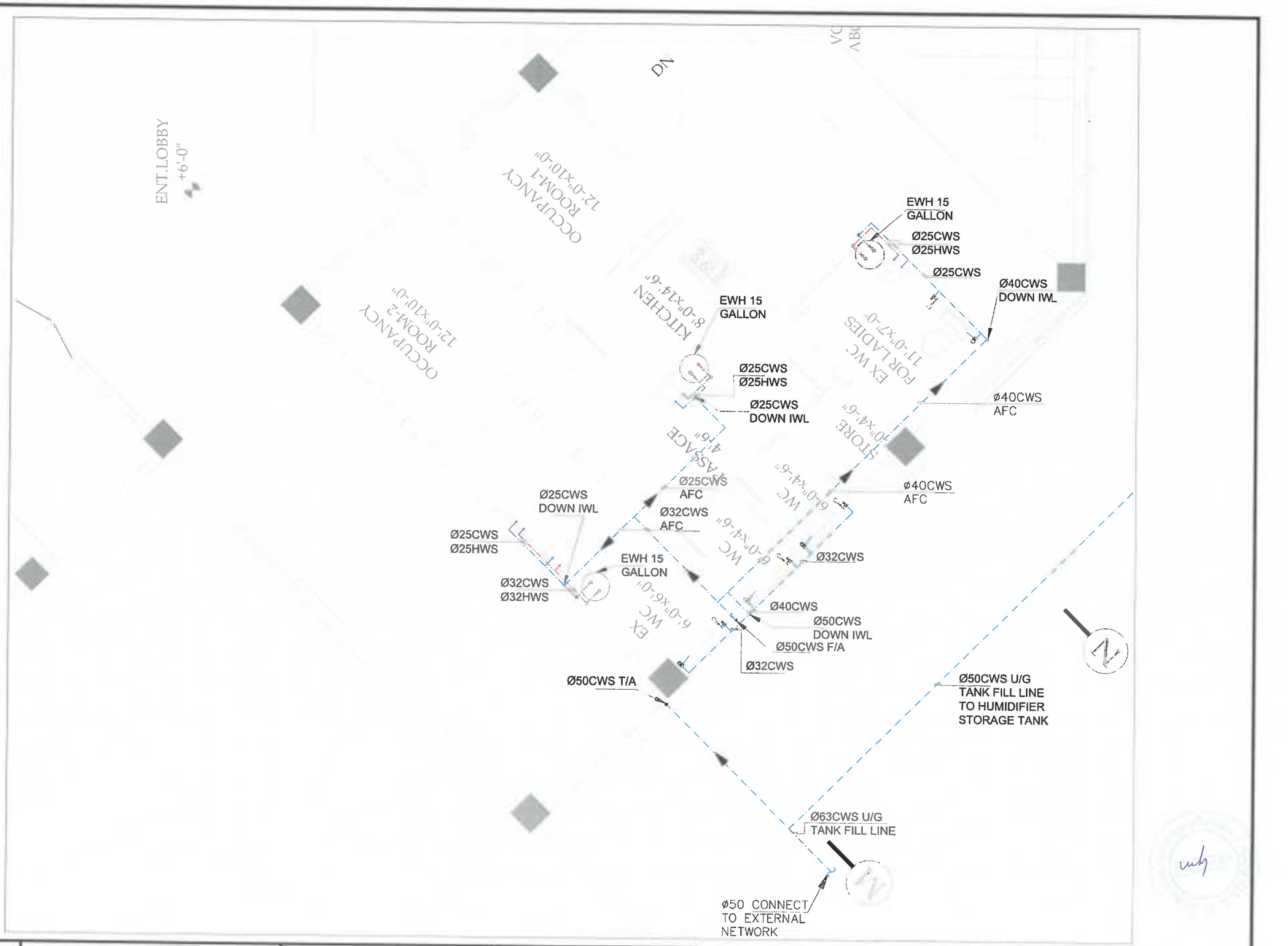



| | | | | | |
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**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|
| | | | |




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| APPROVED BY: | Engr.SADAQAT HUSSAIN |
| DATE: | AUGUST-2026 |

DRAWING TITLE:

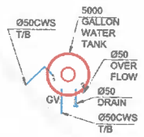
**GROUND FLOOR ENLARGED PLAN-B WATER SUPPLY LAYOUT**

DRAWING NO: PITB-MB-MUL-04-PL-06

SCALE: 1/4"=1' SHEET: A3

# TENDER DRAWING

| REV. | DESCRIPTION | SIGN. | DATE |
|---|---|---|---|




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|---|---|
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| DESIGNED BY: | Engr.ABDUL QADEER |
| CHECKED BY: | Engr.FAHAD HASSAN |
| APPROVED BY: | Engr.SADAQAT HUSSAIN |
| DATE: | AUGUST-2026 |

DRAWING TITLE:

