

Standard Bidding Document

315-Construction of Mosque at SBP HOK with allied works along with
Underground Water Tank and Landscaping, SBP Head Office Karachi
(Works)

National

Single Stage-Two Envelope



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REQUEST FOR BIDS

PROCUREMENT OF CIVIL WORKS

1. The **SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC))** has reserved Funds for the procurement planned for FY **2026-27**. The **SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC))** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**315-Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi**" with the reference of "**P88684**".

2. The **SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC))** invites sealed Bids from eligible Bidders for procurement of Works (**315-Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi**) described in the bidding documents on **EPADS v2.0**.

3. **Single Stage-Two Envelope** will be used by adopting **Least Cost Based Selection (LCBS)** Technique for the subject procurement, in line with the Public Procurement Rules, 2004 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority from time to time.

4. All Bids must be accompanied by a Bid Security amount described in Bid Security Section in Bidding Document in the form of **Pay Order, Banker's Cheque, Demand Draft**. Or all bids must be accompanied by bid securing declaration in the format specified in the Bidding documents

5. E-Bidding documents, containing detailed terms & conditions, specifications and requirements etc. are available on **e-Pak Acquisition and Disposal System (EPADS)** at **<https://epads.gov.pk/opportunities/federal/procurements/88684>** for all the interested bidders registered on **EPADS v2.0**. Bidders are required to get themselves registered on **EPADS v2.0** to participate in Bidding process.

6. The e-bids, prepared in accordance with the instructions in the e-Bidding documents, must be submitted through **EPADS v2.0** on or before **Thursday, September 24, 2026 12:00 PM**. E-bids will be opened by using **EPADS v2.0** on the same day at **Thursday, September 24, 2026 12:30 PM**. Manual submission of Bids shall not be entertained. Those vendor who have not yet registered on the new version of **EPADS v2.0**, may register themselves on <https://vendors.epads.gov.pk/>. A tutorial to explain the registration process is available at <https://www.youtube.com/watch?v=MNW6T38v7tc>.

In terms of Rules 48 of Public Procurement Rules, 2004 Grievance Redressal Committee (GRC) is notified for the subject procurement and notification copy is available on the procuring agency's website and on Authority's website at (www.ppra.org.pk).

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Instructions to Bidders

A. INTRODUCTION

1. Scope of Bid

1.1. The Procuring agency/Employer (PA), as indicated in the Bid Data Sheet (BDS) invites Bids for the execution of Works as specified in the BDS and Section V- Works Requirements. The name, identification, and number of lots (contracts) of this National/ International Competitive Bidding process are specified in the BDS.

2. Source of Funds

2.1. Source of funds as referred in Clause 2 of Bid Data Sheet.

3. Eligible Bidders

3.1. A bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country, or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture or consortium. In the case of a joint venture or consortium, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture or consortium shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture or consortium during the Bidding process, and in case of award of contract, during the execution of contract. Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.

Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with any instructions issued by the Authority.

(The limit on the number of members of JV or Consortium may be prescribed

in BDS, in accordance with the guidelines issued by the PPRA).

3.2. The invitation for bids is open to all prospective bidders subject to any provisions of incorporation or licensing by the respective national/international incorporating agency or statutory body established for that particular trade or business. Procuring agencies shall specify the registration/licensing requirements for the foreign bidder keeping in view the requirement of that business.

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

3.3.1. are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring agency/Employer to provide consulting services for the preparation of design or technical specifications of the works that are the subject of the bid; or

3.3.2. have controlling shareholders in common; or

3.3.3. receive or have received any direct or indirect subsidy from any of them; or

3.3.4. have the same legal representative for purposes of this Bid; or

3.3.5. 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/Employer regarding this Bidding process; or

3.3.6. Submit more than one bid in this bidding process.

3.4. A Bidder may be ineligible if –

3.4.1. he is declared bankrupt or, in the case of company or firm, insolvent;

3.4.2. payments in favor of the bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

3.4.3. the bidder is convicted, by a final judgment of a Court of Law or relevant Professional Statutory Body, of any offence involving professional conduct;

3.4.4. The bidder is debarred/ blacklisted by a national level Procuring agency/Employer and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of bid securing declaration.

3.5. As and when required, bidders shall provide to the Procuring agency/Employer evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.

3.6. Bidders shall submit proposal relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract is envisaged.

4. Eligible Material and Equipment

4.1. All the material and equipment to be mobilized under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such materials and equipment. For this purpose, ineligible countries are stated in the section-IV titled as “Eligible Countries”.

B. BIDDING DOCUMENTS

5. Contents of Bidding Documents

5.1. The scope of Works, bidding procedures, and terms and conditions of the contract are prescribed in the bidding documents. In addition to the Invitation for Bids, the bidding documents which should be read in

conjunction with any addenda issued in accordance with ITB 7.1 include:

Section I -Invitation for Bids

Section II Instructions to Bidders (ITBs)

Section III Bid Data Sheet (BDS)

Section IV Eligible Countries

Section V Evaluation and Qualification Criteria

Section VI Works Requirements Technical Specifications & Schedule of Requirements

Section VII Standard Bidding Forms

Section VIII General Conditions of Contract (GCC)

Section IX Particular Conditions of Contract (PCC)

Section X Contract Forms

5.2. The bidder is expected to examine all instructions, forms, specifications, terms and conditions prescribed in the bidding documents. Failure to furnish all the information required in the bidding documents will be at the bidder's risk and may result in the rejection of his bid.

6. Clarification of Bidding Document, Pre-bid Meeting

6.1. A prospective bidder requiring any clarification of the bidding document may notify the Procuring agency/Employer through EPADS.

6.2. The Procuring agency/Employer shall respond to the request for clarification in accordance with Rule 31 of the Public Procurement Rules 2004.

6.3. Should the Procuring Agency deem it necessary to amend the BIDDING document as a result of a clarification, it shall do so following the procedure under ITB 7.

6.4. If indicated in the BDS, the bidder's designated representative is invited at the bidder's cost to attend a pre-bid meeting at the place, date and time mentioned in the BDS. During this pre-bid meeting, prospective bidders may request clarification of the schedule of requirement, the evaluation criteria or any other aspects of the bidding documents.

6.5. Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be uploaded on EPADS. Any modification to the bidding documents that may become necessary as a result of the pre-bid meeting shall be made by the Procuring agency/Employer exclusively through the use of an Addendum pursuant to ITB 7. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

6.6. The bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the bidder's own expense.

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

7. Amendment of Bidding Documents

7.1. The procuring agency may issue notification of any change, addition, modification or deletion in accordance with Rule 23 of the Public Procurement Rules 2004 i.e. Bidding Documents.

7.2. To give prospective bidders reasonable time in which to take an addendum/corrigendum into account in preparing their bids, the Procuring agency/Employer may, at its discretion, extend the deadline for the submission of bids:

Provided that the Procuring agency/Employer shall extend the deadline for submission of bid in pursuance of Rule 27 of the Public Procurement Rules 2004, i.e. Extension of time for submission of bids, if such an addendum is

issued within last three (03) days of the bid submission deadline.

C. PREPARATION OF BIDS

8. Language of Bid

8.1. The bid prepared by the bidder, as well as all correspondence and documents relating to the bid exchanged by the bidder and the Procuring agency/Employer shall be written in the English language unless specified in the BDS. Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless specified in the BDS, in which case, for purposes of interpretation of the bidder, the translation shall govern.

9. Documents Constituting the Bids

9.1. The Bids prepared by the Bidder shall constitute of all the documents required in the BDS.

10. Documents Establishing Eligibility of Material, Equipment and Works, their Conformity to Bidding Documents

10.1. The bid prepared by the bidder shall constitute the following components: -

10.1.1. Documentary evidence established in accordance with ITB 10 that the material and equipment to be utilized by the Bidder for the executions of works are eligible material and equipment and conform to the Bidding Documents;

10.1.2. Documentary evidence established in accordance with ITB 11 that the bidder has been authorized to carry out the Construction works;

10.1.3. Documentary evidence established in accordance with ITB 11 that the bidder is eligible and/or qualified for the subject bidding process;

10.1.4. Form of Bid and Bid Prices completed in accordance with ITB 12 and 13;

10.1.5. Completed schedules as required, including priced Bill of Quantities in accordance with ITB 13.

10.1.6. Technical Proposal completed in all aspects in accordance with ITB-15.

10.1.7. Bid security or Bid Securing Declaration furnished in accordance with ITB 17;

10.1.8. Any other document required in the BDS.

10.2. In addition to the requirements, bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.

10.3. The bidder shall furnish, as part of its bid, all those documents establishing the eligibility in conformity to the terms and conditions specified in the bidding documents for all material, equipment and works which the bidder proposes to execute.

10.4. The documentary evidence of conformity of the material, equipment and works to the Bidding Documents may be in the form of literature, drawings, and data, and shall consist of:

10.4.1. a detailed description of the work methodology, approach, schedule and resources to be mobilized at site;

10.4.2. an item-by-item commentary on the Procuring agency/Employer's Technical Specifications demonstrating substantial responsiveness of the material, equipment and works to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications;

10.4.3. any other procurement specific documentation requirement as stated in the BDS.

10.5. The required documents and other accompanying documents must be in English. In case any other language than English is used the pertinent translation into English shall be attached to the original version.

11. Documents Establishing Eligibility and Qualification of the Bidder

11.1. The bidder shall furnish, as part of its bid, all those documents establishing the bidder's eligibility to participate in the bidding process and/or its qualification to perform the contract if its bid is accepted.

11.2. The documentary evidence of the bidder's eligibility to bid shall establish to the satisfaction of the Procuring agency/Employer that the bidder, at the time of submission of its bid, is from an eligible country as defined in Section-IV titled as "Eligible Countries".

11.3. The documentary evidence of the bidder's qualification to perform the contract if its bid is accepted shall establish to the satisfaction of Procuring agency/Employer that:

11.3.1. The bidder has the financial and technical capability necessary to perform the Contract, meets the qualification criteria specified in Section-V, Evaluation and Qualification Criteria and BDS.

11.3.2. In the case of a bidder not doing business within Pakistan, the bidder is or will be (if awarded the contract) represented by a local bidder (Joint Venture) in accordance with the PEC works bylaws, and in case of award of works such foreign firm is required to participate in the execution of works to carry out its obligations as prescribed in the Conditions of Contract and /or Technical Specifications.

11.3.3. That the bidder meets the qualification criteria listed in Section-V, Evaluation and Qualification Criteria and BDS.

12. Forms of Bid

12.1. The Bidder shall fill the Form of Bids furnished in the bidding documents. The Bids Form must be completed without any alterations to its format and no substitute shall be accepted.

13. Bid Prices

13.1. The bid prices quoted by the bidder in the Standard bid Forms, Bill of Quantities and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the bidding documents.

13.2. The bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. If a Price Schedule shows items listed but not priced, their prices shall be construed to be included in the prices of other items in the Bill of Quantities and will not be paid for separately by the Procuring agency/Employer.

13.3. Items not listed in the Price Schedule shall be assumed not to be included in the bid, and provided that the bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive bidder(s) shall be construed to be the price of those missing item(s):

Provided that:

13.3.1. where there is only one (substantially) responsive bidder, or

13.3.2. where there is provision for alternate proposals and the respective items are not listed in the other bids,

The Procuring agency/Employer may fix the price of missing items in accordance with market survey, and the same shall be considered as final price.

13.4. The Bid price to be quoted in the Form of Bid in accordance with ITB 12 shall be the total price of the bid.

13.5. Unless otherwise specified in the BDS and the Contract, the rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the

Conditions of Contract.

13.6. If so specified in ITB 1.1, bids may be invited for individual lots (contracts) or for any combination of lots (packages).

13.7. Prices quoted by the Bidder shall be fixed during the bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and shall be rejected, pursuant to ITB 27, unless otherwise price adjustment is permissible under Conditions of the Contract.

13.8. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date twenty-eight (28) days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the bidder.

14. Currencies of Bid and Payment

14.1. Prices shall be quoted in Pakistani Rupees unless otherwise specified in the BDS. Comparison of bids and tie of bid shall be treated in accordance with the Rule 30(2) of Public Procurement Rules, 2004.

15. Documents Comprising the Technical Proposal

15.1. The bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section VII – Standard Bid Forms, in sufficient detail to demonstrate the adequacy of the bidder's proposal to meet the work requirements and the completion time.

16. Bid Validity Period

16.1. Bids shall remain valid for the period specified in the BDS after the bid submission deadline prescribed by the Procuring agency/Employer. A bid valid for a shorter period shall be rejected by the Procuring agency/Employer as non-responsive. The period of bid validity will be determined from the complementary bid securing instrument i.e. the expiry period of bid security or bid securing declaration as the case may be.

16.2. Under exceptional circumstances, prior to the expiration of the initial Bids/Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids/Bid. Such request for extension of the period of bid validity shall be carried out in accordance with Rule 26 of the Public Procurement Rules, 2004.

17. Bid Security or Bid Securing Declaration

17.1. Pursuant to ITB 11.1 unless otherwise specified in the BDS, the bidder shall furnish as part of its bid, a Bid Security in accordance with Rule 25 of the Public Procurement Rules, 2004 in the amount and currency specified in the BDS or Bid Securing Declaration as specified in the BDS in the format provided in Section VII (Standard Bidding Forms).

In case Procuring agency/Employer is inviting bids in lots / packages, the bidder shall be required to submit his bid security against the respective lot/package for which he is submitting his bid.

Until the development of functionality of auto verification of financial instrument in EPADS, the scanned copy of bid security or bid securing declaration, as the case may be, shall be uploaded on E-PADS whereas the original instrument to be submitted to the procuring agency before closing of bid submission deadline,

17.2. The Bid Security shall be denominated in the local currency or in another freely convertible currency, and it shall be in the form specified in the **BDS** which shall be in any of the following:

17.2.1. A bank guarantee, an irrevocable letter of credit issued by a Scheduled bank in the form provided in the Bidding Documents or another form acceptable to the Procuring agency/Employer and valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period for Bid Validity is extended. In either case, the form must include the complete name of the bidder;

17.2.2. A cashier's or certified cheque; or

17.2.3. Another security as indicated in the **BDS**.

17.3. The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in Section VII (Standard Bidding Forms) or another form approved by the Procuring agency/Employer prior to the bid submission.

17.4. The Bid Security shall be payable promptly upon written demand by the Procuring agency/Employer in case any of the conditions listed in ITB 17.9 are invoked.

17.5. Any bid not accompanied by a Bid Security or Bid Securing Declaration in accordance with ITB 17.1 or 17.3 shall be rejected by the Procuring agency/Employer and shall be declared as non-responsive bid, pursuant to ITB 27.

17.6. Unsuccessful bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bid Validity prescribed by the Procuring agency/Employer pursuant to ITB 16. The Procuring agency/Employer shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest:

17.6.1. The expiry of the Bid Security;

17.6.2. The entry into force of a procurement contract and the provision of a performance security (or guarantee), for the performance of the contract if such a security (or guarantee), is required by the Bidding documents;

17.6.3. The rejection by the Procuring agency/Employer of all Bids;

17.6.4. The withdrawal of the bid prior to the deadline for the submission of bids, unless the bidding documents stipulate that no such withdrawal is permitted.

17.7. The successful bidder's Bid Security will be discharged upon the bidder signing the contract pursuant to ITB 40, or furnishing the performance security (or guarantee), pursuant to ITB 41.

17.8. The Bid Security may be forfeited or the Bid Securing Declaration executed:

17.8.1. if a Bidder:

17.8.1.1. Withdraws its Bid during the period of Bid Validity as specified by the Procuring agency/Employer, and referred by the bidder on the Form of Bid except as provided for in ITB 16.2; or

17.8.2. In the case of a successful bidder, if the bidder fails:

17.8.2.1. to sign the contract in accordance with ITB 40; or

17.8.2.2. to furnish performance security (or guarantee) in accordance with ITB 41.

17.9. In case of Bid Security issued by the foreign bank is allowed by the Procuring agency/Employer, the same should be counter guaranteed by a corresponding bank in Pakistan. Furthermore, in case of joint venture, it should be in the name of Joint venture to ensure joint responsibility. In case the JV is not legally constituted at the time of bid submission, the bid security or bid securing declaration shall be in the names of all future members as named in the letter of bid.

18. Withdrawal of Bids

18.1. Before bid submission deadline, any bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and the corresponding must accompany the respective written notice.

19. Format and Signing of Bid

19.1. The Bidder shall prepare and submit Bids through EPADS with due diligence after carefully reading all the terms and condition before bid submission deadline.

D. SUBMISSION OF BIDS

20. Submission of Bids through EPADS v2.0

20.1. All bids shall be submitted through EPADS v2.0.

21. Deadline for Submission of Bids

21.1. All bids shall be received through **EPADS v2.0** not later than bid submission deadline as specified in the **BDS**.

21.2. The Procuring agency/Employer may, under exceptional circumstances and at its discretion, extend the deadline for the submission of bids, pursuant to Rule 27 of the Public Procurement Rules, 2004. Extension of Time for submission of bid, by amending the Bidding Documents in accordance with ITB 7, in which case all rights and obligations of the Procuring agency/Employer and bidders previously subject to the deadline will thereafter be subject to the new deadline.

22. Substitution and Modification of bids

22.1. A bidder may substitute or modify his bid after it has been submitted, provided that written notice of the substitution or modification of the bid, is received by the Procuring agency/Employer prior to the deadline for submission of bids.

22.2. Revised bid may be submitted after the substitution or modification made in the original bid in accordance with the provisions referred in **ITB 18**.

E. OPENING AND EVALUATION OF BIDS

23. Opening of Bids

23.1. The Procuring Agency will open bids in accordance with Rule 28 of the Public Procurement Rules, 2004 and as specified in the BDS.

24. Confidentiality

24.1. Information relating to the examination, clarification, evaluation and comparison of bids and recommendation of contract award shall not be disclosed to bidders or any other persons not officially concerned with such process until the time of the announcement of the respective evaluation report.

25. **Clarification of Bids**

25.1. Clarification of Bidding Documents shall be carried out in accordance with Rule 31 of the Public Procurement Rules, 2004.

25.2. The alteration or modification in the bid which in any case affect the following parameters will be considered as a change in the substance of a bid:

- 25.2.1. evaluation & qualification criteria;
- 25.2.2. required scope of work;
- 25.2.3. contract price;
- 25.2.4. all securities requirements;
- 25.2.5. tax requirements;
- 25.2.6. terms and conditions of bidding documents.
- 25.2.7. change in the ranking of the bidder

26. **Preliminary Examination of Bids**

26.1. Prior to the detailed evaluation of bids, the Procuring agency/Employer will determine whether each bid:

- 26.1.1. meets the eligibility criteria defined in **ITB 3** and **ITB 4**;
- 26.1.2. has been prepared as per the format and contents defined by the Procuring agency/Employer in the bidding documents;
- 26.1.3. has been properly signed;

26.1.4. is accompanied by the required securities; and

26.1.5. is substantially responsive to the requirements of the bidding documents.

The Procuring agency/Employer's determination of a bid's substantial responsiveness will be based on the contents of the bid itself.

26.2. A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one that: -

26.2.1. affects in any substantial way the scope, quality, or performance of the Works;

26.2.2. limits in any substantial way, inconsistent with the bidding documents, the Procuring agency/Employer's rights or the bidders' obligations under the Contract; or

26.2.3. if rectified, would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

26.3. The Procuring agency/Employer will confirm that the documents and information specified under ITB 9, 10 and 11 have been provided in the bid. If any of these documents or information is missing, or is not provided in accordance with the Instructions to Bidders, the bid shall be rejected.

26.4. The Procuring agency/Employer may waive-off any minor informality, nonconformity, or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

Explanation: A minor informality, non-conformity or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a Bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is immaterial when the effect on quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the works. The Procuring agency/Employer either shall give the bidder an opportunity to cure any deficiency resulting from a minor

informality or irregularity in a bid or waive the deficiency, whichever is advantageous to the Procuring agency/Employer. Examples of minor informalities or irregularities include failure of a bidder to –

26.4.1. Submit the number of copies of signed bids required by the invitation;

26.4.2. Furnish required information concerning the number of its employees;

26.4.3. the firm submitting a bid has formally adopted or authorized, before the date set for opening of bids, the execution of documents by typewritten, printed, or stamped signature and submits evidence of such authorization and the bid carries such a signature.

26.5. Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer may request the bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any such aspect of the technical Proposal linked with the ranking of the bidders. Failure of the bidder to comply with the request may result in the rejection of its bid.

26.6. Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer shall rectify quantifiable nonmaterial nonconformities or omissions related to the Financial Proposal. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or nonconforming item or component.

26.7. If a bid is not substantially responsive, it will be rejected by the Procuring agency/Employer and may not subsequently be evaluated for complete technical responsiveness.

27. Examination of Terms and Conditions; Technical Evaluation

27.1. The Procuring agency/Employer shall examine the bid to confirm that all terms and conditions specified in the **GCC** and the **PCC** have been

accepted by the bidder without any material deviation or reservation.

For this purpose:

“Deviation” means departure from the requirements specified in the Bidding Document.

“Reservation” means setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document.

27.2. The Procuring agency/Employer shall evaluate the technical aspects of the bid submitted in accordance with ITB 30, to confirm that all requirements specified in Section VI – Works Requirement, Technical Specifications of the Bidding Documents have been met without material deviation or reservation.

27.3. If after the examination of the terms and conditions and the technical evaluation, the Procuring agency/Employer determines that the bid is not substantially responsive in accordance with ITB 27, it shall reject the bid.

28. Correction of Arithmetic Errors

28.1. Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -

28.1.1. if there is a discrepancy between unit prices and the sub-total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the sub-total price shall be corrected, unless in the opinion of the Procuring agency/Employer there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;

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

28.1.3. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

28.1.4. Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bid, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.

28.2. The amount stated in the Bid will, be rectified by the Procuring agency/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 amount, its bid shall be rejected after forfeiture of Bid Security or execution of the Bid Securing Declaration, as the case may be, in accordance with **ITB 41.3**.

29. Conversion to Single Currency

29.1. 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 from outside the Procuring agency/Employer's country (referred to as the "Foreign Currency Requirements") shall indicate the same in the letter of bid-financial proposal. The proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements either (i) entirely in the currency of the Bidder's home country or, (ii) at the bidder's option, entirely in Pak rupees provided always that a bidder expecting to incur expenditures in a currency or currencies other than those stated in (i) and (ii) above for a portion of the foreign currency requirements, and wishing to be paid accordingly, shall indicate the respective portions in his bid. Comparison of bids quoted in different currencies and conversion of bids into a single currency shall be carried out in accordance with Rule 30(2) of the Public Procurement Rules, 2004.

30. Evaluation of Bids

30.1. The Procuring agency/Employer shall evaluate and compare only the bids determined to be substantially responsive, pursuant to **ITB 27**.

30.2. In evaluating the Technical Proposal of each Bid, the Procuring agency/Employer shall use the criteria and methodologies listed in the BDS

and in terms of works requirement. No other evaluation criteria or methodologies shall be permitted.

30.3. The Procuring agency/Employer's evaluation of a bid will take into account:

30.3.1. the bid price, excluding provisional sums and the provision, if any, for contingencies in the summary bill of quantities, but including day work items, where priced competitively;

30.3.2. converting the amount resulting from applying above, if relevant, to a single currency in accordance with ITB 29;

30.4. 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.

30.5. If these bidding documents allow bidders to quote separate prices for different lots, and the award to a single bidder of multiple lots, the methodology of evaluation to determine the lowest evaluated lot combinations in the Form of Bid, is specified in the **BDS**.

30.6. If the bid, which results in the Evaluated Bid Price (Successful Bid), is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

Explanation:

"Unbalanced" or "front-loaded" bids consist of deliberately submitting bids with artificially high prices or unit rates for the early stages of a construction project, offset by artificially low prices or unit rates for the later stages of the project, to improve the contractor's cash flow.

31. Domestic Preference

31.1. If the **BDS** so specifies, the Procuring agency/Employer will grant a margin of preference to the domestic contractor in line with the rules, regulations, regulatory guides or instructions issued by the Authority from time to time.

32. Determination of Successful Bid

32.1. The Procuring agency/Employer shall compare the evaluated bids in accordance with the predefined bidding procedure, of all substantially responsive bids to determine the Successful bidder.

33. Qualification of Bidder

33.1. The Procuring agency/Employer shall determine to its satisfaction whether the bidder is substantially responsive and whose bid is declared as Successful bid either continues to meet (if prequalification applies) or meets (if post-qualification applies) the qualifying criteria specified in Evaluation and Qualification Criteria.

Note: In case of international bidding, the parameters for incorporation or licensing within Pakistan may be fulfilled as part of post qualification.

33.2. The determination shall be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to **ITB 11**.

33.3. Prior to contract award, the Procuring agency/Employer will verify that the successful bidder (including each member of a JV) is not blacklisted/debarred. The Procuring agency/Employer will conduct the same verification for each sub-contractor proposed by the successful bidder.

34. Sub-Contractors

34.1. The bidder shall provide details regarding any specialized sub-contractor to the Procuring agency/Employer. In case change of sub-contractors, the bidder shall promptly notify the Procuring agency/Employer and obtain approval for replacement of sub-contractors.

34.2. Bidders may propose sub-contracting up to the percentage of total value of contracts or the volume of works as specified in the **BDS**.

35. **Abnormally Low Financial Bid**

35.1. A procuring Agency may reject abnormally low bids. The decision of the Procuring agency/Employer to reject a bid and reasons for the decision shall be recorded in the procurement proceedings and promptly communicated to the bidder concerned. Moreover, the Procuring agency/Employer shall not incur any liability solely by rejecting abnormally bid

Guidance for Procuring agency/Employer:

An abnormally low bid means, in the light of the Procuring agency/Employer's estimate and of all the bids submitted, the bid appears to be abnormally low by not providing a margin for normal levels of profit. In order to identify the Abnormally Low Bid (ALB) following approaches can be considered to minimize the scope of subjectivity:

35.1.1. Comparing the bid price with the cost estimate;

35.1.2. Comparing the bid price with the bids offered by other bidders submitting substantially responsive bids; and

35.1.3. Comparing the bid price with prices paid in similar contracts in the recent past either government- or development partner-funded.

35.2. The Procuring agency/Employer will determine to its satisfaction whether the bidder that is selected as having submitted the successful bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in **ITB 11**

35.3. The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to **ITB 11**, as well as such other information as the Procuring agency/Employer deems necessary and appropriate. Factors not included in these bidding documents shall not be used in the evaluation of the bidders' qualifications.

35.4. Procuring agency/Employer may seek “Certificate for Independent Price Determination” from the bidder and the results of reference checks may be used in determining award of contract.

Explanation: The Certificate shall be furnished by the bidder. The bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.

35.5. An affirmative determination will be a prerequisite for award of the contract to the bidder. A negative determination will result in rejection of the bidder’s bid, in which event the Procuring agency/Employer will proceed to the next ranked bidder to make a similar determination of that bidder’s capabilities to perform satisfactorily.

F. AWARD OF CONTRACT

36. **Criteria of Award**

36.1. Subject to **ITB 36 and 37**, the Procuring agency/Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has been declared as Successful Bidder, provided that such bidder has been determined to be:

36.1.1. eligible in accordance with the provisions of **ITB 3**;

36.1.2. is determined to be qualified to perform the Contract satisfactorily;
and

36.1.3. Successful negotiations have been concluded, if any.

37. **Negotiations**

37.1. The Committee of the Procuring agency/Employer may negotiate with the Most Advantageous Bidder relating to the following areas:

37.1.1. a minor alteration to the technical (drawings, design technical specifications) details of the statement of works;

37.1.2. Methodology, work plan, staffing in view to streamline the work;

37.1.3. a minor amendment to the Particular conditions of Contract;

37.1.4. finalizing payment arrangements;

37.1.5. clarifying details that were not apparent or could not be finalized at the time of Bidding;

37.2. Where negotiation fails to result into an agreement, the Procuring agency/Employer may invite the next ranked bidder for negotiations. Where negotiations are commenced with the next ranked bidder, the Procuring agency/Employer shall not reopen earlier negotiations.

38. Procuring agency's Right to reject All Bids

38.1. The procuring agency has the right to reject all bids in accordance with Rule 33 of the Public Procurement Rules, 2004. However, the Authority (i.e. **PPRA**) may call from the Procuring agency/Employer the justification of those grounds.

39. Notification of Award

39.1. The procuring agency shall announce and publish the evaluation result in accordance with Rule 35 of the Public Procurement Rules, 2004.

39.2. Where no complaints have been lodged, the bidder whose bid has been accepted will be notified of the award by the Procuring agency/Employer prior to expiration of the bid validity period through EPADS. However, the Procuring agency/Employer shall not award any procurement contract at least for five (05) days after the announcement of final evaluation report. The notification letter (herein after and in the condition of the contract and contract form called "Letter of Acceptance" will specify the sum that the Procuring agency/Employer will pay the successful bidder in consideration for the execution and completion of the

works as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).

39.3. The notification of award will constitute the formation of the Contract, subject to the bidder furnishing the Performance Security (or guarantee) in accordance with **ITB 41** and signing of the contract in accordance with **ITB 40**.

39.4. Upon the successful bidder's furnishing of the performance security (or guarantee) pursuant to **ITB 41**, the Procuring agency/Employer will promptly notify each unsuccessful bidder, the name of the successful bidder and the Contract amount and will discharge the Bid Security or Bid Securing Declaration of the bidder(s) pursuant to **ITB 17**.

40. Signing of Contract

40.1. Promptly after notification of award, Procuring agency/Employer shall send the successful bidder the draft agreement, incorporating all terms and conditions as agreed by the parties to the contract.

40.2. Immediately after the Redressal of grievance by the **GRC**, and after fulfillment of all conditions precedent of the Contract Form, the successful bidder and the Procuring agency/Employer shall sign the contract.

40.3. Where no formal signing of a contract is required, work order issued to the bidder shall be construed to be the contract.

41. Performance Security (or Guarantee)

41.1. After the receipt of the Letter of Acceptance, the successful bidder, within the specified time, shall deliver to the Procuring agency/Employer a Performance Guarantee in the amount and in the form stipulated in the BDS and PCC, denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract.

41.2. If the Performance Guarantee is provided by the successful bidder and it shall be in the form specified in the BDS which shall be in any of the following:

41.2.1. certified cheque, cashier's or manager's cheque, or bank draft;

41.2.2. irrevocable letter of credit issued by a scheduled bank of Pakistan or in the case of an irrevocable letter of credit issued by a foreign bank, the letter shall be confirmed or authenticated by a scheduled bank of Pakistan;

41.2.3. bank guarantee confirmed by a reputable local bank or, in the case of a successful foreign bidder, bonded by a foreign bank; or

41.2.4. surety bond callable upon demand issued by any reputable surety or insurance company.

Any Performance Guarantee submitted shall be enforceable in Pakistan.

41.3. Failure of the Most Advantageous Bidder to comply with the requirement of **ITB 40** shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security or declare blacklisted (in case bid securing declaration is submitted) in which event the Procuring agency/Employer may make the award to the next most advantageous bidder or reinitiate the procurement process afresh (as a case may be).

42. **Advance Payment**

42.1. Advance payment will be provided to the bidder in percentage and in the manner as agreed by the both parties in terms of Conditions of the Contract.

42.2. The Procuring agency/Employer will provide an advance payment as stipulated in the Conditions of Contract, subject to a maximum amount, as stated and/or Conditions of the Contract. The advance payment request shall be accompanied by an advance payment security (guarantee) in the form provided in Section X. For the purpose of receiving the advance payment, the bidder shall make and estimate of, and include in its bid, the expenses that will relate to the purchase of equipment, machinery, materials, and on the engagement of labor during the first month beginning with the date of the Procuring agency/Employer's "**Notice to Commence**" as specified in the **PCC**.

43. General Performance of the Bidders

43.1. The Procuring agency/Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts / works. The Procuring agency/Employer may seek information / report from the previous employer for consideration. However, the Procuring agency/Employer shall incorporate such parameters in the evaluation criteria and accordingly decide the fate of the bid submitted.

44. Corrupt & Fraudulent Practices

44.1. Procuring agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Suppliers/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid to engage in any corrupt and fraudulent practices.

G. GRIEVANCE REDRESSAL & COMPLAINT REVIEW MECHANISM

45. Grievance Redressal

45.1. Grievance Redressal shall be carried out in accordance with Rule 48 of the Public Procurement Rules, 2004 i.e. Redressal of grievances by the procuring agency and "Redressal of Grievances Regulations 2021".

H. MECHANISM OF BLACKLISTING

46. Mechanism of Blacklisting

46.1. The Procuring agency/Employer shall proceed Blacklisting of Bidders/Contractors in accordance with Rule 19 of the Public Procurement Rules, 2004 i.e. Blacklisting and "Blacklisting and Debarment of Bidders or Contractors Regulations 2024.



Bid Data Sheet

Bids Data Sheet (BDS)

The following specific data for the procurement of Goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

BDS Clause Number	ITB Number	Amendments of, and Supplements to, Clauses in the Instruction to Bidders
A. Introduction		
1	1.1	Name of Procuring Agency:SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)) The subject of procurement is:315- Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi Expected commencement date: Thursday, October 15, 2026
2.	2.1	Financial year for the operations of the Procuring Agency:2026-27 Name and identification number of the Contract: P88684
3.	3.1	JV/Consortium or Association Allowed: No Number of JV/Consortium Members: Nil
B. Bidding Documents		

4.	6.2 & 6.4	The Bidders may seek clarifications through EPADS v2.0: Clarification Date: Friday, September 11, 2026 Pre-Bid Meeting: Thursday, September 10, 2026 11:00 AM Venue: Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road
5.	7.2	Any addendum, in case issued, shall be published on SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)) website and on EPADS v2.0.
C. Preparation of Bids		
6.	8.1	List of documents required along with the bid: No
7.	9.1	The qualification criteria to establish the supply / production capability of the bidder. <i>see Eligibility Criteria</i>
8.	11.2	Works and Their related documents: <i>See section Required Scope of Work</i>
9.	11.1	Price schedule will be provided according to the format defined and acquired. <i>see section price schedule.</i>
10.	11.4	Specifications: <i>see section of specifications.</i>

11.	11.5 & 13.5	The price shall be Fixed . The bid price shall be adjusted in accordance with Appendix provided - Formula for Price Adjustment.
12.	14.1	Currency of the Bids shall be : PKR
13.	16.1	The Bids/Bid Validity period shall be: 180 Days
14.	17.1	The amount of Bid Security shall be as defined in Bid Security Section for items and lots given in BDS 6
15.	17.2	The Bid Security shall be in the form of: Pay Order, Banker's Cheque, Demand Draft
16.	15.1	Alternative Bids to the requirements of the bidding documents willnot be permitted.
D. Submission of Bids		
17.	18.1 & 21.1	Bid shall be submitted online on EPADS v2.0 whereas hard copy of the bid security should be submitted to the following; Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province). Bids that are not submitted on EPADS v2.0 shall be disqualified. The deadline for Bids submission is: Thursday, September 24, 2026 12:00 PM

E. Opening and Evaluation of Bids

18.	24.1	The Bids opening shall take place on EPADS v2.0. Day : Thursday Date: September 24, 2026 Time : 12:30 PM
19.	30.2	Selection technique adopted will be: Least Cost Based Selection (LCBS) see <i>Evaluation Criteria</i>

F. Award of Contract

20.	41.1 & 41.2	The Performance guarantee shall: 10.00%. The Performance Guarantee shall be acceptable in the form of: Pay Order, Banker's Cheque, Call at Deposit, Bank Guarantee, Demand Draft
21.	45.1	Arbitrator shall be appointed by mutual consent of the both parties.

G. Review of Procurement Decisions

22.	37	Grievance against this procurement shall be submitted online on EPADS v2.0.
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Eligibility Criteria

Bidder's Type	Required Registration
Individual / Individual Consultant Sole Proprietorship Partnership Firm Company (Private Limited) Company (Public Limited) Company (Holding Company) Company (Limited by Guarantee) State Owned Enterprise (Private Limited) State Owned Enterprise (Public Limited)	FBR (NTN) PEC

Eligibility Criteria	Document
Revenue Authority Registration: The Bidder should be registered with relevant / concerned Provincial Revenue Authority. If not registered, the 100% tax shall be deducted at source as per applicable law and credited to relevant account.	No
PEC Valid Registration: The bidder should have valid registration with Pakistan Engineering Council at least in Category of C-3 or above with specialization in CE-10, ME-01, ME-03, EE-04.	Yes
Undertaking/Letter of Bid (As per Format attached): The bidder is required to submit an undertaking/letter of bid as per format attached.	Yes

Evaluation Criteria

Least Cost Based Selection (LCBS)

Weightage

Technical Evaluation Weightage	
100	
Technical Marks	100
Passing Marks	100
Technical Evaluation Criteria	
Experience: The bidder has completed/ awarded/ in-hand at least 02 projects pertaining to construction of buildings each of min. cost Rs. 250 M, during last seven (07) years. (Copies of work orders/ completion certificates/ contract agreements or equivalent documents). (Quantitative)(Doc Required)	30
Annual Sales volume or Gross Turnover: Available of at least Rs.300 M in any of the last five years. Attach Copy(s) of Audited Financial Statements or Income Tax return filed in FBR. --OR-- Availability of Bank Credit Line facility amounting to Rs.75 M or above during last one year or availability of Liquid Assets of equivalent amount) --OR-- Financial Capability Available of Rs.75 M or above. (Submit Bank statement as evidence showing required balance at any one instance in the statement of last three months before date of publication of tender notice) (Quantitative)(Doc Required)	30
The Bidder should provide support letter from the Original Equipment Manufacturer (OEM) of the lifts or its Authorized Distributor. The OEM or authorized distributor should have valid credentials (OEM and dealership) for the quoted lifts brand for last three (03) consecutive years including current year. (Quantitative)(Doc Required)	20

The Bidder should provide support letter from the Original Equipment Manufacturer (OEM) of the sound system or its Authorized Distributor. The OEM or authorized distributor should have valid credentials (OEM and dealership) for the quoted sound system brand for last three (03) consecutive years including current year. (Quantitative)(Doc Required)

20

Jobs/Lots

Jobs Without Lots :

Job	Delivery Schedule	Quantity	Bid Security
Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi	Address: SBP Complex, I.I. Chundrigar road Karachi Schedule: 450 Days Quantity: 1/job	1/job	5000000 PKR

Items Without Lots :

Item	UNSPSC	Delivery Schedule	Quantity	Bid Security	Related to Job/Lot
Nil	Building construction management	Address: SBP Complex, I.I. Chundrigar road Karachi Schedule: 450 Days Quantity: 1/job	1/job	PKR	

Related Services :

No



Work Specifications and Market Rates

Jobs Without Lots :

Job: Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi

Specifications / Requirements:

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
1		SECTION-1: CONSTRUCTION OF MOSQUE				
2		SUB-SECTION-1-A: CIVIL WORKS				
3		Civil Works Providing, fabricating and applying at any elevation / height except where otherwise stated in the specific item of the Bill of Quantities including all material, labour, scaffolding & plant for the following items complete in all respects as per drawings, approved shop drawings, technical specifications, miscellaneous details and instructions by the Engineer In-Charge.				
4		PROTECTION WORKS				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
5	1	Cordoning off the entire project site along with the materials dumping area using 8ft high corrugate sheets fixed with the help of angle irons/ channels/ MS pipes etc. to the entire satisfaction of the Engineer In-Charge. The fencing will have to be provided around an area of about 17000 Sft and duration for this fencing will be the entire construction period of the project. The contractor can use the MS pipes and other useable sections removed from the existing parking shed at site but the contractor will have to handover all employer's materials to the employer when these are no more needed. Any new material brought by the contractor for this item of work will be the contractor's property and he will take it away when these are no more required at site.	Job	1	3000000	3000000
6		DEMOLITION WORKS				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
7	2	Dismantling of existing fiber shed structure completely including MS pipe supports stacking of serviceable material at designated place in the bank premises including disposal of unserviceable material and debris outside the municipal limits at any lead complete in all respects as per site requirements and as directed by Engineer In-Charge.	Job	1	300000	300000
8		DEMOLITION OF EXISTING MOSQUE & ADJOINING PRAYER HALL				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
9	3	Demolition of existing Buildings/Structures including Plumbing (sewer lines, fixtures, manholes etc), Electrical & Mechanical Works, PCC (driveway), clearing the site to any level as per site (including paved areas, ablation areas), roof of any type, beam, column, wall, floor, foundation from its base (RCC/ load bearing/any type etc.), excavation and dewatering (if required). Demolition will be carried out from top to bottom with precautionary measures to ensure safety for people, adjacent structures/building/services etc. Any damage inspiring or death will be sole responsibility of the Contractor. The Contractor will remove the suitable/ un-suitable demolished material/ debris from Site to outside of the municipal limits and complete cleaning, leveling and dressing of Site up to required level complete in all respects as per site requirements and as directed by Engineer In-Charge.	Job	1	1250000	1250000
10	4	Dismantling of existing PCC flooring and stone soling including disposal of debris away from site, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Cft	7392	180	1330560

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
11	5	Dismantling of existing RCC flooring/ walls including disposal of debris away from site, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Cft	200	350	70000
12	6	Dismantling of existing block masonry walls including disposal of debris away from site, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Cft	500	150	75000
13		EARTH WORKS				
14	7	Excavation for Raft Foundation, underground Tanks, Septic Tanks (rectangular square or any other shape in all kinds of soil including disposal or stacking of surplus/rejected excavated materials to designated places at any lead & lift complete in all respects as per site requirements and as directed by Engineer In-Charge.	Cft	62712	40	2508480