**ROOF FLOOR PLAN**
**WATER SUPPLY LAYOUT**

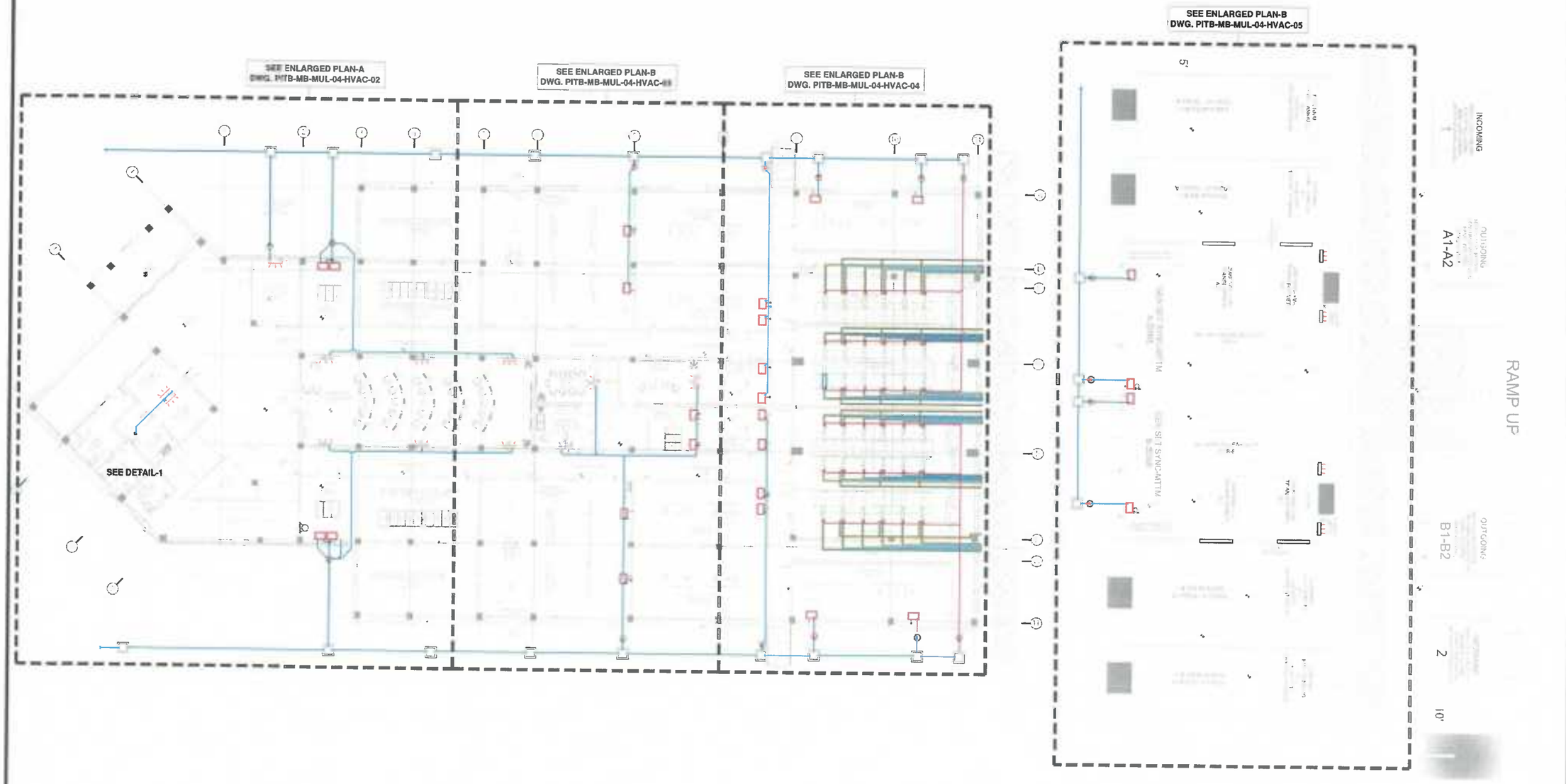
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SCALE: 1/16"=1'

SHEET: A3

TENDER DRAWING

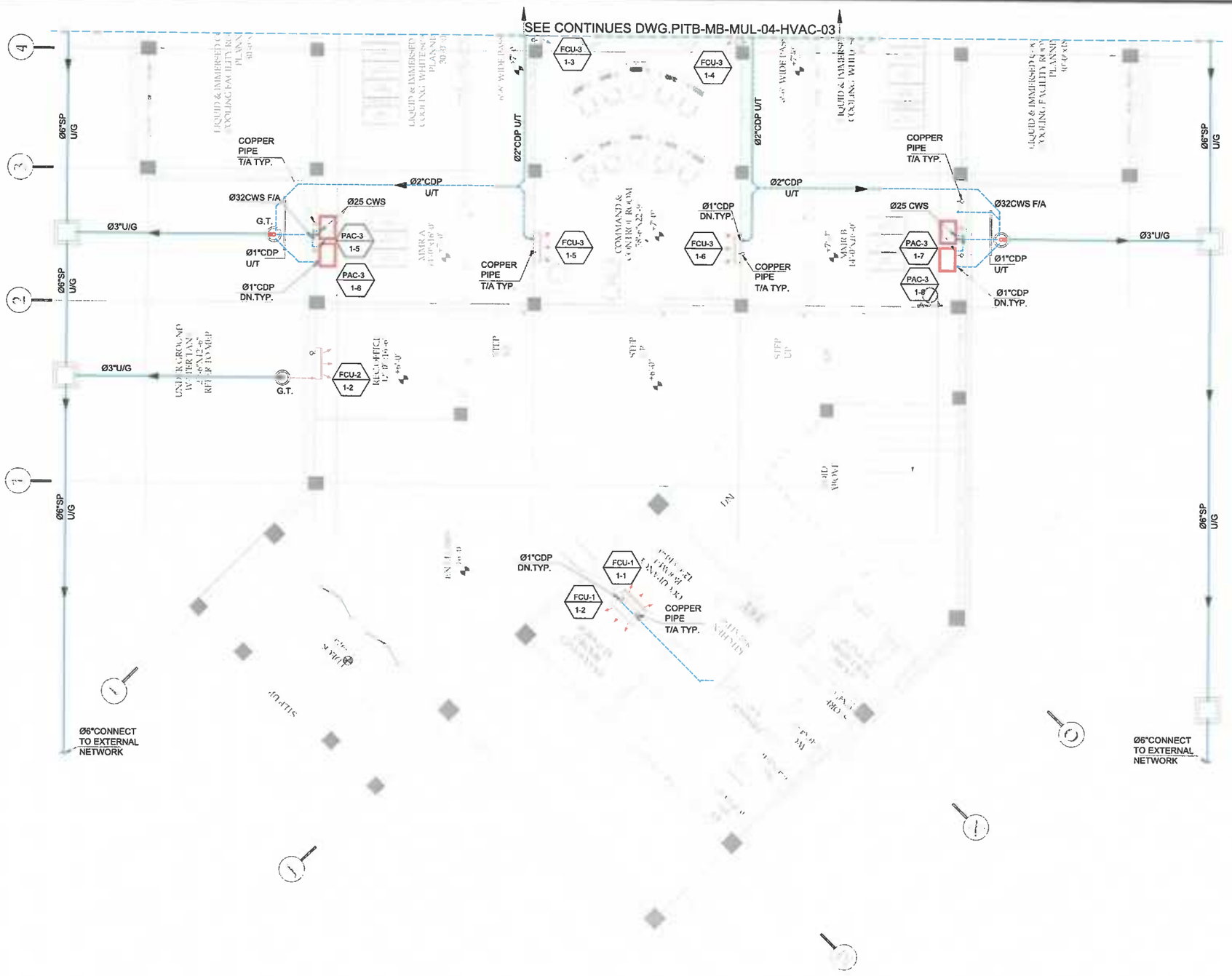
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**TENDER DRAWING**

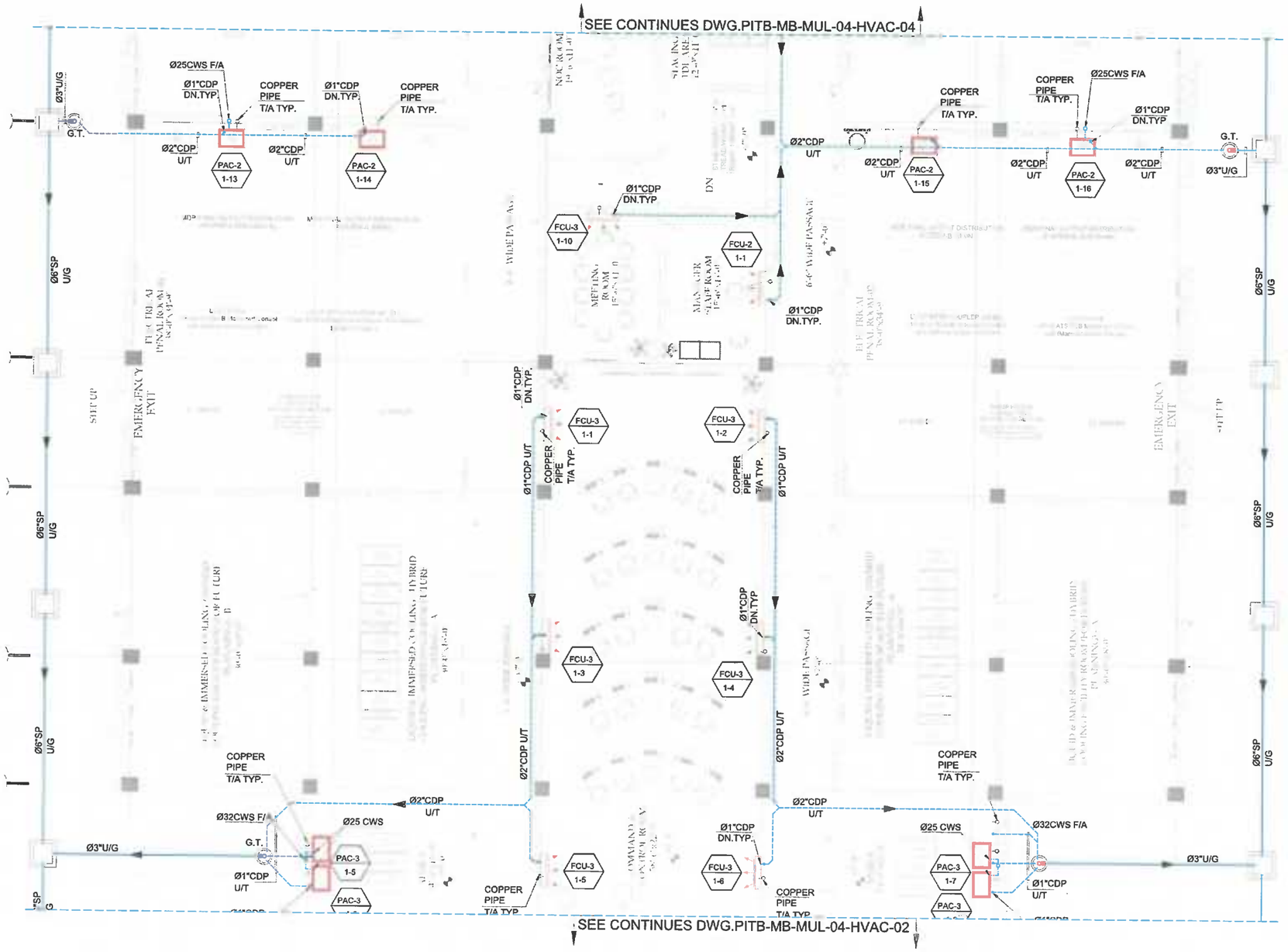
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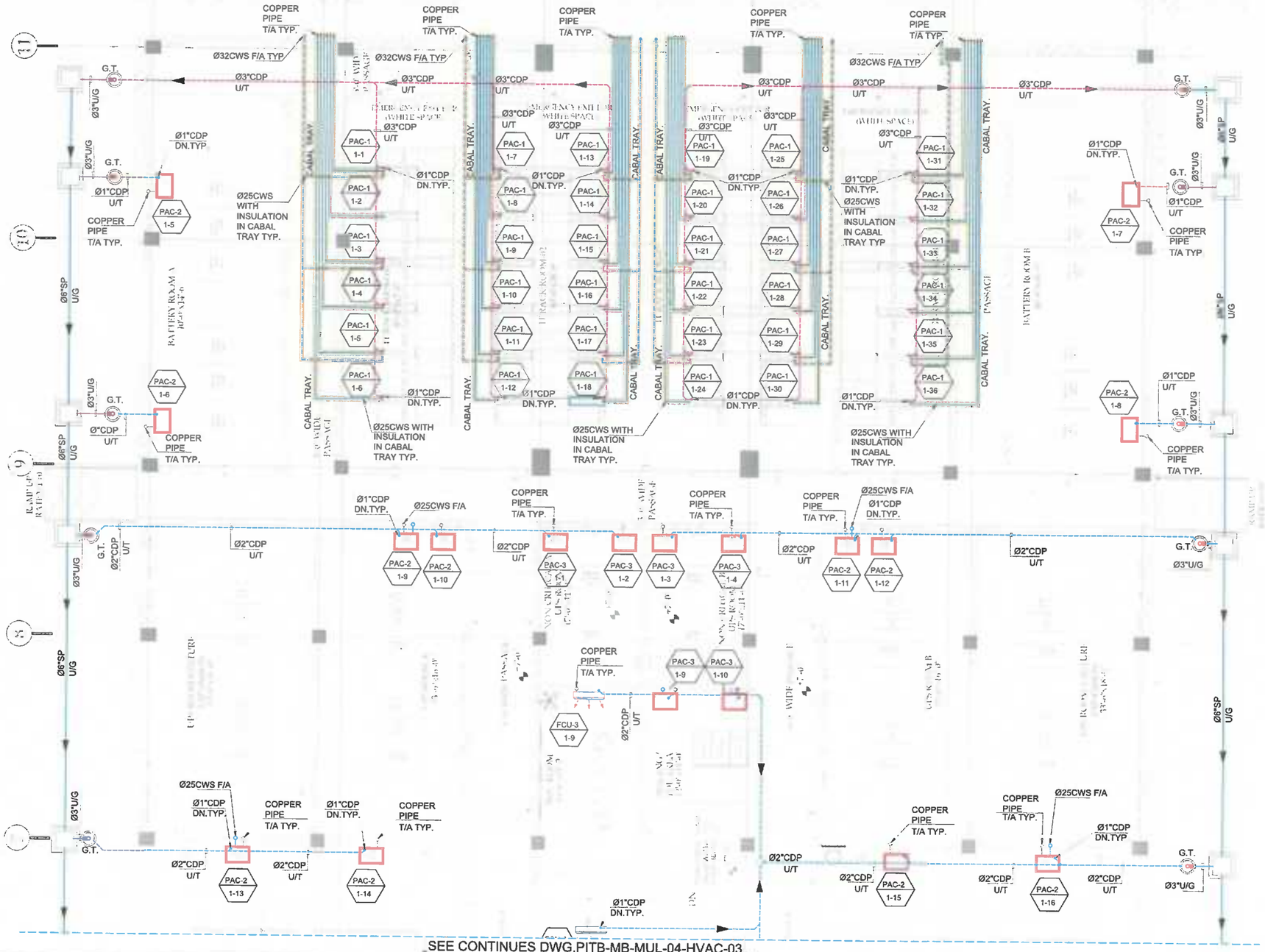