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
15	8	Backfilling filling in foundation, under floors or around plinths etc with soil obtained from excavation including watering and compaction in 150 mm layer and dressing to required profile and shape complete in all respects as per site requirements and as directed by Engineer In-Charge.	Cft	62712	35	2194920
16	9	Providing, laying and compacting in layers of 150 mm borrow earth upto plinth level complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Cft	11000	50	550000
17	10	Filling Granular, stone soling or selected material obtained from outside sources including compaction complete in all respects as per site requirements and as directed by Engineer In-Charge.	Cft	3746	200	749200
18	11	Same as above item but using stone & concrete debris available at the site.	Cft	500	75	37500
19		DEWATERING				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
20	12	Pumping out and disposal of water from excavation etc, including all labour, use of pumps, plants etc. Payment will be made on the basis of double quantity of soil excavated below the ground water table.	Cu.M	1774	220	390280
21		TERMITE CONTROL TREATMENT				
22	13	Provide and spray approved pesticide solution as per manufacturer's recommendation in excavated earth, consolidated layer or earth under floor, walls etc., complete as per specifications by approved agency of Termite Control for building (Basement area will be measured for payment). Warranty period to be mentioned and warranty Certificate to be provided by the Contractor for Ten years. complete in all respects as per site requirements and as directed by Engineer In-Charge..	Sft	17842	45	802890
23		STEEL REINFORCEMENT				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
24	14	Providing & laying reinforcement bars using hot rolled deformed billet steel bars "Grade 60" conforming to ASTM A-615 including the cost of straightening, cutting, bending, binding, wastage and such overlaps as are not shown on drawings, placing in position on chairs, tying with binding wire etc, in all kinds of RCC work complete in all respects as per site requirements and as directed by Engineer In-Charge.	Kgs	169551	450	76297950
25		PLAIN AND REINFORCED CONCRETE				
26		Providing, laying, vibrating/ consolidating and curing, ready-mix concrete brought from approved batching plant (Lucky Paragon or other approved by the Employer), including the cost of providing and fixing & removal of fair face steel plates/ ply wood shuttering, complete in all respects as per drawings, specifications and as directed by the Engineer In-charge. (Contractor shall have to submit Mix. Design prepared by NED University or other similar approved institute before start of concreting).				
27		(A) SUB-STRUCTURE				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
28	15	PCC (1:4:8) concrete using Ordinary Portland cement complete in all respects as shown on the drawings.	Cft	5946	600	3567600
29	16	PCC with 3000 psi compressive cylindrical strength concrete using modified portland cement in C.C pad rooms/external prayer area	Cft	2494	745	1858030
30	17	RCC reinforced concrete with 3000 psi compressive cylindrical strength using weigh batch concrete including pump etc. and transportation as per site requirements in following sub-structures as per design shown on the drawings				
31	(a)	Foundations concrete	Cft	16104	910	14654640
32	(b)	Column up to plinth beam from raft with concrete strength 4000Psi	Cft	1000	1050	1050000
33	(c)	Plinth Beams	Cft	1566	1010	1581660
34		(B) SUPER-STRUCTURE				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
35	18	RCC reinforced concrete with 4000 psi compressive cylindrical strength using weigh batch concrete including pump etc. and transportation as per site requirements in following structures as per design shown on the drawings				
36	(a)	Columns & Walls	Cft	9512	1200	11414400
37	19	RCC reinforced concrete with 3000 psi compressive cylindrical strength using weigh batch concrete including pump etc. and transportation as per site requirements in following structures as per design shown on the drawings				
38	(a)	Beams & Lintels	Cft	7734	1050	8120700
39	(b)	Slabs	Cft	12326	1010	12449260
40	(c)	Staircase (Waist slab, beam, landing, stets)	Cft	925	1010	934250
41	(d)	Parapet Wall	Cft	477	1200	572400
42	(e)	Dome i/c minaret top dome	Cft	312	1500	468000
43		BLOCK MASONRY				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
44	20	Providing and laying masonry walls using approved quality machine made solid concrete blocks of approved size, with minimum compressive strength of 1000PSI, of Envicrete, IZHAR or other approved equivalent make, laid in 1:4 cement-sand mortar upto Basement/GF roof level including thorough filling of mortar in joints and raking out joints, curing etc. cost of required scaffolding, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Cft	5741	675	3875175
45	21	Same as Sr. # 44 above, but upto 1st floor roof level.	Cft	1170	685	801450
46	22	Same as Sr. # 44 above, but upto 2nd floor roof level.	Cft	2586	695	1797270
47		CARPENTRY & JOINERY WORK				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
48	23	Providing and fixing in position single-leaf / double-leaf Semi Glazed wooden panelled doors as per drawing, comprising 2" (50 mm) thick door shutters manufactured from approved 1st Class Hardwood (Burma Teak), sound, well-seasoned, and free from knots, fissures, sapwood, warping and other defects and 6 mm thick plain glass of Ghani or other approved make, including 2" (50 mm) thick Burma Teak door frames of width equal to the wall thickness. The item shall further include 4" (100 mm) wide plain Burma Teak beading with beveled edges on inner and outer sides, providing & applying approved anti-termite treatment to infill and all wooden components, best quality brass tower bolts minimum 18" long at top and bottom for all door panels, one approved quality brass door lock of European or Italian origin, and minimum 05 Nos. 6" long stainless steel hinges with brass bushes per shutter, 04 Nos 2' long stainless steel handles made from 1.5"x1.5"x16SWG tubes as per approved design complete with all necessary hardware, screws, fittings and fixing arrangements. The rate shall also include lacquer polishing of the complete door assembly in approved shade/colour, complete in all respects as per site requirements and as directed by Engineer In-Charge.	Sft	659	10000	6590000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
49	24	Providing and fixing in position Burma Teak Windows as per approved design with 2" thick Burma Teak frame wide as per wall width and same wood beading 4" wide all around the inner side of the mosque and 6mm thick plain glass of Ghani or approved make, having lipping of same wood around the glass complete with all necessary hardware, screws, fittings and fixing arrangements. The rate shall also include lacquer polishing of the complete window assembly in approved shade/colour, complete in all respects as per site requirements and as directed by Engineer In-Charge.	Sft	3214	7300	23462200
50	25	Providing and fixing Burma Teak Beading on wall of Size 3/4" thick and 2" width, including polishing complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Rft	676	700	473200

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
51	26	Proviing and Fixing 3' high stair railing comprising of 2" dia 16 SWG SS Pipe hand rail at top and two 1"x1"x16SWG SS pipes laid horizontally with 1-1/2" wide 3/8" thick SS pipe vertical supports at every alternate step including base plates/cups etc., top rail/ pipe fixed to the vertical supports with the help of 3/4" wide 3/8" thick 2" long strips provided over all vertical supports, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Rft	150	4500	675000
52	27	Proviing and Fixing SS hand rail comprising of pipe of size 2 " dia 16 SWG fixed to walll with the help[of SS supports/ brackets made from 3/4" wide 3/8" thick strips fixed to wall with plate/cup at wall after every 3' complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Rft	150	1200	180000
53		WOODEN CABENITS				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
54	28	Providing, fabricating and fixing in position floor standing/wall mounted cabinets 15" deep for placing quran sharif, with back boxes made from 10mm thick laminated HDF board of approved quality & make, and front side and doors etc. made from approved quality scratch resistant laminated MDF board 18mm thick of approved colour and design, matt finish SS edge banding at exposed surfaces, cost of approved quality SS hydraulic hinges, SS handles, magnetic catchers, and all adhesives & hardware required for fabrication and fixing of the cabinets, complete in all respects as per site requirements and as directed by the Engineer In-Charge (Measurement for payment shall be made on the surface area of the front side of the cabinets only)	Sft	400	3000	1200000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
55	29	Providing and fixing in position 6ft high shoe racks of 12 inches depth, fabricated from 16 SWG stainless steel sheet for shelves supported over framing with stainless steel angle sections of size 1"×1"×1/8" size. The item also includes all necessary accessories, fittings, fixing arrangements, hardware, and installation, complete in all respects, as per approved drawings, site requirements, and as directed by the Engineer In-Charge.	Sft	200	3500	700000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
56	30	WATER PROOFING & BUILT-UP ROOFING Providing and torch-applying 4 mm thick modified bitumen, non-woven polyester fibre-reinforced based PE/HDPE finish type waterproofing membrane of Roofgrip or other approved equivalent make, strictly in accordance with the manufacturer's instructions. The work includes application of approved primer at a coverage rate of approximately 4 m ² per litre, ensuring all required overlaps of minimum 3" width, cost of providing and applying about 200micron thick layer of approved quality polyethylene sheet, complete in all respects as per site requirements and as directed by the Engineer In-Charge. Measurement for payment shall be based on the top surface area only. (Note: The contractor shall submit material samples along with technical data sheets for approval by the Engineer In-Charge prior to application at site.)	Sft	5425	320	1736000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
57	31	Providing, mixing, and laying an average 3" thick PCC screed (1:2:4) laid in alternate panels. The surface shall be finished smooth with a trowel and cured using damp jute cloth. The rate shall include all materials, labour, tools and plant, and incidental works necessary to complete the job complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Sft	5425	263	1426775
58	32	Making PCC edge fillet (gola) of triangular shape, (4" x 4") in size, along the outer walls using cement-sand concrete in (1:2:4) ratio. The work includes the use of a latex-based concrete bonding agent from Sika, Fosapak, or other approved manufacturer at the rate of 3 litres per bag of cement or as per manufacturer's instructions. The fillet shall be finished with a smooth trowel surface and cured properly, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Rft	550	170	93500

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
59	33	Providing and fixing 3/4" thick Ziarat white marble tiles of size 12" × 24", laid in approved pattern, including all materials such as cement mortar, bonding agent, cutting, finishing, and fixing arrangements, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Sft	4692	750	3519000
60		UPVC DOORS, VENTILATORS				
61		VENTILATORS				
62	34	Providing & fixing of approved quality partially openable uPVC ventilators in white or other approved color made from minimum 2mm thick uPVC sections duly strengthened with 1.5mm thick MS sheet sections reinforcement, frame made from minimum 70mm wide section, with 5mm thick clear plain glass panels, best quality rubbers, brushes, gaskets/EPDM, tapes, stoppers, hinges, stainless steel screws and other hardware required, including sealing with approved quality silicone, removal of stickers and cleaning, complete in all respects as per site requirements and as directed by the Engineer In-Charge	Sft	32	2500	80000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
63		UPVC DOORS FOR WASHROOMS				
64	35	Providing & fixing of approved quality PVC-Polyurathene sandwich panel doors of Ploy Doors or other approved equivalent make in approved colour and design, minimum 40mm thick door panels along with door frames made from 16SWG GI sheet, cost of holdfasts, along with cost of approved quality brass hinges, handle locks, stainless steel screws, 3 stainless steel coat hangers behind each door along with all hardware required for proper fixing of doors, complete in all respects as per site requirements, specifications, instructions of the manufacturer and as directed by the Engineer In-Charge. Door panel size= 2.5ft x 7ft	Jobs	9	52500	472500
65	36	Doors same as above but with door panel 3ft x 7ft size.	Jobs	3	63000	189000
66		STAINLESS STEEL MOON (CRESCENT)				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
67	37	Providing, fabricating and fixing decorative mosque moon (crescent) of 2'-6" diameter, manufactured from approved quality SS sheet (minimum 18 SWG) (as approved), accurately cut and shaped to true curvature, including welding, grinding and finishing. The crescent shall be finished with high-quality gold colour PVD coating or other approved protective coating to achieve smooth and uniform appearance. The crescent shall be fixed over approved supporting arrangements, including SS base plate, about 4ft high SS spindle/spire, anchor bolts, clamps, lifting arrangements, scaffolding, alignment, erection at required height, and all necessary accessories. The rate shall include the cost of material, labour, tools & plants, transportation, installation, electrical works, testing, finishing, safety measures and all incidentals, complete in all respects as per drawings/specifications, site requirements and as directed by the Engineer In-Charge.				
68	(a)	Over main dome	Jobs	1	400000	400000
69	(b)	Over minaret dome	Jobs	1	450000	450000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
70		QURANIC AYAT / ISLAMIC CALLIGRAPHY				
71	38	Providing and fixing Quranic Ayats/ Islamic calligraphy sculptures made from 20SWG black or golden colour stainless steel sheets, all words minimum 1-1/2" thick, welded/ jointed together to make the required ayat/ kalima, fixed to the walls using approved quality screws etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge. (Measurement for payment shall be made on the basis of out to out height and length of the sculpture)	Sft	50	8500	425000
72		FINISHES (INTERNAL)				
73		CEMENT PLASTER				
74	40	Providing and laying plaster with cement sand mortar with G.I. expanded metal and approved corner bead at the interfaces of structures of different materials including staging and curing complete in all respects as per site requirements and as directed by Engineer In-Charge.				
75	(a)	1/2" thick plaster with 1:4 cement sand mortar on ceilings & internal walls	Sft	31684	60	1901040

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
76	(b)	1/2" thick plaster with 1:4 cement sand mortar mixed with puddlo @ 5lbs per bag of cement on projections and parapets	Sft	2000	100	200000
77	41	Providing and fixing Architectural Resin Jali (Rasin, Sea Soil, Cement and marble powder) as per approved design and drawings at any height including all materials, scaffolding tools and plants complete in all respects as per site requirements and as directed by Engineer In-Charge.	Sft	5002	2500	12505000
78		FLOOR & WALL FINISHES				
79	42	Providing & fixing in position A-grade Supreme quality/finish full body polished/Semi polished porcelain scratch resistant tiles of Master, Shabbir, Orient or approved equivalent in 60cm x 120 cm or other approved size on floor using tile bond of Stile or other approved equivalent including the cost of cutting of tiles where required, grouting with matching color pigment including the cost of base leveling mortar/plaster as per site requirement, disposal of debris from the Bank premises, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Sft	18291	800	14632800

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
80	43	Providing and laying Premium quality Prepolished Granite slabs over cement sand base mortar, setting in cement slurry, filling the joint with white cement, washing, cleaning and curing etc. complete in all respects as per drawings, specifications and/or as directed by the Engineer. (at any elevation)				
81	(a)	Floor (3/4" Thick) (Vietnamese White)	Sft	1616	3800	6140800
82	(b)	Entrance/Exit Steps, Entrance Lobby, Ramp, Treads (3/4" Thick) (Sado white or other approved) with three grooves with rubber filling to make the steps anti-slip	Sft	1168	2000	2336000
83	(c)	Riser Stair Case 1/2" thick pre perolished Granite (1/2" Thick) (Sado White or other approved)	Sft	403	1100	443300
84	(d)	Landing (3/4" Thick) (Sado White or other approved)	Sft	480	1500	720000
85	(e)	Window Sills (3/4" Thick) with half round and polished exposed edges Sado White or other approved	Sft	304	1650	501600
86	(f)	Ablution Seats with half round polished exposed edges (Sado White or other approved)	Sft	168	1750	294000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
87	44	Providing and laying granite skirting/ dado/ threshold of approved quality over rough base plaster, exposed to wall with approved adhesive color / type / finish to match floor, setting in cement slurry, complete in all respect as per drawings specifications and/ or as directed by the Engineer (at any elevation) Sado white or approved equivalent				
88		a) 4" high skirting on Stairs / Steps and vanity counter sides (1/2")	Sft	300	900	270000
89	45	Providing and Laying Vanity Top 3/4" thick granite slabs Sado white or other approved, making holes s per fixture size and shape with rounded & polished nosing/ edges all around exposed edges including the octs of resuired cement paste/ base morot etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Sft	42	1900	79800

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
90	46	Providing and applying washed Terrazo using approved colour and size stone granuels on outside walls etc. at any height including cost of surface preparation and 1:4 cement-sand base plaster at any height complete in all respects as per site requirements and as directed by Engineer In-Charge.	Sft	29707	450	13368150
91	47	Providing and applying 3 coats of plastic Emulsion emulsion paint of ICI Dulux, Berger, Kansai or other approved make, of approved shade over a coat of primer of the approved manufacturer to all internal surfaces including smooth filling complete in all respects as per site requirements and as directed by Engineer In-Charge.	Sft	31684	80	2534720

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
92	48	Providing, fabricating, and fixing motorized tensile fabric shed comprising of approved quality tensile fabric laid/supported/ running on SS wire strands, anchored to the RCC beams with the help of approved quality MS assemblies, minimum weight fabric is 725 gsm (Gram per Sq. meter) tensile fabric sheet, including approved quality pull wires and pulley assemblies, required motors of approved quality and rating, as per drawings and specifications. The work includes the provision of all necessary materials, labor, equipment, and tools required for the successful completion of the project as per site conditions and as directed by the Engineer In-Charge.	Sft	1616	2000	3232000
93		PLUMBING & DRAINAGE WORKS				
94		Vanity Counter Works				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
95	49	Providing, mixing, laying, vibrating and curing of 3" thick Reinforced Cement Concrete for vanities 1:2:4 ratio, including the cost providing, cutting, bending and binding 3/8" dia steel bars @ 6"c/c bothways of Grade-40 deformed steel and making cut/grooves & drilling the bars in the existing masonry wall for proper fixing of slab, including cost of providing, fixing & removal of required water tight form work, making of holes for under counter type vanity basins, smooth trowel finished, complete in all respects as per site requirements and as directed by the Engineer In-Charge. (Measurements for payment shall be taken after deduction of all openings/holes etc.)	Sft	89	400	35600
96		Tile Works				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
97	50	Providing & fixing in position A-Grade porcelain Tiles of Master/Shabbir/ Orient or other equivalent make, of 60cmx60cm or other approved size,quality, colour & shade (as per the sample approved by the Bank) on walls and floors having minimum thickness of 10mm and required size, including fixing with tile bond of M/s Shabbir or approved equivalent including the cost of filling with best quality grout with application of base plaster as per site requirement to make surface plumb/square, complete in all respect as per site conditions and as directed by the Engineer In-Charge. Gloss finish for walls and matt finish for floor, after sample approval.	Sft	3488	700	2441600
98		Water Supply & Sewerage Works				
99	51	Providing, jointing and laying hot type PPRC pipe of FIRAT/Popular or approved equivalent make including cutting, heat jointing, testing etc. and the cost of required specials, hooks, etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge.				
100		a) 25 mm	Rft	300	350	105000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
101		b) 40mm	Rft	200	450	90000
102		c) 60mm	Rft	300	550	165000
103	52	Providing and fixing ball valve of Kitz/Popular or approved equivalent for 125 psi together with all additional material required for complete installation, complete in all respects as per site requirements and as directed by the Engineer In-Charge.				
104		a) 40mm	Each	4	15000	60000
105		b) 25 mm	Each	4	8000	32000
106		c) 60 mm	Each	4	20000	80000
107	53	Providing & laying Sch.40 uPVC pipe of Popular or approved make & quality for waste water, including the cost of all required specials like bends,tees etc, sockets, elbows & solutions, cutting/making hole in walls, complete hanging arrangements for all pipes with slab with stainless steel U-clips/clamps etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge. (Note: Vent pipes must go above the building parapet)				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
108	(a)	4" dia.	Rft	700	1100	770000
109	(b)	6" dia.	Rft	200	1400	280000
110	54	Providing & laying Sch.40 uPVC pipe of Steelex or approved make & quality for Rain water, including the cost of all required specials like bends,tees etc, sockets, elbows & solutions, cutting/making hole in walls, complete hanging arrangements for all pipes with walls with stainless steel U-clips/clamps etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge.				
111	(a)	4" dia.	Rft	350	1100	385000
112	55	Providing & fixing in position, uPVC floor trap for floor drains of Popular or approved equivalent make, with 6" x 6" size heavy duty full stainless steel jali set of Alpine or other approved equivalent, complete in all respects as per site requirements and as directed by the Engineer In-Charge.				
113		4" size	Each	14	6000	84000
114		Sanitary Fittings				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
115	56	Providing & fixing W.C, HD-43 of Porta or other approved equivalent make, including the cost of uPVC P-trap, providing & fixing of concealed type flush tank of Porta (G3004A) or other approved equivalent make, including the cost approved quality T-stop cock of Master/Sonex or approved equivalent, CP connection pipe, MS frame and other accessories required for proper fixing of the flush tank, connection with the WC, connection pipe, flushing pipe, providing and applying sealant Max Track of Sika, CHEMAFLEX of ICPL or other approved equivalent make around flush pipe at joint with WC & around WC neck before placing the WC in position, etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	82000	492000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
116	57	Providing & fixing under counter type wash basin of Porta (HDLU-008) or approved equivalent make, including the cost of basin waste of approved quality, stainless steel screws, fixing with the help of approved quality epoxy adhesive, bottle trap of Master or other approved equivalent make, connection pipes, waste pipes etc. complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	30000	180000
117	58	Providing and fixing powder coated pillar cock (as per approved sample) of Master, Sonex or other approved equivalent make, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	12000	72000
118	59	Providing and fixing powder coated Mixer Long Neck with for ablution (as per approved sample) of Master, Sonex or other approved equivalent make, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	36	12000	432000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
119	60	Providing & fixing in position, powder coated double bib cock (as per approved sample) of Master, Sonex or approved equivalent make, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	5500	33000
120	61	Providing & fixing in position approved quality Muslim Shower (as per approved sample) of Master, Sonex or approved equivalent make including the cost of approved quality connection pipe of same brand, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	6000	36000
121	62	Providing and fixing powder coated Regal type T-Stop Cocks (as per approved sample) of Master, Sonex or approved equivalent make, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	12	3500	42000
122	63	Providing & fixing in position, plastic body liquid soap dispensers of Zilver or approved equivalent, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	4	20000	80000