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SEE CONTINUES DWG.PITB-MB-MUL-04-HVAC-05

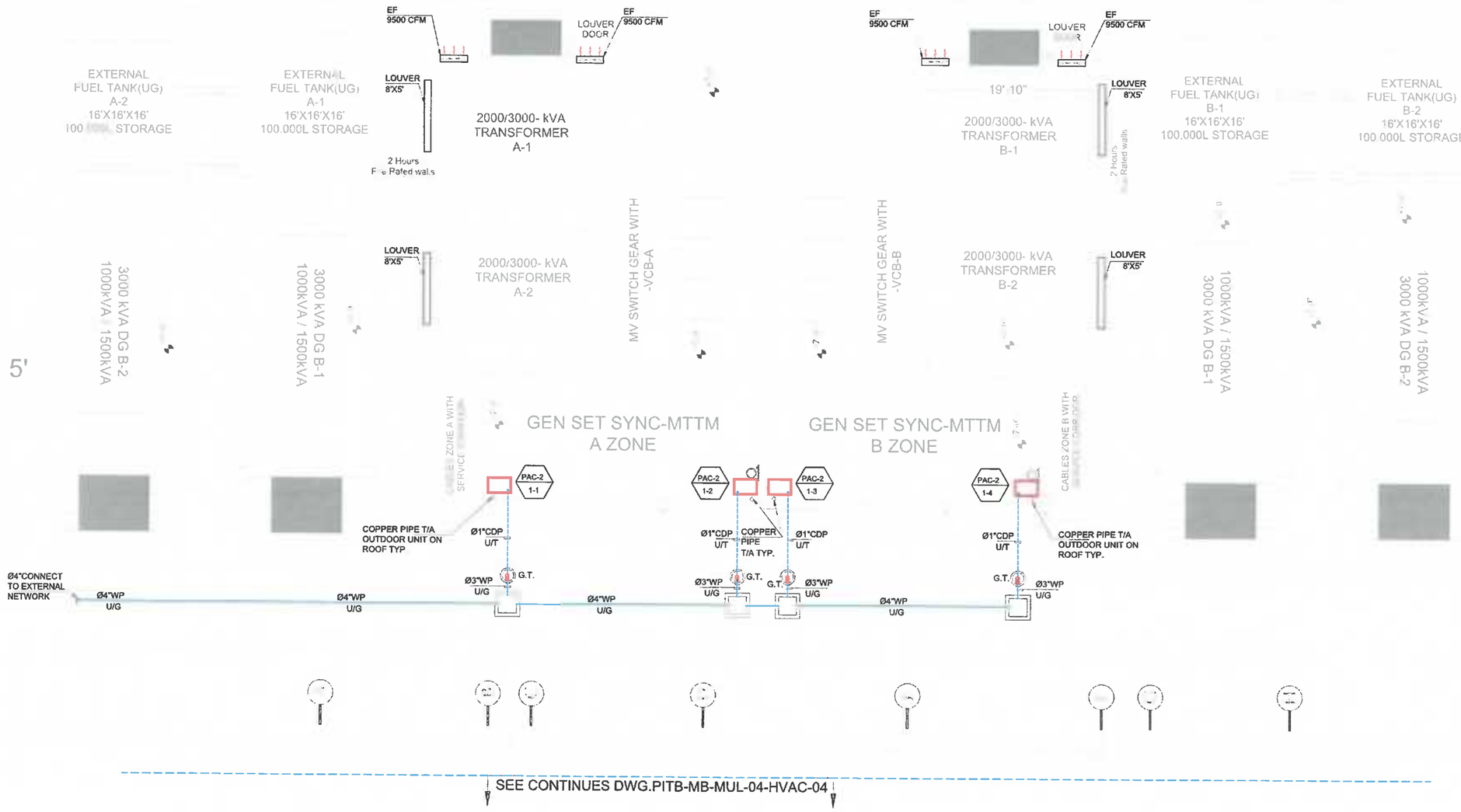



SEE CONTINUES DWG.PITB-MB-MUL-04-HVAC-03

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**TENDER DRAWING**