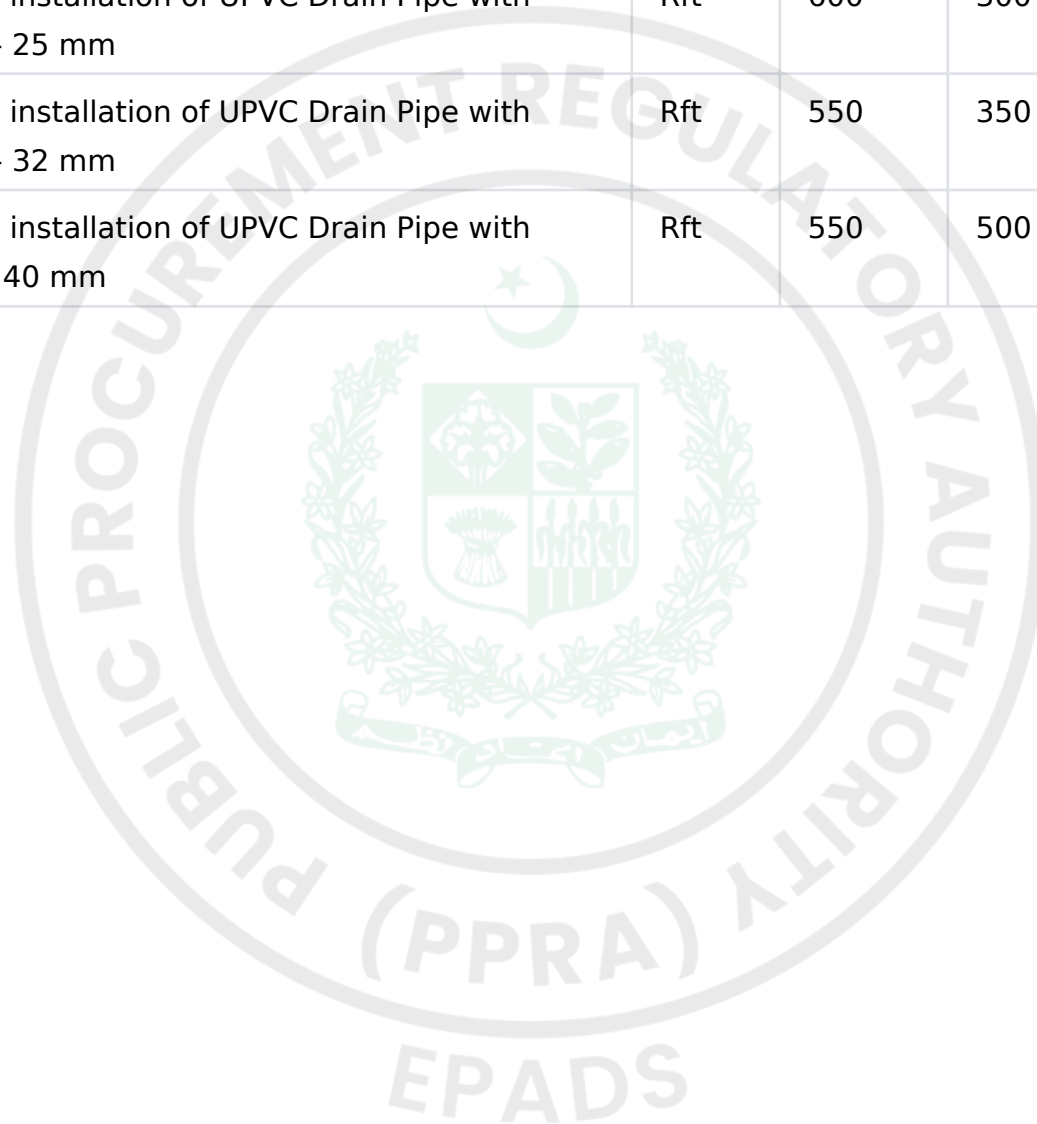
Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
123	64	Providing & fixing in position, 5mm thick imported approved quality looking mirror of 2ft x 4ft size with 12mm thick 1.5" wide Corian dupont edging all around of Cocoa Brown or other approved colour, including fixing approximately 4" away from the wall with the help of stainless steel studs, etc. required for fixing of the mirror, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	60000	360000
124	65	Providing & fixing in position, stainless steel Tissue Paper Holder (as per approved sample) of Master, Sonex or other approved make, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Each	6	2200	13200
125		SUB-SECTION-1-B: HVAC Works				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
126	66	Supply of Air-Cooled Modular VRF Outdoor Unit, inverter driven scroll T3 compressor, heat pump type, R410A/R35 refrigerant, microprocessor control, low noise condenser fan, Black anti-corrosion coated condenser coil, suitable for 415V/3Ph/50Hz complete in all respects (Minimum 35 TR each) including vibration isolators and MS mounting frame with anti-rust paint and concrete pedestal supports.	Nos	2	5500000	11000000
127	67	Supply of Ceiling Concealed / Cassette Type Indoor Unit - 4 TR capacity, complete with cooling coil, EEV, drain pump, washable filter, wired remote controller, suitable for 220V/1Ph/50Hz	Nos	18	250000	4500000
128	68	Supply of Centralized Controller for complete VRF system with monitoring and scheduling facility	Set	1	230000	230000
129	69	Suply of Additional Refrigerant Charge as required beyond factory charge	Kg	50	6000	300000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
130	70	Providing, supplying, installing, testing and commissioning of seamless ACR grade soft drawn copper refrigerant piping, phosphorous deoxidized and dehydrated, suitable for R410A /R35 refrigerant and high-pressure VRF applications, complete with Imported nitrile rubber insulation (Class O),Vapor barrier wrapping, Refnet joints / Y branch joints, Brazing, Pipe clamps and supports, GI saddles and hangers, Wall/floor sleeves, Pressure testing with dry nitrogen, Vacuuming and dehydration, Refrigerant charging, Leak testing complete in all respects as per manufacturer recommendations. The copper pipes shall conform to ASTM B280 / JIS H3300 / EN 12735-1 standards and must be suitable for operating pressure of inverter-based VRF systems.				
131	a	Copper Pipe – 1/4" dia - 22 SWG (for liquid refrigerant line connection of small indoor units) or size as per manufacturer vrf design software recommendation	Rft	450	700	315000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
132	b	Copper Pipe - 3/8" dia - 22 SWG (for liquid line / branch connection in VRF system) or size as per manufacturer vrf design software recommendation	Rft	550	1050	577500
133	c	Copper Pipe - 1/2" dia - 20 to 22 SWG (for liquid line and branch interconnection between indoor and outdoor units) or size as per manufacturer vrf design software recommendation	Rft	650	1450	942500
134	d	Copper Pipe - 5/8" dia - 20 SWG (for Refrigerant suction/gas line) or size as per manufacturer vrf design software recommendation	Rft	350	2100	735000
135	e	Copper Pipe - 3/4" dia - 18 to 20 SWG (for medium capacity gas line connection) or size as per manufacturer vrf design software recommendation	Rft	400	2250	900000
136	f	Copper Pipe - 7/8" dia - 18 SWG (High-pressure refrigerant gas line pipe suitable for VRF main branch piping) or size as per manufacturer vrf design software recommendation	Rft	350	3000	1050000
137	g	Copper Pipe - 1-1/8" dia - 16 to 18 SWG (Main refrigerant header copper pipe between outdoor units and main distribution network) or size as per manufacturer vrf design software recommendation	Rft	250	3500	875000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
138	69	Supply and installation of UPVC Drain Pipe with insulation - 25 mm	Rft	600	300	180000
139	70	Supply and installation of UPVC Drain Pipe with insulation - 32 mm	Rft	550	350	192500
140	71	Supply and installation of UPVC Drain Pipe with insulation- 40 mm	Rft	550	500	275000



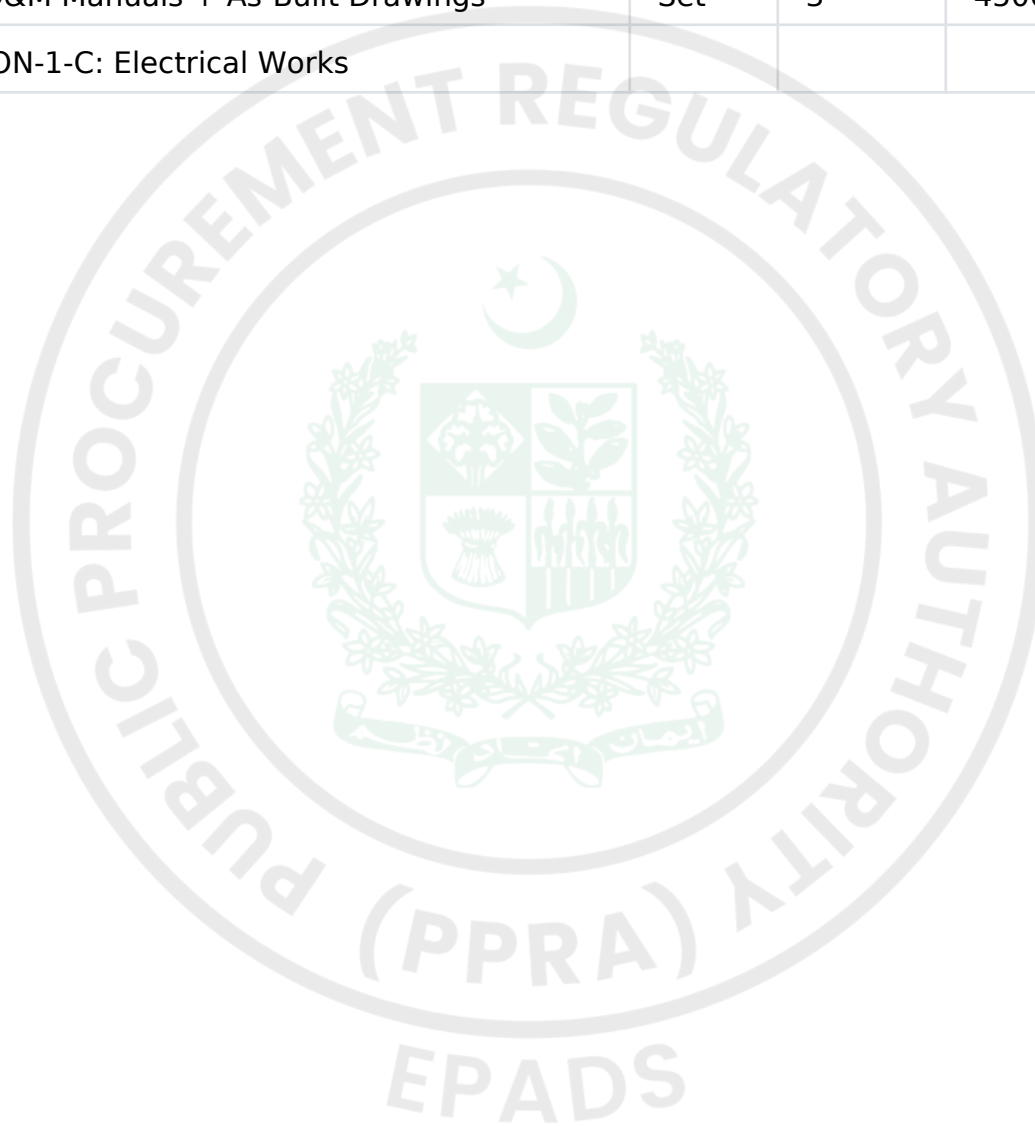
Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
141	72	Supply, installation, testing and commissioning of Electric Distribution Panel, Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthling braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:- Main Incoming Side • 01 Nos. 250 Amp Four Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type • 03 Nos. Indication Lights • 03 Nos. 2 Amp SP MCB • 1 No. Multimeter with required CT's Current Measurement on common busbar Outgoing For Outdoor Units • 02 Nos. 125 Amp Four Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type • 03 Nos. Indication Lights • 03 Nos. 2 Amp SP MCB • 1 No. Multimeter with required CT's Current Measurement on common busbar Outgoing For Indoor Units • 18 Nos. 10A TP MCB 10kA Protection Devices • Surge Protection Device, Type-II, 3 Phase (1 No.) • RCCB for outdoor unit # 1 & 2 (2 Nos.) (4P, 125 A, 300mA) • Phase Failure Relay (01 No.) • Under/Over Voltage Relay (Adjustable) All cable links/bus bar links must be as per outgoing load. All Circuit Breakers (Make: Schneider/ABB or approved equivalent) must be compact size, as per	Job	1	1500000	1500000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
142	73	Supply, Laying, Termination, Testing & Commissioning of Cables along with PVC pipe of appropriate diameter complete installation and termination accessories to be laid in already installed Cable trench / Cable ladder / Cable tray / Duct Bank including all accessories including cutting/chasing in walls, floors, and required civil restoration works. Complete in all respects. - Imported Lugs and Connectors shall be used in LV Cables. -Manual crimping of lugs is not allowed. Proper lug presser for smaller lugs and hydraulic lug presser for large size lugs should be used.				
143	a	4C × 25 sqmm Cu	Meter	75	7500	562500
144	b	3C × 10 sqmm Cu Outdoor to Indoor Units	Meter	150	3500	525000
145	c	3C × 2.5 sqmm Cu (Drop to Indoor Units)	Meter	300	1000	300000
146	d	2C × 1.5 sqmm Cu Shielded (Control Cable)	Meter	260	480	124800
147	e	1C x 16 sqmm Cu (Earthing Cable Outdoor Units)	Meter	150	1500	225000
148	f	1C x 2.5 sqmm Cu (Earthing Cable Indoor Units)	Meter	320	330	105600

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
149	74	Installation of Outdoor Units including lifting, alignment and fixing, Installation of Indoor Units including suspension arrangement and supports, Pressure Testing with Nitrogen, Vacuuming and Dehydration of Refrigerant Circuit, Refrigerant Charging & Oil Balancing, Testing, Balancing and Commissioning of Complete VRF System, Training of Client Staff for operation & maintenance	Job	1	250000	250000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
150	75	Providing Yearly Comprehensive Warranty for complete VRF air conditioning system including all outdoor units, indoor units, refrigerant piping, control wiring, and accessories. The scope includes complete preventive and corrective maintenance services to ensure uninterrupted and efficient system operation. Scope shall include: - Comprehensive warranty for all VRF system components including compressors, PCB cards, fan motors, sensors, expansion valves, controllers, and all associated parts including the electrical accessories. -Free-of-cost repair and/or replacement of any defective component during warranty period. -Free refrigerant gas charging , including leak detection, rectification, vacuuming, and recharging. -Monthly preventive maintenance visits (total 60 visits over 5 years) including cleaning, inspection, testing, and system performance checks of indoor and outdoor units. - Breakdown and emergency service support with prompt response and rectification. - All labor, tools, testing instruments, consumables, and transportation included. - Submission of service reports after each visit and maintenance log records. - The system shall be maintained in fully operational condition throughout the warranty period in accordance with manufacturer recommendations and the best industry practices.	Job	5	800000	4000000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
151	76	Supply of O&M Manuals + As-Built Drawings	Set	3	45000	135000
152		SUB-SECTION-1-C: Electrical Works				



Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
153	77	Supply, installation, testing and commissioning of recessed/surface mounted LED panel light of size 600 mm × 1200 mm (2 ft × 4 ft) with high efficiency LED technology, suitable for commercial and institutional lighting applications. The luminaire shall provide uniform glare-controlled illumination with low power consumption and long operational life. The fitting shall meet or exceed the following minimum specifications: Type: LED Panel Light Size: 2 ft × 4 ft (600 × 1200 mm) Power Consumption: 38-45 Watts Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement Luminous Flux: minimum 5400 lumens Color Rendering Index (CRI): ≥ 80 Power Factor: ≥ 0.90 Operating Voltage: 220-240V AC, 50/60Hz Protection Class: minimum IP20 Housing: powder coated metal body Life Span: minimum 50,000 operating hours Warranty: minimum 2 years replacement warranty Compliance: IEC 60598 or equivalent international standards The rate shall include driver, mounting accessories, connectors, suspension/fixing hardware, wiring connections, testing and commissioning, and all associated works required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.	Nos	16	20000	320000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
154	78	Supply, installation, testing and commissioning of flexible COB LED strip/cove lighting complete with driver, V-profile aluminium channel and diffuser, suitable for decorative and architectural lighting applications. The LED strip shall provide continuous dot-free illumination with high color consistency and uniform light distribution. The fitting shall meet or exceed the following minimum specifications: Type: Flexible COB LED Strip Light Color Temperature (CCT): 3000K (Warm White) or approved as per site requirement Power Consumption: minimum 10-14 W/m Luminous Flux: minimum 700-1250 lm/m Color Rendering Index (CRI): ≥ 80 Protection Rating: IP20 or above LED Type: COB continuous light technology for uniform illumination Life Span: minimum 50,000 operating hours Driver: suitable electronic driver/power supply compatible with strip load Compliance: IEC/Equivalent international standards Warranty: minimum 2 years replacement warranty The scope includes supply of LED strip, driver, aluminium V-profile, diffuser, mounting clips, connectors, soldering, wiring, fixing, testing and commissioning, along with all accessories, consumables and labour required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.	Mtr	200	3750	750000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
155	79	Supply, installation, testing and commissioning of recessed/surface mounted LED panel light of size 1 ft × 4 ft (300 mm × 1200 mm) suitable for office, commercial and institutional lighting applications. The luminaire shall provide uniform, glare-controlled and flicker-free illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications: Type: LED Panel Light Size: 1 ft × 4 ft (300 × 1200 mm) Power Consumption: 30-40 Watts Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement Luminous Flux: minimum 3600-4000 lumens Color Rendering Index (CRI): ≥ 80 Power Factor: ≥ 0.90 Operating Voltage: 220-240V AC, 50/60Hz Protection Class: minimum IP20 Mounting: recessed/surface/suspended compatible Life Span: minimum 50,000 operating hours Compliance: IEC 60598 or equivalent international standards Warranty: minimum 2 years replacement warranty The rate shall include LED driver, mounting accessories, connectors, suspension/fixing hardware, wiring connections, testing and commissioning, and all associated works required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge	Nos	23	15000	345000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
156	80	Supply, installation, testing and commissioning of high efficiency surface mounted LED downlight suitable for commercial and institutional lighting applications. The luminaire shall provide uniform glare-controlled illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications: Type: Surface Mounted LED Downlight Power Consumption: at least 60 Watts Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement Luminous Flux: minimum 6600 lumens Luminous Efficacy: minimum 100 lm/W Color Rendering Index (CRI): ≥ 80 Power Factor: ≥ 0.90 Input Voltage: 220-240V AC, 50/60Hz Housing Material: die-cast aluminium body Protection Rating: minimum IP65 Mounting: surface mounted type Driver: integral electronic driver/power supply unit Life Span: minimum 50,000 operating hours (L70B50) Operating Temperature: -20°C to +40°C Compliance: IEC 60598 or equivalent international standards Warranty: minimum 2 years replacement warranty The rate shall include supply of luminaire, driver, mounting accessories, fixing hardware, connectors, wiring connections, testing and commissioning, and all associated labour, consumables and accessories required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In Charge	Nos	3	50000	150000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
157	81	Supply, installation, testing and commissioning of surface mounted LED downlight suitable for commercial and institutional lighting applications. The luminaire shall provide uniform, glare-controlled and flicker-free illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications: Type: Surface Mounted LED Downlight Power Rating: 12-15 Watts Correlated Color Temperature (CCT): 3000K / 4000K / 6500K Luminous Flux: minimum 1200 lumens Color Rendering Index (CRI): ≥ 80 Power Factor: ≥ 0.80 Operating Voltage: 220-240V AC, 50/60Hz Protection Rating: minimum IP20 Mounting Type: surface mounted Life Span: minimum 25,000 operating hours Compliance: IEC 60598 or equivalent international standards Warranty: minimum 2 years replacement warranty The rate shall include LED driver/power supply unit, mounting accessories, connectors, fixing hardware, wiring connections, testing and commissioning, and all associated labour, consumables and accessories required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.	Nos.	24	5500	132000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
158	82	Supply and installation of 56-inch DC inverter ceiling fans of high-efficiency, compatible with 200-250V AC, 50Hz supply. Each fan shall have a sweep of 56 inches, a power consumption not exceeding 40W. The body shall be made of die-cast or aluminum alloy with rust-resistant finish and aerodynamic blades. Fans shall be supplied with remote controls, offering soft-start. Each fan shall be supplied complete with downrod, mounting accessories, and instruction manuals, and shall carry a minimum one-year warranty.	Jobs	140	15000	2100000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
159	83	Supply and installation of long rods (downrods) for ceiling fans, fabricated from high-strength mild steel or aluminum alloy with rust-resistant finish. Each rod shall have a standard length of 24 inches (or as required by site conditions) to ensure safe clearance and optimal air circulation. The rods shall be compatible with 56-inch DC inverter ceiling fans, designed to securely support aerodynamic blades and die-cast/aluminum alloy fan bodies. Each rod shall be supplied complete with coupling, screws, safety pin, and mounting accessories, along with installation instructions, and shall carry a minimum one-year warranty.	Jobs	60	1500	90000
160	84	Supply and installation of window fitted round/square shaped plastic body exhasut fans of size 12", speed not less than 1350RPM, 99.9% copper winding of Make Voldam, GFC, Pak Fan or approved equivalent	Jobs	8	12000	96000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
161	85	Supply, installation, testing and commissioing of Electric Distribution Panel (Name: P&LDB-1) , Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthling braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:- Incoming Side 1 • 01 Nos. 100 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type • 03 Nos. Indication Lights • 03 Nos. 2 Amp SP MCB • 1 No. Multimeter with required CT's Current Measurement on common busbar Incoming Side 2 • 01 Nos. 80 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type • 03 Nos. Indication Lights • 03 Nos. 2 Amp SP MCB • 1 No. Multimeter with required CT's Current Measurement on common busbar Outgoing Side 1 • 20 Nos. 20A TP MCB 10kA • 16 Nos. 16A DP MCB 10kA Outgoing Side 2 • 20 Nos. 10A TP MCB 10kA • 15 Nos. 16A DP MCB 10kA All cable links/bus bar links must be as per outgoing load. All Circuit Breakers must be compact size, as per specifications and complying with standards, complete in all respect as directed by Engineer In-charge The vendor must submit shop drawings for	Jobs	1	300000	300000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
162	86	Supply, installation, testing and commissioingof Electric Distribution Panel (Name: MDB-1) , Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthling braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:- Incoming Side • 01 Nos. 400 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type • 03 Nos. Indication Lights • 03 Nos. 2 Amp SP MCB • 1 No. Multimeter with required CT's Current Measurement on common busbar Outgoing Side • 02 Nos. 250A TP MCCB 25kA • 02 Nos. 100A TP MCCB 25kA • 02 Nos. 80A TP MCCB 25kA • 01 Nos. 60A TP MCCB 25kA All cable links/bus bar links must be as per outgoing load. All Circuit Breakers must be compact size, as per specifications and complying with standards, complete in all respect as directed by Engineer In-charge The vendor must submit shop drawings for approval of the Engineer before the manufacturing of the DB.	Jobs	1	350000	350000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
163	87	Supply and installation of Power switch socket/ Multi sheet 13 Amps with metallic powder coated back box with fixing material by observing beauty and proper level on wall from floor level with necessary fitting, fixing material, drilling, chipping, wall cutting, paint work and repairing as per original , connections complete in all respects as directed by engineer-in-charge.	Jobs	30	2500	75000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
164	88	Supply, installation, testing and commissioning of automatic electric hand dryer suitable for washroom applications, designed for high-speed and energy-efficient hand drying operation. The unit shall be wall mounted type with durable construction and shall meet or exceed the following minimum specifications: Type: Automatic sensor-based hand dryer Operating Voltage: 220-240V AC, 50 Hz Power Rating: 1500-2000 Watts Activation: Infrared automatic sensing Air Speed: high-speed drying performance Body Material: ABS/metallic corrosion-resistant housing Noise Level: low noise operation Safety Features: overheating and overload protection Mounting: wall mounted complete with fixing accessories The scope includes fixing, wiring connection from nearby power source, testing, commissioning and all associated accessories, consumables, labour and hardware required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.	Jobs	4	65000	260000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
165	89	Supply, installation, testing, and commissioning of following LED Lights wiring, Electrical wiring must be compliant with IEC 60364 or BS 7671 and type tested certification from KEMA/RAWAT/PQSIR) and PVC pipe of 25 mm dia of class C (Electrical PVC pipe must be in compliant with BS 6099-1 or PS 1905-87 or equivalent standards) The cost includes supply, laying, and installation of wires in concealed/recessed as per site PVC conduit pipe with all necessary installation material and redressing as per original condition, complete in all respects as per standard industry practice to the satisfaction of the Engineer In-charge .				
166	a	Circuit Wiring from DB to Gang Switches using 2 x 2.5mm sqr. & 1.5mmsqr. as ECC copper/PVC wire	Mtr	700	880	616000
167	b	Point to Point Wiring from Gang Switches to LED lights and looping using 2 x 1.5mm sqr. & 1.5mmsqr. as ECC copper/PVC wire	Mtr	1300	650	845000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
168	90	Supply and installation of following Gang switch sheets/face plates for LED lights of with metallic powder coated back box/PVC back box 3"x3" concealed/recessed as per site with fixing material by observing beauty and proper level on wall from floor level. Complete in all respects as directed by engineer-in-charge.				
169	a	6 Gang Sheets	Jobs	8	2450	19600
170	b	4 Gang Sheets	Jobs	13	2400	31200