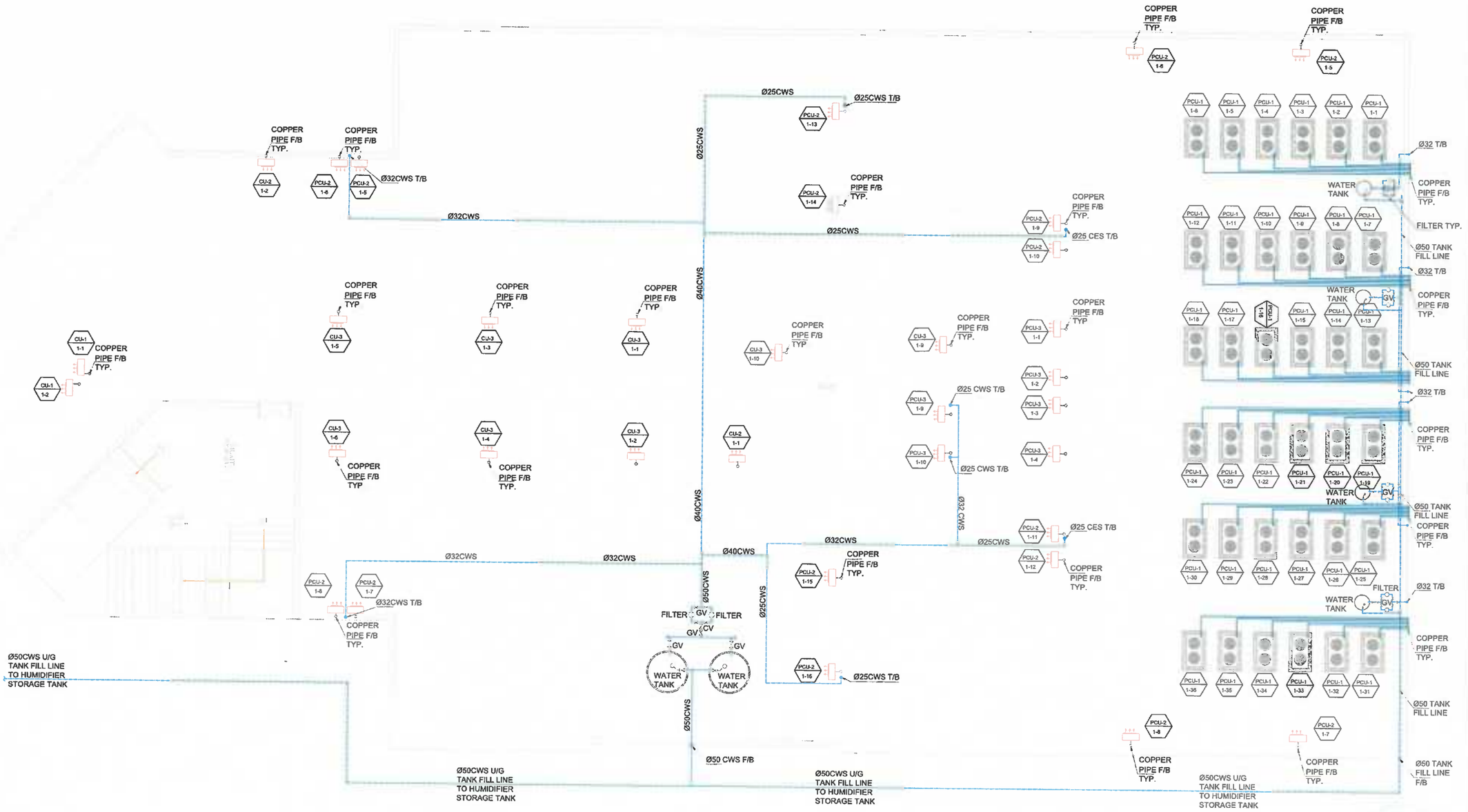
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**TENDER DRAWING**

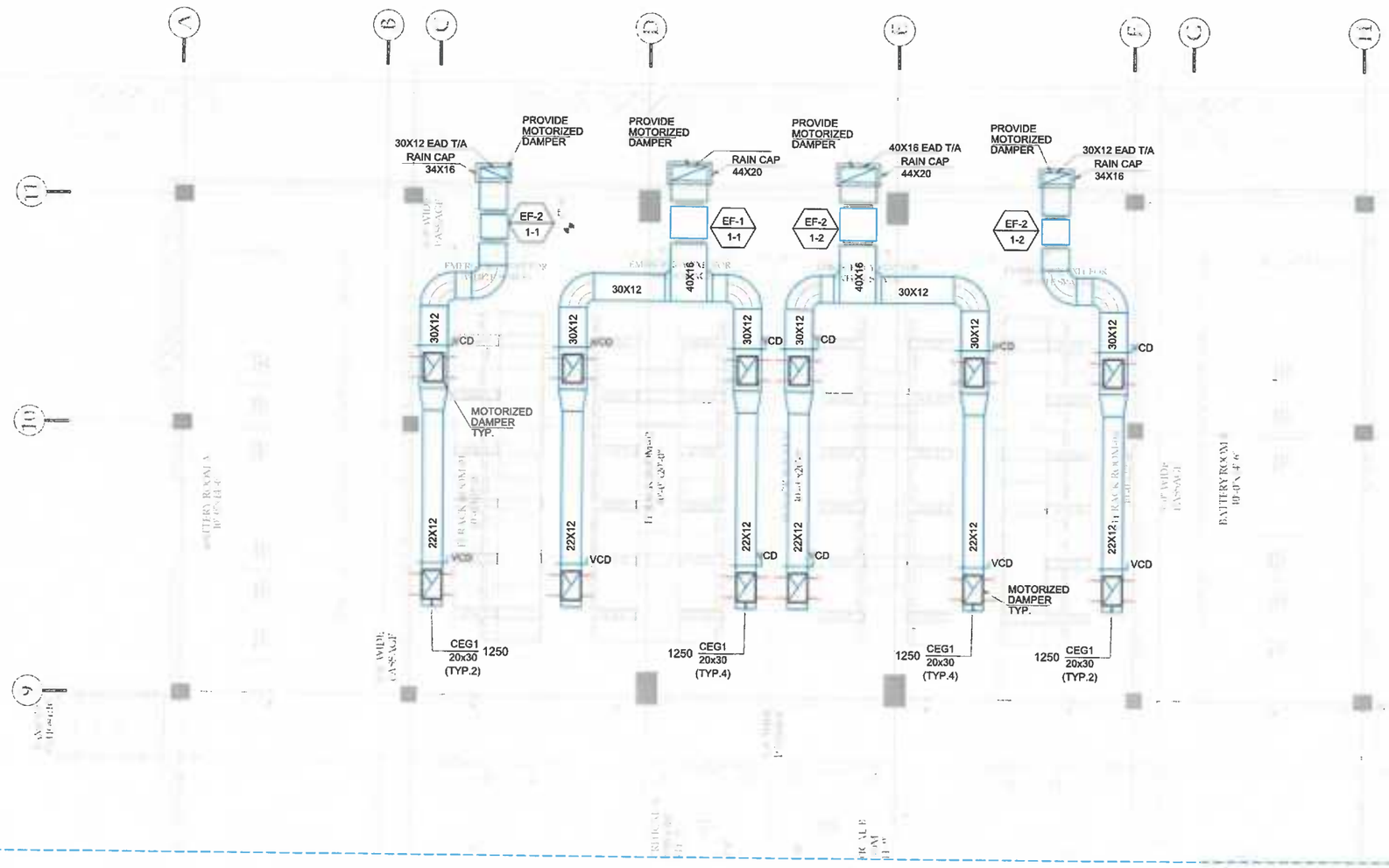
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**TENDER DRAWING**

| REV. | DESCRIPTION | SIGN. | DATE |
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SHEET NOTES:

1. MOTORIZED DAMPERS SHALL BE INTERLOCKED WITH THE FIRE ALARM SYSTEM AND SHALL ALSO BE INTEGRATED WITH THE DATA CENTER CENTRAL CONTROL SYSTEM FOR MONITORING.
2. UNDER NORMAL OPERATING CONDITIONS, THE MOTORIZED DAMPERS SHALL REMAIN NORMALLY CLOSED.
3. IN THE EVENT OF FIRE, THE NOVEC 1230 FIRE SUPPRESSION SYSTEM SHALL OPERATE FIRST. FOLLOWING ACTIVATION OF THE NOVEC 1230 SYSTEM AND COMPLETION OF THE REQUIRED AGENT RETENTION TIME (MINIMUM 10 MINUTES), THE MOTORIZED DAMPER SHALL BE OPENED MANUALLY, AND THE ASSOCIATED SMOKE EXHAUST FAN SHALL ALSO BE STARTED MANUALLY by the authorized operator.
4. THE SMOKE EXHAUST SYSTEM SHALL NOT START AUTOMATICALLY UPON ACTIVATION OF THE FIRE ALARM OR NOVEC 1230 SYSTEM. Manual operation shall only be carried out after completion of the specified agent retention period.
5. A SEPARATE, DEDICATED DISTRIBUTION BOARD (DB) SHALL BE PROVIDED FOR THE COMPLETE SMOKE EXTRACTION SYSTEM, INCLUDING POWER SUPPLY AND CONTROL OF THE MOTORIZED DAMPERS AND SMOKE EXHAUST FANS.
6. THE DEDICATED DB SHALL BE PROVIDED WITH INDIVIDUAL SWITCHES/CONTROL DEVICES FOR MANUAL OPERATION OF EACH MOTORIZED DAMPER AND ASSOCIATED SMOKE EXHAUST FAN.
7. THE DEDICATED SMOKE EXTRACTION SYSTEM DB SHALL BE INSTALLED OUTSIDE THE DATA CENTER POD/PROTECTED AREA AT A LOCATION ACCESSIBLE TO THE AUTHORIZED OPERATOR. FINAL LOCATION SHALL BE COORDINATED AT SITE AND APPROVED BY THE COMPETENT AUTHORITY PRIOR TO INSTALLATION.
8. ALL CONTROL, INTERLOCKING, POWER AND COMMUNICATION REQUIREMENTS SHALL BE COORDINATED WITH THE FIRE ALARM SYSTEM, NOVEC 1230 FIRE SUPPRESSION SYSTEM AND DATA CENTER CENTRAL CONTROL SYSTEM prior to installation.
9. ALL EQUIPMENT, CONTROL PANELS, DAMPERS, FANS, CABLES AND ASSOCIATED ACCESSORIES SHALL BE SUITABLE FOR THE INTENDED SMOKE EXTRACTION/FIRE EMERGENCY DUTY AND SHALL COMPLY WITH THE APPLICABLE CODES, STANDARDS AND PROJECT REQUIREMENTS.
10. PROVIDE RAIN CAP AT THE END OF VERTICAL DUCT. TERMINATE IT AT LEAST 5 FEET ABOVE THE HIGHEST EQUIPMENT.
11. CONTRACTOR SHALL VERIFY ALL EXISTING SITE CONDITIONS, EQUIPMENT LOCATIONS, ACCESS REQUIREMENTS, POWER SUPPLY AND CONTROL INTERFACES BEFORE COMMENCEMENT OF WORK.