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
171	91	Supply, installation, testing, and commissioning of power circuits for switch sockets from DB to power point/point to point using: 2 x 2.5mm sqr. & 1.5mmsqr. as ECC copper/PVC wire (Electrical wiring must be compliant with IEC 60364 or BS 7671 and type tested certification from KEMA/RAWAT/PQSIR) and PVC pipe of 25 mm dia of class C (Electrical PVC pipe must be in compliant with BS 6099-1 or PS 1905-87 or equivalent standards) The cost includes supply, laying, and installation of wires in concealed/recessed as per site PVC conduit pipe with all necessary installation material and redressing as per original condition, complete in all respects as per standard industry practice to the satisfaction of the Engineer In-charge	Mtr.	500	920	460000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
172	92	Supply, Laying, Termination, Testing & Commissioning of 4 No. 1C-240 Sqmm AL/XLPE/PVC + ECC 1C-120 Sq.mm Cu/PVC LV Cable along with complete installation and termination accessories to be laid in already installed Cable trench / Cable ladder / Cable tray / Duct Bank including all accessories. Complete in all respects. -Imported Lugs and Connectors shall be used in LV Cables. - Bi-Mettalic Lugs to be used with Aluminum Cables. - Manual crimping of lugs is not allowed. Proper lug presser for smaller lugs and hydraulic lug presser for large size lugs should be used.	Mtr.	140	4800	672000
173	93	Supply & Laying of following sizes of 120mm dia UPVC Conduits including all accessories such as bends, sockets, j-boxes, flexible conduits, metal saddles e.t.c for Main / Sub Main Power, Telephone & Data Cables, concealed / surface on wall as per design drawings. Provide Pull boxes where ever required. Note: The below mentioned conduits will be used for items where description of the item clearly states that the conduit is not inclusive or already installed. This section will also cover empty conduit runs, sleeves, conduit risers etc.	Mtr.	140	4800	672000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
174	94	Supply, Laying, Termination, Testing & Commissioning of 4C-25 Sqmm Al/PVC + ECC 1C-6 Sq.mm Al/PVC LV Cable along with PVC pipe of appropriate diameter complete installation and termination accessories to be laid in already installed Cable trench / Cable ladder / Cable tray / Duct Bank including all accessories. Complete in all respects. -Imported Lugs and Connectors shall be used in LV Cables. -Manual crimping of lugs is not allowed. Proper lug presser for smaller lugs and hydraulic lug presser for large size lugs should be used.	Mtr.	45	1200	54000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
175	95	Supply, installation & testing of earthing set comprising of Bore earthing up to water level (minimum 50ft), lime, salt & charcoal mixture, packed hard including excavation & perfect back filling. 50 mm dia uPVC pipe and copper wires up to test terminal and also providing, fixing & connection of 300mm x 50mm x 5mm Earth test terminal with brass nuts bolts & washer along with construction of RCC inspection chamber with heavy duty CI cover Lid and lock protection, The Contractor shall perform the earth resistance test as per relevant IEEE/IEC standards, the earthing resistance should be less than 4 ohms. complete in all respect as directed by engineer incharge.	Jobs	2	200000	400000
176	96	Supply, installation, testing and commissioning of at least 400A MCCB Circuit Breaker Adjustable 36kA-40kA atleast in substation panel with complete modification of bus bar per site requirement complete in all respects directed by engineer in-charge in complainece with BS 387 1 - Miniature & Molded Case Circuit Breakers or equivalent standard	Jobs	1	300000	300000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
177	97	Supply, installation, testing, and commissioning of 5 core control wire Make Cu 1.5mm ² , Electrical wiring must be compliant with IEC 60364 or BS 7671 and type tested certification from KEMA/RAWAT/PQSIR) and PVC pipe of 25 mm dia of class C (Electrical PVC pipe must be in compliant with BS 6099-1 or PS 1905-87 or equivalent standards) The cost includes supply, laying, and installation of wires in PVC conduit pipe with all necessary installation material and redressing as per original condition, complete in all respects as per standard industry practice to the satisfaction of the Engineer In-charge .	Mtr	45	1200	54000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
178	98	Supply, Installation, fixing, testing and commissioning of main decorative chandelier for mosque prayer hall, including suspension arrangement, ceiling mounting supports, anchoring system, alignment, electrical wiring connections, load balancing and complete integration with existing lighting circuit. The scope includes provision of all necessary hardware, clamps, chains/rods, connectors, fasteners, scaffolding/lifting arrangement, safety measures, testing and adjustment required for safe and stable installation of chandelier at designated height. The item shall be completed in all respects as per site requirements and instructions of the Engineer In-Charge.	Jobs	1	30000	30000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
179	99	Supply, Installation, fixing, testing and commissioning of small decorative chandelier for mosque area, including mounting arrangement, suspension supports, electrical connections, alignment and integration with existing lighting system. The scope includes all accessories, fixing hardware, connectors, consumables, scaffolding/lifting arrangement, testing and necessary safety measures required for complete and secure installation. The item shall be executed in all respects as per site conditions and instructions of the Engineer In-Charge.	Jobs	2	18000	36000
180	100	Supply, installation, testing and commissioning of at least 60A MCCB Circuit Breaker for lighting as per site requirement complete in all respects directed by engineer in-charge in compliance with BS 387 1 - Miniature & Molded Case Circuit Breakers or equivalent standard complete in all respects as directed by Engineer In-charge	Jobs	2	25000	50000
181		SUB-SECTION-1-D: LIFT WORKS				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
182	101	Supply of Machine Room Less (MRL) passenger lift of 3 stops (Ground + 2) minimum capacity 630Kg, as per EN-81 safety standards, operational on 380-415 Volts, 3-phase, 50 Hz, 3 stops, with following features: • Permanent magnet gearless hoisting motor capable of serving Ground + 2 Floors with microprocessor control panel, Car Operating Panels (COP) • Floor operating panels (FOP) One (01) on each lift lobby equipped with up/down stainless steel call buttons with braille and buzzer, door tracks, sills, door drive mechanism and its complete control system • Reservation services system inside each car • Indicator flicker and chime before car arrival (Audible alert system in the car announcing the floor that the car has arrived at) • Automatic control of the door's operating closing time according to the kind of floor and call. • Automatic rescue device (ARD)/Emergency Landing Device, • Full length light curtain, with door closing force limiting device • Weight overload buzzer • All safety devices as per safety standards of EN-81 • Telephone intercom system • Alarm bell • Voice Prompt System for blind persons indicating each floor reached • Further equipped with lights, fan, call bell, emergency backup for lights, fan, alarm and intercom • Operation manual, maintenance manual and circuit diagrams (English Version). Two Hard Copies & One Soft copy in USB. • In accordance with manufacturer's standard	Job	1	15000000	15000000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
183	102	Installation, testing and commissioning of MRL type passenger elevator(s), including complete system along with car assembly, guide rails, hoisting machine and ropes, control panel, speed governor, safety devices, landing and car doors, and all associated components required for a fully functional installation. The system shall be installed in accordance with approved specifications as mentioned in Volume 1 Technical Specifications and lift stop schedule. The scope also includes all civil works with provision and installation of M.S. scaffolding within the shaft for safe execution of works, complete erection. The rate shall include all materials, equipment, labour, tools, accessories, testing, commissioning and statutory compliance, ensuring safe, reliable and complete operation of the elevator system in all respects as directed by the Engineer In-Charge.	Job	1	1600000	1600000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
184	103	Provision of comprehensive operation and maintenance services for elevator system(s) for a period of one (01) year, including deployment of one (01) qualified operators/technicians at site, each having minimum three (03) years' relevant experience in operation and maintenance of elevators. The scope includes routine operation, preventive and breakdown maintenance, periodic inspection, minor adjustments, lubrication, cleaning, attending faults, ensuring safe and smooth functioning, and maintaining operational records/logs. The service shall ensure maximum uptime, safety compliance and reliable performance of the elevator system. The rate shall include all labour, supervision, tools, consumables and associated services required for complete operation and maintenance, carried out in all respects as per site requirements and instructions of the Engineer In-Charge.	Month	12	100000	1200000
185		SUB-SECTION-1-E: SOUND SYSTEM				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
186	104	Supply of professional 2-way surface mount speaker system suitable for auditorium, public address and background music applications, complete with mounting bracket and all associated accessories. The speaker shall be designed for wall/ceiling mounting and shall provide clear voice intelligibility and high-quality music reproduction. The speaker system shall meet or exceed the following minimum specifications: Type: 2-way surface mount speaker system Speaker Size: low frequency driver with high frequency dome tweeter Continuous Program Power: minimum 150W Rated Noise Power: minimum 90W Sensitivity: minimum 91 dB (1W/1m) Frequency Response: 50 Hz - 20 kHz or better Dispersion: minimum 100° × 100° coverage or better Mounting: wall/ceiling mountable with adjustable steel bracket Construction: heavy-duty enclosure Operating Temperature: -10°C to +50°C Certification: EN54-24 certified outdoor/weatherproof version where specified	Nos.	11	120000	1320000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
187	105	Supply of compact two-way wall mount speaker system suitable for auditorium, conference and public address applications, designed for wide dispersion, high speech intelligibility and high-quality music reproduction. The speaker shall be complete with mounting bracket and all associated accessories and shall meet or exceed the following minimum specifications: Type: Two-way bass reflex wall mount speaker Rated Input: minimum 30 Watts Power Handling Capacity: minimum 140W continuous program Rated Impedance: 8 Ohms with 70V/100V line transformer tapping Sensitivity: minimum 90 dB (1W/1m) Frequency Response: 80 Hz - 20 kHz (-10 dB) Input Terminal: push-in terminal type Enclosure Material: HIPS resin or equivalent high durability enclosure Mounting: wall/ceiling mountable with adjustable bracket	Nos.	6	85000	510000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
188	106	Supply of two-way weatherproof music horn speaker suitable for outdoor public address and background music applications, designed for high intelligibility, high efficiency and wide area sound coverage. The speaker system shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications: Type: Two-way weatherproof music horn speaker Rated Input Power: 60 Watts minimum Line Voltage Operation: 70V/100V line transformer type Sensitivity: minimum 100 dB (1W/1m) Maximum Sound Pressure Level: minimum 117 dB at rated power Frequency Response: 100 Hz – 20 kHz or better Dispersion Angle: minimum 90° horizontal × 80° vertical Speaker Components: Low Frequency: minimum 6-inch cone type High Frequency: dome tweeter type Dust & Water Protection: minimum IP66 rated Enclosure Material: weatherproof ABS resin or equivalent Finish: UV resistant outdoor coating Suitable for outdoor installations including stadiums, parking areas, corridors and public spaces	Nos.	2	150000	300000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
189	107	Supply of weatherproof high-intelligibility driver unit suitable for public address and outdoor announcement applications, designed for use with compatible horn flare assembly. The driver unit shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications: Type: High impedance driver unit for horn speaker Rated Input Power: 50 Watts minimum Line Voltage Operation: 70V/100V line system Sensitivity: minimum 110 dB (1W/1m) Frequency Response: 150 Hz – 6 kHz or better Dust & Water Protection: minimum IP65 rated (with compatible horn assembly) Impedance Selector: external tap selector arrangement Construction: corrosion resistant housing with powder coated finish Horn Coupling: standard threaded coupling suitable for compatible horn flare Suitable for outdoor public address and announcement systems	Nos.	6	24000	144000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
190	108	Supply of weatherproof long horn speaker suitable for outdoor public address, emergency announcement and mass notification applications, designed for high intelligibility and long-distance sound projection. The speaker shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications: Type: Long horn / reflex horn speaker Rated Input Power: minimum 30-50 Watts Line Voltage Operation: 70V/100V line system or equivalent High sensitivity suitable for long-range coverage Frequency Response: suitable for speech intelligibility and announcement applications Weatherproof construction suitable for outdoor installation Corrosion resistant housing and mounting hardware Adjustable mounting bracket arrangement Suitable for continuous duty operation in outdoor environments	Nos.	6	14000	84000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
191	109	Supply of professional multichannel digital power amplifier suitable for auditorium, public address and professional sound reinforcement applications. The amplifier shall be rack mountable and capable of delivering high power output with low distortion and reliable continuous operation. The unit shall meet or exceed the following minimum specifications: Type: Class-D multichannel digital power amplifier Channels: 4 independent output channels Output Power: Minimum 1000W × 4 channels at 4Ω Minimum 650W × 4 channels at 8Ω Bridge Mode: minimum 2000W × 2 channels at 8Ω Frequency Response: 20 Hz – 20 kHz (±3 dB) Total Harmonic Distortion (THD): ≤ 0.1% Signal to Noise Ratio: ≥ 100 dB Input Impedance: 20kΩ balanced / 10kΩ unbalanced Input Connectors: XLR-F balanced input Output Connectors: NL4 Speakon speaker connectors LED Indicators: Protect, Clip, Signal, Power and level indicators Cooling System: forced air cooling front-to-rear airflow Power Supply: 100–240V AC, 50/60 Hz Power Consumption: maximum 2000W Mounting: standard 19-inch rack mount type Construction: heavy-duty metal chassis suitable for professional applications	Nos.	2	450000	900000

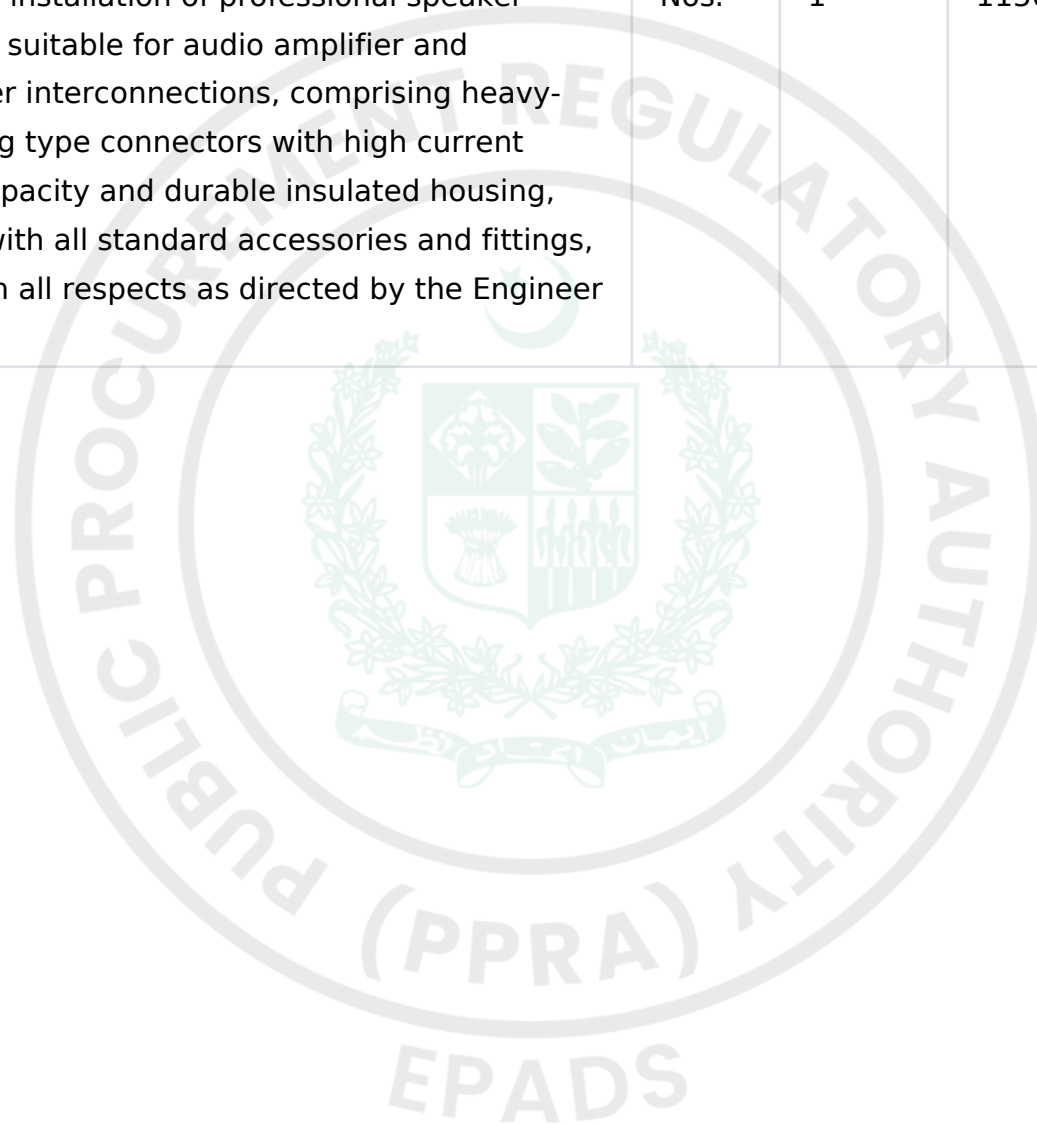
Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
192	110	Supply of professional mixer power amplifier suitable for public address, auditorium, mosque and background music applications, capable of high-quality speech and music reproduction with multi-input mixing and zone selection facility. The amplifier shall be rack/table mount type and shall meet or exceed the following minimum specifications: Type: Mixer Power Amplifier Rated Output Power: 240 Watts minimum Microphone Inputs: minimum 6 balanced MIC/LINE inputs AUX Inputs: minimum 5 AUX inputs Simultaneous Mixing Capability: minimum 9 input sources Recording Input/Output facility Speaker Zones: minimum 2 selectable speaker zones Speaker Output: 100V line and 4-16Ω low impedance output Frequency Response: 50 Hz - 20 kHz (±3 dB) Distortion: ≤ 2% at rated output Signal Processing: provision for equalizer/processor connection Tone Controls: independent bass and treble controls Indicators: power, output level and zone selection LED indicators Input Connectors: XLR/phone jack and RCA type combinations Cooling: convection/forced air suitable for continuous operation Power Supply: 220-240V AC, 50/60 Hz Mounting: rack/table mountable heavy-duty chassis construction	Nos.	2	300000	600000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
193	111	Supply of professional compact digital/analog audio mixing console suitable for auditorium, conference, studio and live sound reinforcement applications. The mixer shall provide high-quality audio processing, multi-channel mixing capability, integrated digital effects and USB audio interfacing for recording and playback applications. The unit shall meet or exceed the following minimum specifications: Type: Professional compact mixing console Input Channels: minimum 16 channels comprising: 12 Mic/Line input channels 4 Mic/Stereo-Line input channels Microphone Preamplifiers: low-noise professional grade preamps Auxiliary Buses: minimum 6 AUX buses Effects Processors: dual integrated digital stereo effects processors Effects Presets: minimum 100 factory presets and 20 user programmable presets Equalizer: 11-band stereo graphic equalizer USB Audio Interface: professional 4-in/4-out USB interface Audio Resolution: minimum 24-bit / 96 kHz MIDI Interface: integrated MIDI input/output support Frequency Response: 15 Hz – 70 kHz or better THD: ≤ 0.01% Phantom Power: +48V selectable phantom power Display: OLED/LCD display for effects and system settings Outputs: balanced XLR master outputs and monitor outputs Controls: independent channel EQ, AUX, FX and gain controls Construction: heavy-duty compact chassis suitable for portable and fixed installations	Nos.	1	500000	500000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
194	112	Supply of professional dynamic headset microphone suitable for speech reinforcement, auditorium, presentation and live sound applications. The microphone shall provide clear voice reproduction, high gain-before-feedback and reliable hands-free operation. The unit shall meet or exceed the following minimum specifications: Type: Dynamic close-talk headset microphone Polar Pattern: Cardioid (unidirectional) Frequency Response: 50 Hz – 15 kHz Output Connector: 3-pin XLR male balanced output Output Impedance: 150Ω rated or better Sensitivity: suitable for professional speech applications Construction: lightweight adjustable wireframe headset with flexible boom arm Cable: attached shielded microphone cable minimum 1.2 m length Accessories: foam windscreen and cable clip Finish: black or approved equivalent Operation: no phantom power required Suitable for indoor speech, stage and presentation applications	Nos.	1	117000	117000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
195	113	Supply and installation of microphone outlet plate complete with phono/audio jack and socket assembly suitable for professional audio signal connections, including mounting box, connectors, termination and labeling. The outlet shall be suitable for balanced audio applications and shall include all accessories required for complete installation, testing and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.	Nos.	2	8400	16800
196	114	Supply and installation of professional audio interconnection patch cable suitable for connection between amplifier and mixer, comprising shielded low-noise cable with heavy-duty audio jack connectors. The cable shall be suitable for professional sound applications and shall include all standard terminations, complete in all respects as directed by the Engineer In-Charge.	Nos.	6	8400	50400

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
197	115	Supply and installation of professional speaker connectors suitable for audio amplifier and loudspeaker interconnections, comprising heavy-duty locking type connectors with high current carrying capacity and durable insulated housing, complete with all standard accessories and fittings, complete in all respects as directed by the Engineer In-Charge.	Nos.	1	11500	11500



Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
198	116	Supply and installation of 27U floor standing PA equipment rack fabricated from heavy-duty steel sheet with powder coated finish and front glass door, suitable for housing professional audio and communication equipment. The rack shall be complete with ventilation arrangement, cable management provision, mounting hardware and power distribution unit (PDU). The rack shall meet or exceed the following minimum specifications: Rack Size: 27U standard 19-inch rack Construction: heavy-duty MS/CRCA steel sheet Finish: powder coated anti-corrosive finish Front Door: lockable toughened glass door Mounting Rails: adjustable equipment mounting rails Ventilation: fan mounting/ventilation provision Accessories: cable manager, shelves and mounting hardware PDU: rack mountable power distribution unit Base: floor standing type with levelling arrangement/casters	Nos.	1	85000	85000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
199	117	Supply of professional handheld wired dynamic microphone suitable for public address, speech and vocal applications, complete with microphone holder, cable and standard accessories. The microphone shall provide clear voice reproduction and reliable performance and shall meet or exceed the following minimum specifications: Type: Dynamic handheld wired microphone Polar Pattern: unidirectional/cardioid Frequency Response: suitable for speech and vocal applications Output Connector: standard professional audio connector Construction: rugged metal body suitable for continuous use Switch: built-in ON/OFF switch Cable: shielded low-noise microphone cable Accessories: microphone holder/clip and carrying accessories	Nos.	1	27000	27000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
200	118	Supply of professional imported microphone stand suitable for auditorium, conference, public address and recording applications, designed for stable support and flexible positioning of microphones. The stand shall be heavy-duty construction and shall meet or exceed the following minimum specifications: Type: adjustable floor/table microphone stand Construction: heavy-duty steel/metal body Height Adjustment: adjustable Base: stable tripod or heavy round base type Finish: black powder coated/mat finish Thread Compatibility: standard 5/8-inch or equivalent microphone mounting thread Compatible with standard dynamic and condenser microphones	Nos.	1	13000	13000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
201	119	Supply, laying, termination, testing and commissioning of 2-core 1.5 sq.mm flexible speaker cable suitable for professional audio and speaker system applications, installed through 1" dia PVC conduit pipe concealed/recessed as per site with all required accessories in surface mounted configuration. The cable shall comprise high conductivity copper conductors with durable insulation suitable for low-loss audio signal transmission. The scope includes supply and installation of PVC conduit pipe, bends, couplers, saddles, junction accessories, cable pulling, dressing, termination, fixing, labeling and testing for continuity and proper operation. The rate shall include all consumables, labour, tools and associated works required for complete installation, fully operational in all respects as directed by the Engineer In-Charge.	Mtr	510	900	459000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
202	120	Supply, laying, termination, testing and commissioning of 2-core shielded microphone cable suitable for professional audio and microphone system applications, comprising high conductivity copper conductors with braided/foil shielding for noise and interference-free signal transmission, installed through 1" dia PVC conduit pipe concealed/recessed as per site with all required accessories in surface mounted configuration. The scope includes supply and installation of PVC conduit pipe, bends, couplers, saddles, junction accessories, cable pulling, dressing, termination, fixing, labeling and testing for continuity and signal integrity. The rate shall include all consumables, labour, tools and associated works required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.	Mtr	50	1000	50000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
203	121	Installation, fixing, alignment, testing and commissioning of speakers from Sr#186 to 190 at designated locations, including mounting arrangement, suspension/fixing hardware, electrical/audio connections, cable dressing and integration with existing sound system. The scope includes all labour, tools, consumables, clamps, brackets, fasteners and accessories required for safe and proper installation of speakers, complete with testing for satisfactory audio performance and operation, in all respects as directed by the Engineer In-Charge.	Jobs	25	3000	75000
204	122	Installation, testing, commissioning and sound tuning (including equalization and zoning setup) of the complete PA system by OEM authorized/certified engineer for Sr#191 to 194 and 199 to 200, ensuring proper operational performance and system integration.	Jobs	1	120000	120000
205		SECTION-2: UGWT				
206		Sub-Section 2-A: Dismantling & Excavation Works				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
207	123	Dismantling of existing PCC flooring and stone soling including disposal of unwanted/ surplus debris away from site, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Cft.	1135	180	204300
208	124	Excavation for Raft Foundation, underground Tanks, Septic Tanks (rectangular square or any other shape in all kinds of soil including disposal or stacking of surplus/rejected excavated materials to designated places at any lead & lift complete in all respects as per site requirements and as directed by Engineer In-Charge.	Cft.	29810	40	1192400
209		Sub-Section 2-B: Stone Soling/Pitching and Concrete Works				
210	125	Providing and laying stone soling about 8" thick (stone obtained from Hub source), under foundation/raft slab, complete in all respects as per site requirements and as directed by the Engineer In-charge.	Sft	2270	140	317800
211	126	Providing & laying ready mix PCC (1:4:8) concrete using Ordinary Portland cement complete in all respects as shown on the drawings.	Cft.	1140	600	684000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
212	127	Providing, cleaning/straightening, cutting, bending, binding and fixing in position steel reinforcing deformed bars of Grade 60 (Min. yield strength 60,000 Psi, from Amreli Steel or other make approved by the Employer) conforming to ASTM A-615 including the cost of testing from approved laboratory, concrete spacers, binding wire, complete in all respects as per drawings and as directed by the Engineer In-charge (Payment shall be made according to the approved Bar Bending Schedule, contractor shall have to submit test reports for at least three samples of each size from each consignment).	Kg.	23165	450	10424250

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
213	128	Providing, laying, vibrating/ consolidating and curing, ready-mix concrete brought from approved batching plant (Lucky Paragon or other approved by the Employer), with minimum 3000 psi compressive cylinder strength at 28 days, with sulphate resistant cement, including the cost of providing and fixing & removal of fair face steel plates shuttering, complete in all respects as per drawings, specifications and as directed by the Engineer In-charge. (Contractor shall have to submit Mix. Design prepared by NED University or other similar approved institute before start of concreting).				
214	a	Raft Foundation	Cft.	2150	910	1956500
215	b	Walls	Cft.	2190	1200	2628000
216	c	Roof Slab	Cft.	1500	1010	1515000
217	d	Roof Beams	Cft.	100	1050	105000
218		Sub-Section 2-C: Water Proofing Works				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
219	129	Providing and fixing in position 10" wide transparent PVC water stopper of DECORA or approved equivalent make, (with 03 bulbs), of approved quality, complete in all respects as per drawings and as directed by the Engineer In-charge.	Rft.	210	810	170100
220	130	Providing, mixing, applying and curing ½" thick puddlo plaster on internal & external surfaces in 1:3 ratio using 5 lbs of puddlo per bag of sulphate resistant cement, complete in all respects as per site requirements and as directed by the Engineer In-charge.	Sft.	8680	102	885360
221	131	Providing & applying two flood coats of rubberized bitumen on all reinforced concrete surfaces likely to come in contact with the soil, complete in all respects as per site requirements and as directed by the Engineer In-charge.	Sft	4430	35	155050
222		Sub-Section 2-D: Backfilling & Flooring Works				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
223	132	Backfilling filling in foundation, under floors or around plinths etc with soil obtained from excavation including watering and compaction in 150 mm layer and dressing to required profile and shape complete in all respects as per site requirements and as directed by Engineer In-Charge.	Cft.	6310	35	220850
224		Sub-Section 2-E: Manholes & Piping Works				
225	133	Providing and fixing in position Cast Iron manhole cover 2ft x 2ft size with frame, weighing at least 135 KG each including the cost of grouting the frame in RCC walls/ slab, Alpine, Tipu or approved equivalent make, complete in all respects as per site requirements and as directed by the Engineer In-charge.	Nos.	4	50000	200000
226	134	Providing & fixing 2ft high air vents made from 4" dia. Schedul-80 cPVC pipes & elbows with fly mesh/ steel grating set provided at outer end using cPVC sockets etc. complete in all respects as per drawings, specifications and as directed by the Engineer In-charge.	Nos.	4	5000	20000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
227	135	Providing and fixing in position, 2" dia. Schedule-80 uPVC pipe of AGM or approved equivalent make including the cost of required specials, complete in all respects with required accessories, as directed by the Engineer In-charge.	Rft	65	450	29250
228	136	Providing and fixing in position, 4" dia. Schedule-40 uPVC pipe of AGM or approved equivalent make including the cost of required specials, complete in all respects with required accessories, as directed by the Engineer In-charge.	Rft	100	1100	110000
229	137	Providing and fixing in position, rungs each made from 20mm dia. 4 ft long stainless steel bar, including the cost of cutting, bending, fixing as per drawings, and as directed by the Engineer In-charge.	Nos.	20	6000	120000
230	138	Providing & fixing of 2" dia. uPVC handle valve complete in all respects as per site requirements and as directed by the Engineer in Charge.	Nos	2	3500	7000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
231	139	Providing, installation, testing, commissioning etc. of brand new 2HP electric operated single phase mono block water pump of Javed or other approved equivalent brand, with 2" dia. suction & 2" dia. delivery pipes, including cost of 24" x 24" x 18" concrete foundation, required specials, no-return valve of 2" size of Kitz (England) or approved equivalent make, etc. complete in all respects as per site requirements and as directed by the Engineer In-charge.	Job	1	100000	100000
232		SECTION-3: LANDSCAPING				
233	140	Providing and laying pre-cast concrete pavers, city style or other approved shape, 80 mm thick of Envicrete/ Izhaar or other approved Equivalent in red colour, minium compressive strength will be 7000PSI, lalid as per approved pattern including the cost of about 50mm thick stone dust bed and grouting with same stone dust, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Sft	10000	350	3500000
234	141	Same as above but removal & refixing of pavers from the site.	Sft	4000	150	600000

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
235	142	Providing and fixing Kerb Stones of size 1ftx3ftx6inch at bottom and about 3" at top, including the cost of PCC 1:2:4 required for benching/ haunching etc. and cement-sand mortar for grouting, painting with chlorinated rubber paint of approved colour and make, complete in all respects as per site requirements and as directed by the Engineer In-Charge.	Rft	400	800	320000
					GRAND TOTAL:	Rs347,857,160.00

Scope of Work

See Annexure-04 - Scope of Works & KPI



Price Schedule

For Individual Jobs

#	Job Title	Quantity	Unit Price (PKR)	Total Price (PKR)	Delivery Location	Delivery Period / Year	Country of Origin
1							
2							

For Lots

#	Lot Title	Total Lot Price (PKR)	Country of Origin
1	[Lot 1 Title]		





General Conditions of Contract

A. General

1. Definitions

1.1. Unless the context otherwise requires, the following terms whenever used in this Contract shall have the same meaning and shall be interpreted as indicated

1.1.1. "Applicable Law" means the laws and any other instruments having the force of law in the Government's Country, or in such other country as may be specified in the Special Conditions of the Contract (SC), as they may be issued and in force from time to time;

1.1.2. "The Contract" means an agreement enforceable by law;

1.1.3. "The Contract Price" means the price payable to the Contractor under the Contract for the full and proper performance of its contractual obligations;

1.1.4. "The Services" means the work to be performed by the Contractor pursuant to this Contract and as prescribed in the Specifications and Schedule of Activities included in the Contractor's Bid;

1.1.5. "Ancillary Services" means those services ancillary to the provision of Services, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Contractor covered under the Contract;

1.1.6. "GCC" means the General Conditions of Contract contained in this section;

1.1.7. "SCC" means the Special Conditions of Contract by which the GCC may be amended or supplemented;

1.1.8. "Day" means calendar day unless indicated otherwise;

1.1.9. "Effective Date" means the date on which this Contract comes into force and effect;

1.1.10. "The Contractor" means the individual or corporate body whose Bids to provide the Services has been accepted by the Procuring Agency;

1.1.11. "The Project Site," where applicable, means the place or places named in Bid Data Sheet and technical Specifications;

1.1.12. "Government" means the Government of Pakistan;

1.1.13. "Local Currency" means the currency of Pakistan;

1.1.14. "In Writing" means communicated in written form with proof of receipt;

1.1.15. "Completion Date" means the date of completion of the Services by the Contractor as certified by the Procuring Agency;

1.1.16. "Foreign Currency" means any currency other than the currency of the country of the Procuring Agency;

1.1.17. "Party" means the Procuring Agency or the Contractor, as the case may be, and "Parties" means both of them;

1.1.18. "Service" means any object of procurement other than goods or works;

1.1.19. "Subcontractor" means any entity to which the Bidder subcontracts any part of the Services.

2. Applicable Law

2.1. The contract shall be governed and interpreted in accordance with the laws of Pakistan, unless otherwise specified in SCC.

3. Language

3.1. The Contract as well as all correspondence and documents relating to the Contract exchanged between the Contractor and the Procuring Agency, shall be written in the **English language** unless otherwise stated in the SCC. Supporting documents and printed literature that are part of the Contract may be in another language provided these are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, this translation shall govern.

4. Notices

4.1. Any notice, request, or consent made pursuant to this Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent by registered mail, telex, telegram, or facsimile to such Party at the address specified in the SCC.

5. Location

5.1. The Services shall be performed at such locations as the Procuring Agency may approve and as specified in SCC.

5.2. A {DOCUMENTS}

6. Authorized Representatives / Authority of Member in charge

6.1. Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Procuring Agency or the Contractor may be taken or executed by the officials specified in the SCC.

B. Commencement, Completion, Modification, and Termination of Contract

7. Effectiveness of Contract

7.1. This Contract shall come into effect on the date the Contract is signed by both parties and such other later date as may be stated in the SCC.

8. Commencement of Services

8.1. The Contractor shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the SCC.

9. Program schedule

9.1. Before commencement of the Services, the Contractor shall submit to the Procuring Agency for approval a Program showing the general methods, arrangements, order and timing for all activities. The Services shall be carried out in accordance with the approved Program as updated.

10. Starting Date/Expiration Date

10.1. The Contractor shall start carrying out the Services Five (05) days after the date the Contract becomes effective, or at such other date as may be specified in the SCC.

10.2. Unless terminated earlier pursuant to Clause **GCC 14** hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the SCC.

11. Entire Agreement

11.1. This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

12. Modification

12.1. Any modification or variation of the terms and conditions of this Contract, including any modification or variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any modification(s) or variation(s) made by the other Party.

12.2. In cases of any modification(s) or variation(s), the prior written consent of the Procuring Agency is required.

13. Force Majeure

13.1. Definition

For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Contractor and which makes a Contractor's performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

13.2. No Breach of Contract

The failure of a Party to fulfill any of its obligations under the contract shall not be considered to be a breach of, or default under, this Contract in so far as such inability arises from an event of Force Majeure, provided that the Party affected by such an event (a) has taken all reasonable precautions, due care and reasonable alternative

measures in order to carry out the terms and conditions of this Contract, and (b) has informed the other Party as soon as possible about the occurrence of such an event.

13.3. Extension of Time

Any period within which a Contractor shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

13.4. Payments

During the period of their inability to perform the Services as a result of an event of Force Majeure, the Contractor shall be entitled to continue to be paid under the terms of this Contract, as well as to be reimbursed for additional costs reasonably and necessarily incurred by them during such period for the purposes of the Services and in reactivating the Service after the end of such period.

14. Termination

14.1. By the Procuring Agency

The Procuring Agency may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (e) of this Clause. In such an occurrence the Procuring Agency shall give at least thirty (30) calendar days' written notice of termination to the Contractor in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e);

14.1.1. If the Contractor fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension;

14.1.2. If the Contractor becomes (or, if the Contractor consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;

14.1.3. If the Contractor fails to comply with any final decision reached as a result of arbitration proceedings;

14.1.4. If, as the result of Force Majeure, the Contractor is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

14.1.5. If the Procuring Agency, in its sole discretion and for any reason whatsoever, decides to terminate this Contract;

14.2. By the Contractor

The Contractor may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Procuring Agency, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

14.2.1. If the Procuring Agency fails to pay any money due to the Contractor pursuant to this Contract and not subject to dispute within forty-five (45) calendar days after receiving written notice from the Contractor that such payment is overdue;

14.2.2. If, as the result of Force Majeure, the Contractor is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

14.2.3. If the Procuring Agency fails to comply with any final decision reached as a result of arbitration;

14.2.4. If the Procuring Agency is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Bidder may have subsequently approved in writing) following the receipt by the Procuring Agency of the Contractor's notice specifying such breach.

C. Obligations of the Contractor

15. General

15.1. Standard of Performance

15.1.1. The Contractor shall perform the Services and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Contractor shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Procuring Agency, and shall at all times support and safeguard the Procuring Agency's legitimate interests in any dealings with the third parties;

15.1.2. The Contractor shall employ and provide such qualified and experienced Experts and Sub-Contractors as are required to carry out the Services.

15.2. Law Applicable to Services

The Contractor shall perform the Services in accordance with the Contract and in accordance with the Law of Pakistan and shall take all practicable steps to ensure that any of its Experts and Sub-Bidders, comply with the Applicable Law.

16. Conflict of Interests

16.1. Contractor Not to Benefit from Commissions and Discounts

The remuneration of the Contractor shall constitute the Contractor's sole remuneration in connection with this Contract or the Services, and the Contractor shall not accept for their own benefit any trade commission, discount, or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations under the Contract, and the Contractor shall use their best efforts to ensure that the Personnel, any Subcontractors, and agents of either of them similarly shall not receive any such additional remuneration.

16.2. Contractor and Affiliates Not to be Otherwise Interested in Project

The Contractor agree that, during the term of this Contract and after its termination, the Contractor and its affiliates, as well as any Subcontractor and any of its affiliates, shall be disqualified from providing Services (other than the Services and any continuation thereof) for any project resulting from or closely related to the Services.

16.3. Prohibition of Conflicting Activities

Neither the Bidder nor its Subcontractors nor the Personnel shall engage, either directly or indirectly, in any of the following activities:

16.3.1. during the term of this Contract, any business or professional activities in the Government's country which would conflict with the activities assigned to them under this Contract;

16.3.2. during the term of this Contract, neither the Contractor nor their Subcontractors shall hire public employees in active duty or on any type of leave, to perform any activity under this Contract;

16.3.3. after the termination of this Contract, such other activities as may be specified in the SCC.

17. Insurance to be Taken Out by the Contractor

17.1. The Contractor(a) shall take out and maintain, and shall cause any Subcontractors to take out and maintain, at its (or the Sub-contractors', as the case may be) own cost but on terms and conditions approved by the Procuring Agency, insurance against the risks, and for the coverage, as shall be specified in the SCC; and (b) at the Procuring Agency's request, shall provide evidence to the Procuring Agency showing that such insurance has been taken out and maintained and that the current premiums have been paid.

18. Contractor's Actions Requiring Procuring Agency's Prior Approval

18.1. The Contractor shall obtain the Procuring Agency's prior approval in writing before taking any of the following actions:

18.1.1. appointing such members of the Personnel not provided by the Contractor;

18.1.2. changing the Program of activities; and

18.1.3. any other action that may be specified in the SCC.

19. Reporting Obligations

19.1. The Contractor shall submit to the Procuring Agency the reports and documents in the numbers, and within the periods as prescribed by the Procuring Agency.

20. Liquidated Damages

20.1. Payments of Liquidated Damages

The Contractor shall pay liquidated damages to the Procuring Agency at the rate per day stated in the SCC for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the SCC. The Procuring Agency may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

20.2. Correction for Over-payment

If the Intended Completion Date is extended after liquidated damages have been paid, the Procuring Agency shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The

Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in SCC.

20.3. Lack of performance penalty

If the Contractor has not corrected a Defect within the time specified in the Procuring Agency's notice, a penalty for Lack of performance will be paid by the Contractor. The amount to be paid will be calculated as a percentage of the cost of having the Defect corrected, assessed as specified in the Contractor

21. Performance Guarantee

21.1. Within the time stipulated in the acceptance letter from the Procuring Agency, the successful Bidder shall furnish the Performance Guarantee in shape and amount **specified in SCC.**

21.2. The proceeds of the Performance Guarantee shall be payable to the Procuring agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

21.3. The Performance Guarantee shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Procuring agency and shall be in the acceptable form as specified in SCC.

21.4. The Performance Guarantee will be discharged by the Procuring agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise **specified in SCC.**

22. Sustainable Procurement

22.1. The Contractor shall conform to the sustainable procurement contractual provisions, if and as specified in the SCC.

D. Contractor's Personnel

23. Description of Personnel

23.1. The titles, agreed job descriptions, minimum qualifications, and estimated periods of engagement in the carrying out of the Services of the Contractor's Key Personnel. The Key Personnel listed by title as well as by name are hereby approved by the Procuring Agency.

24. Removal and / or Replacement of Personnel

24.1. Except as the Procuring Agency may otherwise agree, no changes shall be made in the Key Personnel. If, for any reason beyond the reasonable control of the Contractor, it becomes necessary to replace any of the Key Personnel, the Contractor shall provide as a replacement a person of equivalent or better qualifications.

24.2. If the Procuring Agency finds that any of the Personnel have (i) committed serious misconduct or have been charged with having committed a criminal action, or (ii) have reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Contractor shall, at the Procuring Agency's written request specifying the grounds thereof, provide as a replacement a person with qualifications and experience acceptable to the Procuring Agency.

24.3. The Contractor shall have no claim for additional costs arising out of or incidental to any removal and/or replacement of Personnel.

E. Obligations of the Procuring Agency

25. Change in the Applicable Law

25.1. If, after the date of this Contract, there is any change in the Applicable Law with respect to taxes and duties which increases or decreases the cost of the Services rendered by the Contractor, then the remuneration and reimbursable expenses otherwise payable to the Contractor under this Contract shall be increased or decreased accordingly by agreement between the Parties, and corresponding adjustments shall be made to the amounts referred in the SCC.

26. Services and Facilities

26.1. The Procuring Agency shall make available to the Contractor and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described in the Terms of Reference, at the times and in the manner specified in the Terms of Reference.

26.2. In case that such services, facilities and property shall not be made available to the Contractor, the Parties shall agree on (i) any time extension that it may be appropriate to grant to the Contractor for the performance of the Services, (ii) the manner in which the Contractor shall procure any such services, facilities and property from other sources, and (iii) the additional payments, if any, to be made to the Contractor as a result thereof.

F. Payments to the Contractor

27. Contract Price

27.1. The price payable shall be in Pakistani Rupees unless otherwise specified in the SCC.

28. Terms and Conditions of Payment

28.1. Payments will be made to the Contractor according to the payment schedule stated in the SCC and as per actual invoice submitted by the Contractor.