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TENDER DRAWING

| REV. | DESCRIPTION | SIGN. | DATE |
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GENERAL NOTES:

1. ALL UNDERGROUND FIREFIGHTING PIPES SHALL RUN 1.25 METER BELOW FINISH FLOOR LAVEL.
2. ALL FIRE FIGHTING SHALL BE COMPLIANCE WITH NFPA AND PREVAILING LATEST INTERNATIONAL STANDARDS.
3. SUPPORT, SPACING SWAY/ SEISMIC BRACING SHALL COMPLY NFPA STANDARDS.
4. ALL HANGERS, BRACKETS, ETC. SUPPORTING THE PIPES AND EQUIPMENT SHALL COMPLY WITH NFPA STANDARDS.
5. ALL FITTINGS / VALVES TO BE APPROVED.
6. EQUIPMENT USED MUST BE UL LISTED OR APPROVED.
7. INSTALLATION OF FIRE FIGHTING SYSTEM (STANDPIPE) SHALL BE AS PER NFPA 14.
8. INSTALLATION OF FIRE FIREFIGHTING EXTINGUISHERS SHALL BE AS PER NFPA 10.
9. PORTABLE FIRE EXTINGUISHERS SHALL BE LISTED LABELED AND CLEARLY MARKED ON EACH FIRE EXTINGUISHERS.
10. PORTABLE FIRE EXTINGUISHERS SHALL BE APPROVED.
11. ALL FIRE FIGHTING PIPES PENETRATION THROUGH WALLS AND SLABS SHALL BE SEALED WITH FIRE RETARDANT MATERIAL OR RATING NOT LESS THAN THE RATING OF WALL OR SLAB BEING PENETRATED.
12. NOTES APPEAR ON OTHER DRAWINGS SHALL BE APPLICABLE FOR ALL THE FIRE FIGHTING DRAWINGS OF THIS PROJECT.
13. ALL FIRE FIGHTING PIPES SHALL BE PROTECTED AGAINST SEISMIC EVENTS COMPLYING WITH NFPA STANDARDS. FLEXIBLE CONNECTION SHALL BE INSTALLED ON BUILDING SEISMIC / EXPANSION JOINTS / GAPS SHALL BE COMPLY WITH LATEST EDITION OF NFPA 13.
14. CONTRACTOR SHALL COORDINATE ALL BUILDER WORK REQUIREMENTS BASED ON DRAWINGS, MATERIAL AND SUBMITTAL APPROVALS.
15. CONTRACTOR TO CO-ORDINATE WITH ALL SERVICES.
16. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATIONS.

LEGEND:

- FIREFIGHTING LINE OUTSIDE BUILDING (HDP)
- FIREFIGHTING LINE INSIDE BUILDING(BLACK STEEL PIPE)
- FIRE HOSE CABINET CLASS II
- FIRE HOSE CABINET CLASS III
- UPRIGHT SPRINKLER
- SIDEWALL SPRINKLER
- PENDENT SPRINKLER
- UPRIGHT SPRINKLER
- FE-1 FIRE EXTINGUISHER ABC
- FE-2 FIRE EXTINGUISHER K-TYP FOR KITCHEN AREA
- FE-3 FIRE EXTINGUISHER CO2
- Ø2½" SIAMESE CONNECTION
- CHECK VALVE
- GATE VALVE
- PUMPER FIRE HYDRANT

= ABOVE FALLS CEILING
= DOWN
= FIRE DEPARTMENT CONNECTION
= FROM ABOVE
= FROM BELOW
= FINISH FLOOR LEVEL
= HIGH LEVEL
= TO ABOVE
= TO BELOW
= UNDER GROUND
= UP IN WALL
= DOWN IN WALL

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DRAWING TITLE: FIREFIGHTING LEGEND AND NOTES

DRAWING NO: PITB-MB-MUL-04-FF-01

SCALE: N.T.S

SHEET: A3

TENDER DRAWING

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SEE ENLARGED PLAN-B
DWG. PITB-MB-MUL-04-FF-03

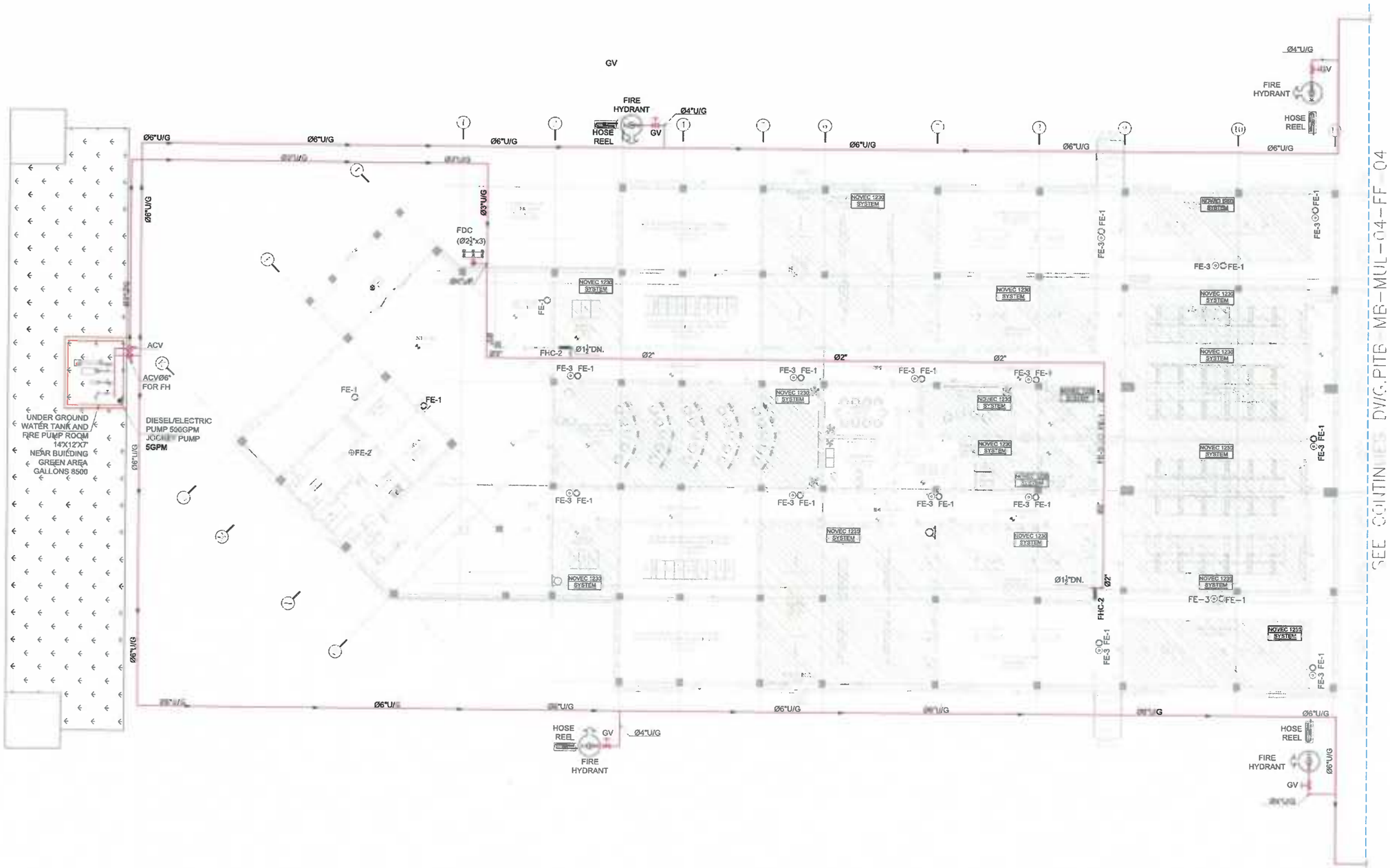
SEE ENLARGED PLAN-B
DWG. PITB-MB-MUL-04-FF-04

Ø6"U/G
Ø4"U/G
GV
FIRE HYDRANT
HOSE REEL
FDC (Ø2½"x3)
Ø4"UP
ACV
ACV Ø6" FOR FH
DIESEL/ELECTRIC PUMP 500GPM
5GPM
FHC-2
Ø1½"DN.
FE-1
FE-2
FE-3 FE-1
NOVEC 1230 SYSTEM
INCOMING
A1-A2
B1-B2
RAMP UP

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| DRAWN BY: | M.SALEEM SAEED |
| DESIGNED BY: | Engr.ABDUL QADEER |
| CHECKED BY: | Engr.FAHAD HASSAN |
| APPROVED BY: | Engr.SADAQAT HUSSAIN |
| DATE: | AUGUST-2026 |
| DRAWING TITLE: | BASEMENT AND MASTER GROUND FLOOR PLAN FIREFIGHTING LAYOUT |
| DRAWING NO: | PITB-MB-MUL-04-FF-02 |
| SCALE: | 1/16"=1' |
| SHEET: | A3 |

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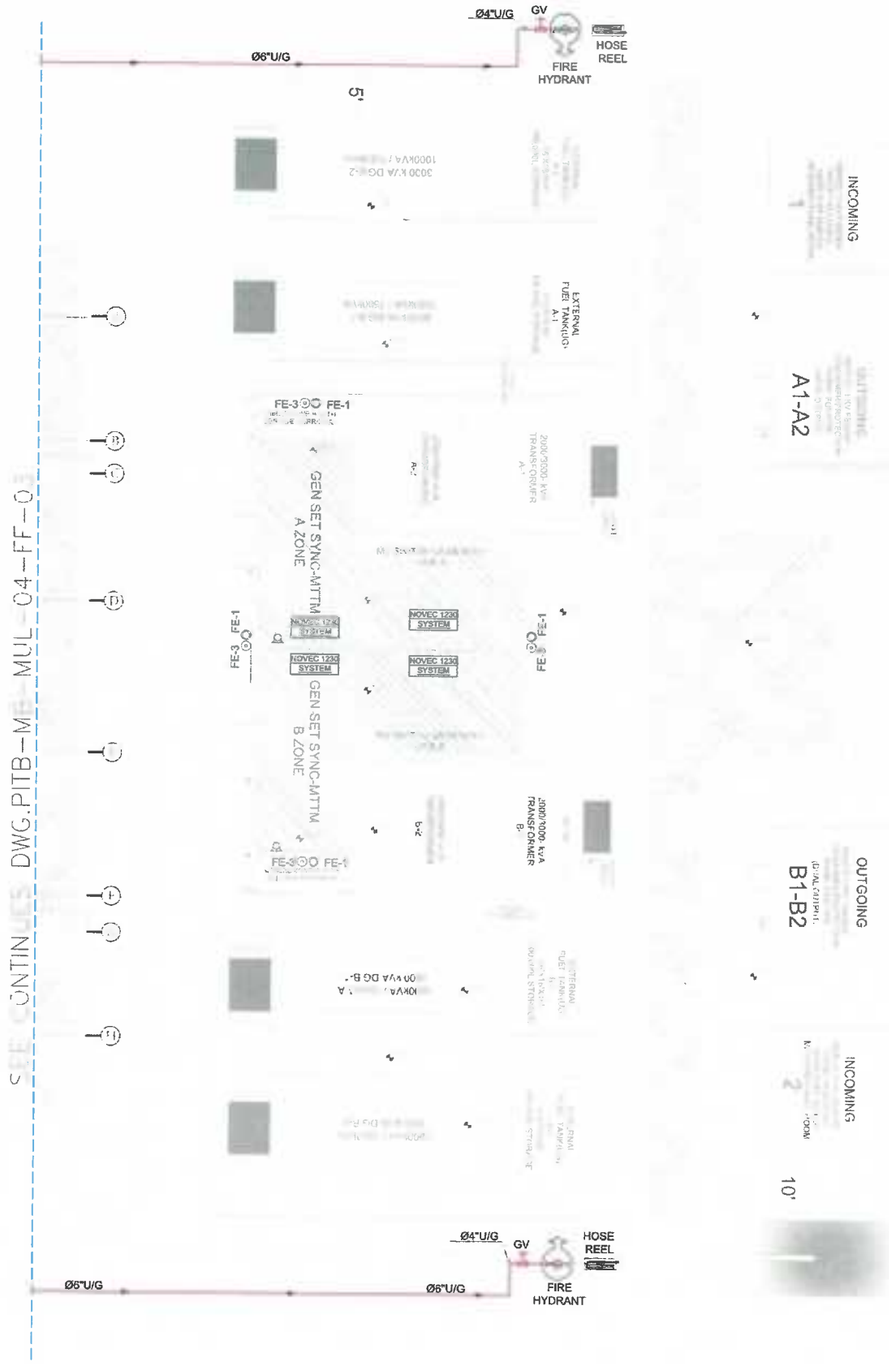
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