28.2. Unless otherwise stated in the SCC, the advance payment shall be made against the provision by the Contractor of a bank guarantee for the same amount, and shall be valid for the period stated in the SCC. Any other payment shall be made after the conditions listed in the SCC for such payment have been met, and the Contractor have submitted an invoice to the Procuring Agency specifying the amount due.

29. Quality Control Identifying Defects

29.1. The principle and modalities of Inspection of the Services by the Procuring Agency shall be as indicated in the SCC. The Procuring Agency shall check the Contractor's performance and notify him of any Defects that are

found. Such checking shall not affect the Contractor's responsibilities. The Procuring Agency may instruct the Contractor to search for a Defect and to uncover and test any service that the Procuring Agency considers may have a Defect. Defect Liability Period is as defined in the SCC.

29.2. A {INSPECTION}

30. Correction of Defects, and Lack of Performance Penalty

30.1. The Procuring Agency shall give notice to the contractor of any Defects before the end of the Contract. The Defects liability period shall be extended for as long as Defects remain to be corrected.

30.2. Every time notice a Defect is given; the contractor shall correct the notified Defect within the length of time specified by the Procuring Agency's notice.

30.3. If the contractor has not corrected a Defect within the time specified in the Procuring Agency's notice, the Procuring Agency will assess the cost of having the Defect corrected, the contractor will pay this amount, and a Penalty for Lack of Performance.

31. Settlement of Disputes Amicable Settlement

31.1. The Parties shall use their best efforts to settle amicably all disputes arising out of or in connection with this Contract or its interpretation.

32. Dispute Settlement

32.1. Arbitration

If any dispute of any kind whatsoever shall arise between the procuring agency and the contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity or termination, or the execution of the contract, the parties shall seek to resolve any such dispute or difference by mutual consultation. If the parties fail to resolve such a dispute or difference even after negotiations or mediation, then the dispute shall be referred within fourteen (14) days in writing by either party to the Arbitrator, with a copy to the other party.

Any dispute in respect of which a notice of intention to commence arbitration has been given, in accordance with **GCC sub-clause 32.1**, shall be finally settled by arbitration. Arbitration may be commenced prior to or after completion of the Contract. Arbitration proceedings shall be conducted in accordance with Arbitration Act 1940. Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless otherwise agreed. The Procuring Agency shall continue to pay the Contractor any undisputed amounts due under the Contract during the resolution of any dispute.



Special Conditions of Contract

SECTION VIII. SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

Number of GC Clause

Amendments of, and Supplements to, Clauses in the General Conditions of Contract

Number of GC Clause 1

Definitions

The Procuring Agency is: SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)), Executive Engineer Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province).

The Supplier is:

The title of the subject procurement is: 315-Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi

Number of GC Clause 2

Applicable/Governing Law:

The Contract shall be interpreted in accordance with the laws of Islamic Republic of Pakistan

Number of GC Clause 3

Language:

The language of the Contract, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be in **English**.

Number of GC Clause 4

Notices:

The addresses for the notices are:

Procuring Agency:

SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)), Executive Engineer Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province).

+92-213-450-4122

shehzad.memon@sbp.org.pk

Contractor/ Bidder:

[Name, address and telephone number]

The Contractor/ Bidder's Representative(s)

[Name, address, telephone number and e-mail address]

Number of GC Clause 6.1

The Authorized Representatives are:

For the Procuring Agency:

SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)), Executive Engineer Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province).

+92-213-450-4122

shehzad.memon@sbp.org.pk

For the Bidder:

Name:

Designation:

Address:

Number of GC Clause 7

Effectiveness of the contract

The Contractor/Bidder shall be effective within days from the date of signature of the Contract by both parties

Number of GC Clause 8

Commencement of Contract:

The Contractor/Bidder shall provide Non-Consultancy Services from the effective date of contract.

Number of GC Clause 10.2

Expiration of Contract:

The time period shall be

Number of GC Clause 14

Termination

In the event of termination of the contract due to any reason as already defined in the General Conditions of Contract, the Bidder shall be responsible for providing to the Authority the Goods till the time of alternate arrangements.

Number of GC Clause 16

Conflict of Interest:

The Procuring Agency reserves the right to determine on a case-by-case basis whether the Bidder should be disqualified from providing goods or services due to a conflict of a nature described in Clause GCC 17.

Number of GC Clause 20

Liquidated Damages

If the Bidder fails to provide services as required under the contract or in case of any data loss/data breach or any incident compromising the data security or other such failures related to any services, the Bidder shall pay to the Procuring Agency as Liquidated Damages at a rate of **0.10% to 10.00%** of the Contract value, in accordance with the extent of performance failure & the cost of investigating such incidents as judged by the Authority.

Number of GC Clause 21

Performance Guarantee:

The amount of performance guarantee shall be **10.00%** of the contract price in acceptable form of **Pay Order, Banker's Cheque, Call at Deposit, Bank Guarantee, Demand Draft**

Number of GC Clause 27

Currency of Payment:

All the payment to be released to the contractor/Bidder shall be in Pakistani Rupees.

Number of GC Clause 28

Payment terms:

Payment will be made to the Bidder against the procured Goods and services according to the actual invoice or running bills submitted by the Bidder against the services provided within the time given in the conditions of the contract.

Number of GC Clause 29

Identifying Defects:

The Authority reserves the right at any time to inspect the premises of the provider to inspect the goods and monitor the goods being provided.

Number of GC Clause 31

Following is the guidance for Dispute Resolution

- i. If any dispute of any kind whatsoever shall arise between the Authority and the Bidder in connection with or arising out of the Contract... (full clause unchanged)
- ii. At future of negotiation the dispute shall be resolved through mediation...
- iii. At failure of mediation, arbitration under Arbitration Act 1940...
- iv. Cost sharing equally...

v. Proceedings may commence before/after completion...

Notwithstanding any reference to the arbitration herein, the parties shall continue to perform their respective obligations under the Contract.

Rules of procedure for arbitration proceedings:

Any dispute between the Authority and a Bidder shall be referred to arbitration under the laws of Pakistan including Arbitration Act 1940.

Place of Arbitration and Award:

The arbitration shall be conducted in English language and place shall be Islamabad. The award shall be final and binding.





Bid Securing Declaration

Form 9: Bid Securing Declaration

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

Bid No.: **P88684**

To: **SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)), Executive Engineer Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province).**

We, the undersigned, declare that:

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

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

1. have withdrawn or modified our Bid during the period of Bid Validity specified in the Form of Bid;
2. Disagreement to arithmetical correction made to the Bid price; or
3. having been notified of the acceptance of our Bid by the Procuring Agency during the period of Bid Validity, (i) failure to sign the contract if required by Procuring Agency to do so or (ii) fail or refuse to furnish the Performance Security or to comply with any other condition precedent to signing the contract specified in the Bidding Documents.

We understand this Bid Securing Declaration shall expire if we are not the successful

Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight (28) days after the expiration of our Bid.



Contract Form

SECTION IX: CONTRACT FORMS

THIS AGREEMENT made the ____ day of _____ 20____ between **SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC))**, Executive Engineer Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province).

(hereinafter called “the Procuring Agency”) of the one part and [name of Bidder] of [city and country of Bidder] (hereinafter called “the Bidder”) of the other part:

WHEREAS the Procuring Agency invited Bids for provision of goods, viz., **315-Construction of Mosque at SBP HOK with allied works along with Underground Water Tank and Landscaping, SBP Head Office Karachi (P88684)** and has accepted a Bids by the Bidder for the provision of Goods in the sum of [contract price in words and figures] (hereinafter called “the Contract Price”).

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

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

2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-

1. This form of Contract;
2. the Form of Bids and the Price Schedule submitted by the Bidder;
3. the Schedule of Requirements;
4. the Technical Specifications;
5. the Special Conditions of Contract;
6. the General Conditions of the Contract;
7. the Procuring Agency’s Letter of Acceptance; and

8. [add here: any other documents]

3. In consideration of the payments to be made by the Procuring Agency to the Bidder as hereinafter mentioned, the Bidder hereby covenants with the Procuring Agency to provide the Goods related services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring Agency hereby covenants to pay the Bidder in consideration of the provision of Goods and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused this Contract to be executed in accordance with their respective laws the day and year first above written.

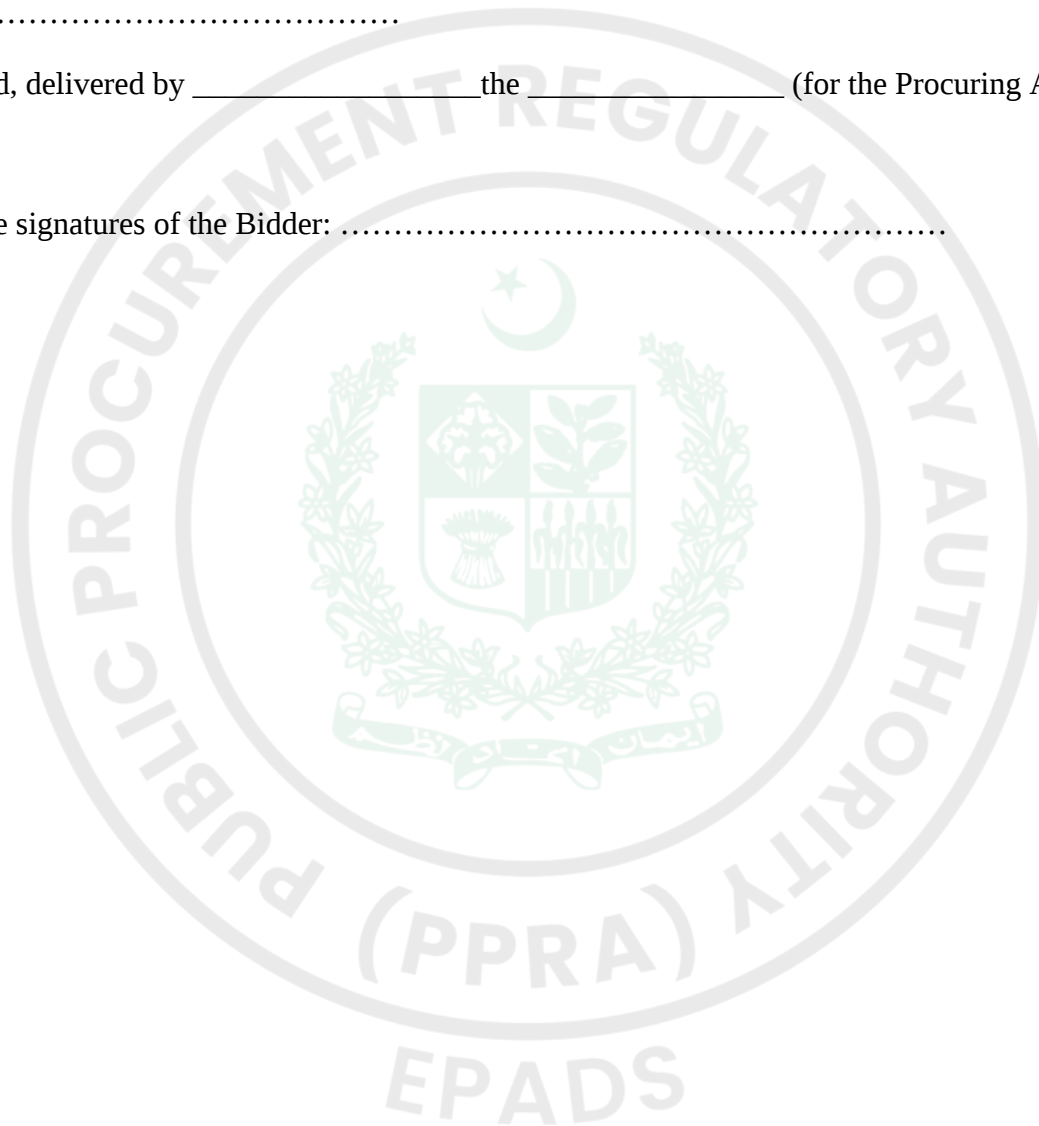
Signed, sealed, delivered by _____ the _____ (for the Procuring Agency)

Witness to the signatures of the Procuring Agency:

.....

Signed, sealed, delivered by _____ the _____ (for the Procuring Agency)

Witness to the signatures of the Bidder:





Integrity Pact

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

Number: Contract

Value: Contract Title:

Dated:

[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 Pakistan or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoP) 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, fee 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 consultations 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 GoP, 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 GoP and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact 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 right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [Name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten times 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 GoP.



Performance Guarantee Form

Performance Guarantee Form

To: **SBP Banking Services Corporation (BSC) (SBP Banking Services Corporation (BSC)), Executive Engineer Engineering Department, 1st Flor, SBP Boulton Market Building, M.A Jinnah Road, Saddar Sub-Division, Karachi South (District), Karachi (Division), Sindh (Province).**

WHEREAS *[name of Bidder]* (hereinafter called “the Bidder”) has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for provision of Goods (hereinafter called “the Contract”).

AND WHEREAS it has been stipulated by you in the said Contract that the Bidder shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Bidder’s performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Bidders guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Bidder, up to a total of *[amount of the guarantee in words and figures]*, and we undertake to pay you, upon your first written demand declaring the Bidder to be in default under the Contract and without cavil or argument, any sum or sums within the limits of *[amount of guarantee]* as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the: *[insert date]*

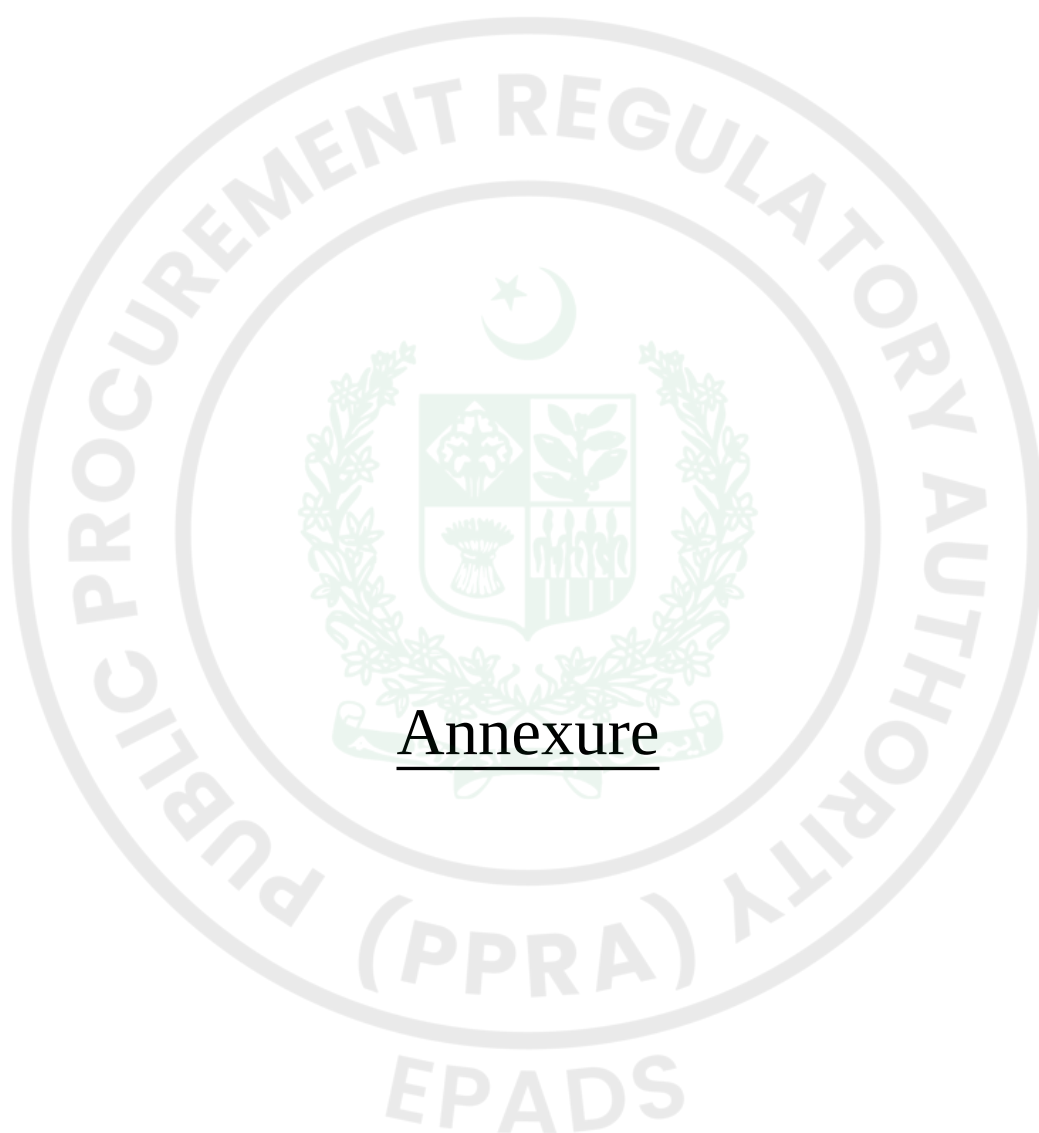
Signature and seal of the Guarantors

[name of bank or financial institution]

[address]

[date]





Annexure

Annexure-01 - Bidding Data Sheet (BDS) – Part-B

Annexure-01 - Bidding Data Sheet (BDS) – Part-B

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-01 - Bidding Data Sheet (BDS) – Part-B** (page number: 167)

Annexure-02 - Section VIII - SCC (Part-B)

Annexure-02 - Section VIII - SCC (Part-B)

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-02 - Section VIII - SCC (Part-B)** (page number: 168)

Annexure-03 - Formula for Price Adjustment

Annexure-03 - Formula for Price Adjustment

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-03 - Formula for Price Adjustment** (page number: 175)

Annexure-04 - Scope of Works & KPI

Annexure-04 - Scope of Works & KPI

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-04 - Scope of Works & KPI** (page number: 176)

Annexure-05 - Technical Specifications

Annexure-05 - Technical Specifications

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-05 - Technical Specifications** (page number: 178)

Annexure-06 - Drawings

Annexure-06 - Drawings

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-06 - Drawings** (page number: 299)

Annexure-07 - Undertaking

Annexure-07 - Undertaking

Technical Submission (Vendor)

See Form Under Additional Forms and Documents: **Annexure-07 - Undertaking** (page number: 318)

Annexure-08 - Supplier Account details

Annexure-08 - Supplier Account details

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-08 - Supplier Account details** (page number: 319)



Procurement Forms







Additional Forms and Documents

Bidding Data Sheet (BDS) – Part-B

The following specific data shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB) and Bidding Data Sheet. Whenever there is a conflict, the provisions herein shall prevail over those in ITB and Bidding Data Sheet.

ITB No.	Amendments of, and Supplements
Preparing of Bids	
11.5 & 13.5	The bid price shall be adjusted in accordance with Annexure-03 – Formula for Price Adjustment and Clause 28.8 of SCC Part B - Price Adjustment.
13.3.2	Alternative Bids to the requirements of the bidding documents will not be permitted.
28.	Determination of Unit Rates The total quoted Bid Price shall be apportioned among the individual BOQ items in proportion to their respective employer's / engineer's estimated unit rates, and the corresponding individual unit rates shall be determined accordingly, without altering the total quoted Bid Price. The Bidder shall be deemed to have accepted such determination and adjustment of the individual unit rates. In the event that the Bidder fails or refuses to accept the aforesaid determination or adjustment, the Bid shall be treated as non-responsive, and the Bid Security shall be forfeited.
41.1	Performance Security (or Guarantee) Add the following at the end Performance Guarantee shall be valid till successful completion of Defect Liability Period
42.2	Advance Payment The Procuring agency/Employer will provide an advance payment as stipulated in the Conditions of Contract.

Section VIII – Special Conditions of Contract (SCC) – Part-B

The following Special Conditions of Contract (SCC) shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC and SCC.

GCC Clause No.	Amendments of, and Supplements to, Clauses in the GCC
6.1	Authorized Representatives / Authority of Member in charge The Authorized representative will be mentioned in Notice to Commence / Work Order
8.1	Commencement of Services The Commencement date will be mentioned in Notice to Commence / Work Order
9.1	Program schedule Contract Duration is: 450 days , from start of commencement of Contract. Refer Annexure-04 - Scope of Works & KPI
12	VARIATIONS AND CLAIMS 12.1 Right to Vary The Employer/Engineer may issue Variation Order(s) in writing. Where for any reason it has not been possible for the Employer/Engineer to issue such Variations Order(s), the Contractor may confirm any verbal orders given by the Employer/Engineer in writing and if the same are not refuted/denied by the Employer/Engineer within seven (7) days of the receipt of such confirmation the same shall be deemed to be a Variation Orders for the purposes of this Sub-Clause. 12.2 Valuation of Variations Variations shall be valued as follows: a) at a lump sum price agreed between the Parties, or b) where appropriate, at rates in the Contract, or c) rates notified by the Government Departments/agencies, or d) in the absence of appropriate rates, the rates in the Contract shall be used as the basis for valuation, or failing which e) at appropriate new rates, as may be agreed or which the Engineer/Employer considers appropriate For the valuation of variations and determination of rates for non-BOQ/extra items, the approval of the Head/Director Engineering shall be obtained. The decision of the Head/Director Engineering in this regard shall be final and binding upon both parties. 12.3 Early Warning The Contractor shall notify the Engineer/Employer in writing as soon as he is aware of any circumstance which may delay or disrupt the Works, or which may give rise for Extension in time. To the extent of the Contractor's failure to notify, which results to the Engineer/Employer being unable to keep all relevant records or not taking steps to minimize any delay, disruption, the Contractor's entitlement to extension of the Time for Completion may be reduced/rejected. 12.4 Variation Procedure The Contractor shall submit to the Engineer/Employer an itemized make-up of the value of variations within twenty-eight (28) days of the instruction. The Engineer/Employer

Section VIII – Special Conditions of Contract (SCC) – Part-B

	shall check and if possible agree the value. In the absence of agreement, the Employer shall determine the value.
13.3	Extension of Time The Contractor shall, within such time as may be reasonable under the circumstances, notify the Employer of any event(s) falling within the scope of Employer's Risks, or Early Warnings, or adverse ground conditions, force majeure not leading to Contract termination, or any instruction of the Employer to slow down the progress of works or change in the scope of Works by the Employer requiring additional time for completion of the Works as per the revised scope of Works, may request the Employer to extend the Completion Time reasonably. The Contractor must have to provide complete record of the circumstances on account of which extension of time is being applied along with an up-dated program/schedule in bar chart form for completion of the balance works. The Employer may evaluate the request lodged by the Contractor and extend the Completion Time. The decision of the Director/Head Engineering will be final & binding upon the Contractor. It is being understood and agreed by the Contractor that the sole remedy for delay shall be extension in the time for performance of the Contractor's work, which extension shall not be subject to any valuation.
17	Insurance to be taken out by the Contractor From AA rated Insurance Company of PACRA/ JCR. The Works Amount of Cover: The sum stated in Letter of Acceptance plus fifteen percent 15%. Contractor 's equipment Amount of Cover: Full replacement Cost Injury to Person and Damaged to Property including Third Party Insurance Amount of Cover: I) As per workmen compensation act II) Contractor's all Risk including Third party III) damages to the Structure, stores if supplied by the Bank
28	Terms and Conditions of Payment Add the following 28.2.1 The Contractor shall submit to the Employer/Engineer, from time to time, a Statement, Bill or Invoice setting out in detail all amounts to which the Contractor considers himself entitled under the Contract, together with all supporting documents and records (if required) to substantiate such amounts, in such form and manner as may be prescribed by the Employer/Engineer from time to time. 28.2.2 The Employer/Engineer shall have the right, by any Bill or Interim Payment Certificate, to make any correction, adjustment or modification to any amount previously certified in any Interim Payment Certificate. Furthermore, if any part of the Works is not being executed to the satisfaction of the Employer/Engineer or is not in accordance with the Contract, the Employer/Engineer shall have the authority to omit, withhold or reduce the value of such work in any Interim Payment Certificate until the Contractor has satisfactorily rectified the relevant deficiencies.

Section VIII – Special Conditions of Contract (SCC) – Part-B

28.2.3 The Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of this cost except where otherwise expressly provided for in the Contract.

28.2.4 The quantities given in the Bill of Quantities are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix as per the Contract.

28.2.5 Upon issuance of Final Completion Certificate, the payments pertaining to the Works completed during Defects Liability Period and / or money as Retention Money shall be released as per sub-Clause-28.3 and the accounts for the contract shall be closed. The Employer shall release payments within sixty (60) days.

28.3 Retention Money

10% of the net payable amount from each bill (except Mobilization Advance) of the Contractor will be deducted as retention money. The retention money would be released as follows:

- a. 5% on Completion of the whole work,
- b. Balance 5% after successful completion of the Defects Liability Period / Warranty Period.

28.4 Advance Payment:

If requested by the Contractor, an interest-free Advance up to 15 % of the Contract Price stated in the Letter of Acceptance shall be paid by the Employer to the Contractor in two equal parts upon submission by the Contractor of an Advance Bank Guarantee for the full amount of the Advance in the specified form from a Scheduled Bank in Pakistan subject to approval of Director/Head Engineering Payments shall be made as per the following criteria;

First part of the Mobilization Advance within twenty (20) days after verification of the approved/ legible Bank Guarantee from the issuing bank.

Second part of the mobilization advance on arrival of required tools & plants and commencement of Works at site to the entire satisfaction of the Employer.

28.5 Payment Terms for E&M (Lift and Sound System)

28.5.1 Payment for Supply of Material/Equipment:

Up to seventy-five percent (75%) of the supply part of the BOQ items will be paid against delivery of material/equipment on site, and upon production of Factory Test Reports / Warranties / Shipping documents/ Inspection Reports at Manufacturer's Facility (where applicable) and indemnity bond as per approved format.

28.5.2 Payment upon Installation, Testing and Commissioning:

Up to ninety percent (90%) of the supply and installation parts of BOQ items will be paid upon successful Testing & Commissioning.

28.5.3 Payment upon issuance of Taking-Over Certificate:

Ten percent (10%) amount of whole BOQ item i.e. Supply and Installation will be paid upon issuance of Taking-Over Certificate and completion of the Whole Works, including

Section VIII – Special Conditions of Contract (SCC) – Part-B

punch list noted at commissioning time. The Contractor shall submit testing and fitness certificate in compliance with safety standards.

28.6 Recovery of Advance:

Advance paid to the Contractor shall be recovered from the interim bills of the Contractor @ 15% of total amount of work done at site for the bill being processed till the time that whole of the amount of Mobilization Advance has been recovered

28.7 Secured Advance

The Employer at his sole discretion may provide to Contractor Secured Advance against an indemnity bond acceptable to the Employer of such sum as the Engineer in charge may consider proper in respect of non-perishable materials brought at the Site but not yet incorporated in the permanent Works subject to approval of Director/Head of Engineering, provided that:

- (a) The materials are in accordance with the Specifications for the permanent works;
- (b) 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 in charge but at the risk to cost of the Contractor;
- (c) The Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer in charge, and such records shall be available for inspection by the Engineer in charge;
- (d) The Contractor shall submit with his monthly statement the estimated value of the materials on Site together with such documents as may be required by the Engineer in charge for the purpose of valuation of materials and providing evidence of ownership and payment therefore;
- (e) 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.
- f) 60% of the purchase price of the item/material or 50% of tender price of the item/material whichever is lesser, after measuring the quantity & verification of the quality of materials at site by the Employer may be paid

The amount of Secured Advance against any item(s)/materials shall be recovered from the next three (03) bill of the Contractor in the form of three equal installments. The Employer reserves the right to recover all outstanding amount of the Secured Advance from very 1st bill of the Contractor submitted after release of the Secured Advance.

28.8 Price Adjustment

The amounts payable to the Contractor 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. Price Adjustment under this Sub-Clause shall not be applicable on supply parts of the items and Operation & Maintenance Services.

- (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

Section VIII – Special Conditions of Contract (SCC) – Part-B

	The adjustment to the monthly statements in respect of changes in cost shall be determined from the following formula:- $P_n = A + b \frac{L_n}{L_o} + c \frac{C_n}{C_o} + d \frac{S_n}{S_o} + \dots$ P_n is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month where any variations and daywork are not otherwise subject to adjustment; A is a constant, specified in the Annexure-03 to Bid, representing the nonadjustable portion in contractual payments; b, c, d are weightages or coefficients representing the estimated proportion of each cost element (Labour, Cement, Sheet and High Speed Diesel) in the Works or Sections thereof, net of Provisional Sums and Prime Cost; the sum of A, b, c, d, e shall be one; L_n, C_n, S_n and D_n are the current cost indices or reference prices of the cost elements for month “n”, applicable to each cost element; and: (c) Sources of Indices and Weightages The sources of indices shall be those listed in the Annexure-03 to Bid. (d) Base, Current, and Provisional Indices The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 28 days prior to the start of the execution month 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 9.1, 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, 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 the Annexure-03 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 12. Such adjustment(s) shall have to be agreed in the variation order.
29.1	Quality Control Identifying Defects Defects Liability Period (DLP) shall be 365 days
30.1	Correction of Defects, and Lack of Performance Penalty Remedying Defects

Section VIII – Special Conditions of Contract (SCC) – Part-B

	The Contractor shall for a period of 12 months from the date of issue of the Taking Over Certificate carry out, at no cost to the Employer, repair and rectification work which is necessitated by the earlier execution of poor quality of work or use of below specifications material in the execution of Works and which is so identified by the Employer/Engineer in writing within the said period. Upon expiry of the said period, and subject to the Contractor's faithfully performing his aforesaid obligations, the Employer/Engineer shall issue a Defect Liability Certificate Failure to remedy any such defects or complete outstanding work within a reasonable time shall entitle the Employer to carry out all necessary works at the Contractor's cost. Uncovering and Testing The Contractor shall give not less than five days' notice in writing to the Engineer-in-charge of work before covering up or otherwise placing beyond the reach of measurement any work in order that same may be measured, and correct dimensions thereof be taken before same is covered or placed beyond the reach of measurement. The Engineer-in-Charge shall check the Contractor's Work and notify the Contractor of any Defects if found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a defect and to uncover/ or testing any work that the he considers may have a Defect Failure to remedying Defects Failure to remedy any defect(s) or complete the outstanding Works except the defects not attributable to the Contractor, to the entire satisfaction of the Employer within a notified time shall entitle the Employer to extend the defect liability period and / or carry out all necessary works at the Contractor's risk to cost.
31.1	Settlement of Disputes Amicable Settlement For Notices Procuring agency/Employer/ Engineer's Authorized representatives name and address: Director / Head Engineering, State Bank of Pakistan
32.1	Dispute Settlement Place of Arbitration is Karachi
33	Add the following clauses Attendance of Meetings The Contractor shall attend all meetings along with his authorized representative(s) when called by the Employer to discuss the quality and progress of Works, site matters and other matters related to the Contract, without any compensation from the Employer
34	Progress Report Monthly progress report in the format acceptable to the Engineer shall be prepared by the contractor and submitted to the Engineer in soft/hard format
35	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 arrangements adopted for such lighting shall be to the satisfaction of the Engineer's Representative.
36	Right of way and Facilities/utilities

Section VIII – Special Conditions of Contract (SCC) – Part-B

	The Contractor shall bear all costs and charges for special and or temporary right of way which may be required for the purposes of the work including those for access to the site The Contractor shall also obtain/arrange at the contractor's risk and cost such facilities /utilities which may be required for the purpose of the work including but not limited to material storage areas, labor accommodation, site offices, temporary access roads, water, electricity etc. All costs, charges, rents, licenses, permissions, utilities and other expenses associated with such facilities shall be borne/obtained by the Contractor.
37	Health, Safety, Environment and Security (HSE&S) - The Contractor shall comply with all statutory and regulatory requirements related to Health, Safety, Environment & Security (HSE&S) as well as Employer's applicable rules, procedures or policies related thereto at no additional cost to the Employer. The costs of supplying and/or doing all such things required for the purpose shall be deemed to be included in the amounts payable under this Agreement to the Contractor. - The Employer shall periodically audit the Contractor's compliance with its HSE&S policies and conduct safety inspections as and when it deems fit. The Contractor shall ensure that Employer's recommendations in this regard are implemented without any delay. - The Contractor shall provide the Employer information about its working practices, materials and equipment and shall operate in a manner which does not compromise Employer's security or environment standards and the safety and health of its employees and other people. Contractor shall also provide the Employer with any information which it may have related to a potential or actual security threat to the Employer. - The Contractor shall certify in writing that its personnel are fully trained to execute the Works safely and shall ensure that they understand all risks and hazards associated with the Works. The Contractor shall keep records of such trainings. - The Employer reserves the right to terminate this Contract without notice to the Contractor in the event of violation of this Clause by the Contractor and related HSE&S requirements of the Employer communicated to the Contractor from time to time. - The Contractor shall pay special attention to the following environmental protection measures; - Use of clean fuels to minimize air polluting emissions. - Control of other air pollutants. - Recovery and recycling of usable materials. - Control of vehicle noise. - Control of noise from power facilities. - Limitation of Vibrations. - Preservation of natural land to the extent possible. - Preservation of archaeological Sites. - Careful handling, storage and utilization of hazardous radioactive materials, toxic chemicals etc.

Formula for Price Adjustment

The source of indices and the weightages or coefficients for use in the adjustment formula under Clause 28.8 shall be as follows:

Cost Element	Description	Weightages	Applicable index
(i)	(ii)	(iii)	(iv)
A	Fixed Portion	0.65	
b	Labour <i>[Labourer (un-skilled) per day shall be taken as representative of all the items of labour (skilled/un-skilled) deployed at site]</i>	0.12	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
c	Cement <i>[OPC cement per bag shall be taken as representative of all types of cements used at site]</i>	0.08	-do-
d	Reinforcing Steel <i>[1/2" Dia grade-40 per tonne shall be taken as representative of all types and diameters of steel reinforcement]</i>	0.10	-do-
e	High Speed Diesel (HSD) <i>[HSD shall be taken as representative of all kind of fuels used in connection with the Contract]</i>	0.05	As announced by Pakistan State Oil (PSO).
	Total	1.000	

Notes:

- 1) The base date price (or base date index) of any element shall be the price of the element for the month on the day falling 28 days prior to the latest day for submission of bids.
- 2) The current date price (or current date index) of any element shall be the price of the element for the month falling on the day 28 days prior to the last day of the period to which the particular Payment Certificate relates
- 3) Any fluctuation in the indices or prices of materials other than those given above shall not be subject to adjustment of the Contract Price.

Scope of Works**1. Location of Site:**

“State Bank of Pakistan, I.I. Chundrigar road, Karachi”

2. Major Items of Contract:

Included but not limited to.

- Dismantling Works
- Excavation & Backfilling Works
- Plain & Reinforced Concrete Works
- Steel Reinforcement works
- Masonry & Plaster Works
- Plaster Works
- Tile & Marble Works
- Carpentry & Joinery Works
- Water Proofing Works
- Plumbing Works
- Painting & Polishing Works
- Fixing of tensile fabric shed & Stainless-Steel crescents
- Electrical Works
- Lift Works
- Sound System Works
- HVAC Works

Construction Schedule

Completion / Delivery Time: 450 Days

Bidder shall provide a program in a bar-chart showing the sequence of work items by which he proposes to complete the Works of the entire Contract. The program should indicate the sequence of work items and the period during which he proposes to complete the Works including the activities like designing, schedule of submitting drawings, ordering and procurement of materials, manufacturing, delivering, construction of civil works, erection, testing and commissioning of Works to be supplied under the Contract. The proposed sequence of execution of various sections of the project shall be according to the given Key Performance Indicators (KPIs) as follows.

Sr	Description of Activity	Total Days	Start Date	Finish Date	Execution Scheduled								
					0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450
i.	Dismantling Works	60											
ii.	Excavation & Backfilling	40											
iii.	Concrete & Steel Works	300											
iv.	Masonry & Plaster Works	250											
v.	Tile/ Marble etc Works	120											
vi.	Carpentry/ Joinery Works	100											
vii.	Plumbing Works	75											
viii.	Paint/ Polish Works	100											
ix.	Electrification Works	150											
x.	Lift Works	100											
xi.	Sound System Works	150											
xii.	HVAC Works	200											
xiii.	Pavement/ Landscaping	100											
xiv.	Waterproofing Works	50											
xv.	Fixing of Tensile Fabric Canopy & SS crescents	50											
xvi.	Punch List works & Handing/Taking Over	30											

The above Key Performance Indicators should be taken into consideration by the bidder in order to execute the works.

If the above KPI is not acceptable to any bidder, the bidder will prepare its own Work Program along with detailed justification for its change. Bids without above given Work Program or bidder's own proposed Work Program without justification shall not be considered responsive.

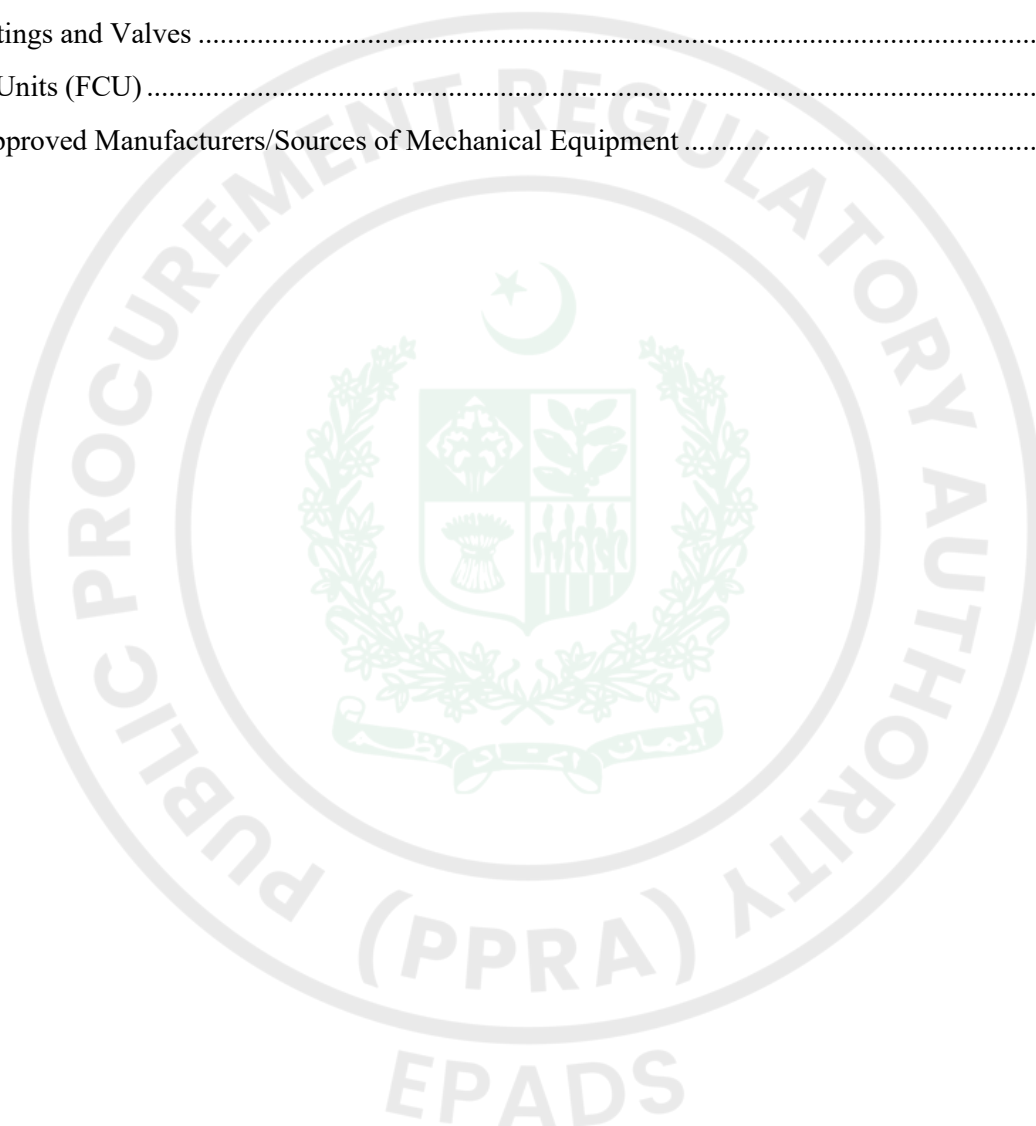
TECHNICAL SPECIFICATIONS FOR ELECTRICAL, WIRELESS AND HVAC WORKS

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The bidder shall provide technical brochures of equipment complying with technical specifications.

1. Brand Names

Equipment and materials specified with brand names have been provided to establish a standard of performance and do not necessarily indicate a preference for a particular manufacturer or material.

The names of manufacturers given below are to indicate the level of quality and performance anticipated by the Employer / Procuring Agency. Other makes may be accepted provided that the quality and performance of such equipment, in the sole opinion of the Employer / Procuring Agency, are at least equal to or better than the equipment offered by the recommended manufacturer listed hereunder.

List of Manufacturers Recommended

The acceptance of equipment/ materials offered by these manufacturers will be subject to compliance with offered models/ materials with the specifications, capacity and/ or performance requirements.

All other items not included in the list hereunder will be approved by the Employer / Procuring Agency in accordance with their compliance with the specifications, capacity and/ or performance requirements.

Onus lies with the Contractor / supplier for establishing the genuineness of any material/ product.

Following are the specifications of material. Bidder can also offer equivalent products, however, adequate documentation in the form of technical data sheets and type test certificates from independent laboratories stating the standards to which the product complies shall be furnished in the support of their being equivalent. The Employer reserves the right to ask the bidder of additional documentation in this regard.

Technical Specifications for Electrical, Wireless & HVAC Works

Product	Standards	Recommended Manufacturers
Telephony Cables (CAT-6 and 100 pair multicore cables)	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Vivanco, Clipsal, 3M, Systemax, or approved equivalent,
Analogue Telephone Set	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Panasonic, Alcatel, Uniden or approved equivalent
IP Telephone Sets	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ) Compatible with HIPATH 4000, V8 PABX	Unify, Cisco, Avaya Panasonic Or approved equivalent
LV Panels, Distribution Boards	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Hussain and Co. Unique Engineering HRA Switchgears RA Engineering OR approved equivalent
LV Circuit Breakers: ACB, MCCB & MCB	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	ABB Schneider GE OR approved equivalent
LV Cables	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ) KEMA Certified	Pakistan Cables Fast Cables New Age Cables Pioneer Cables OR approved equivalent
PVC Conduits and Accessories	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Galco Dadex Jeddah Polymer Civic

Technical Specifications for Electrical, Wireless & HVAC Works

Product	Standards	Recommended Manufacturers
Telephony Cables (CAT-6 and 100 pair multicore cables)	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Vivanco, Clipsal, 3M, Systemax, or approved equivalent,
Analogue Telephone Set	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Panasonic, Alcatel, Uniden or approved equivalent
IP Telephone Sets	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ) Compatible with HIPATH 4000, V8 PABX	Unify, Cisco, Avaya Panasonic Or approved equivalent
		OR approved equivalent
Lighting Fixture	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	Fast LED Lights Philips COARTS Britlite OR approved equivalent
Wireless Audio Conference System	As per standards and specifications mentioned in technical specifications and the Bill of Quantities (BOQ)	TOA Bosch Rest moment or approved equivalent

Section – E-01: General Electrical Requirements

FOREWORD:

This document is to describe the minimum requirements for the equipment and installations and to ensure that the Contractor is fully aware of his duties to perform the required works, in accordance with the terms of the Contract.

1.01 SCOPE OF WORK

The works related to the electrical system, which are included in the scope of this Contract, are shown in Bill of Quantities and explained in these specifications. The works shall broadly include but not limited to the following:

All material and equipment supplied by the Contractor shall be new and, in all respects, conform to the high standards of Engineering design, workmanship, performance and function as here in specified and fully meet the quality level and rugged requirements of the specifications.

The Contractor shall also be responsible to supply any other equipment not specifically mentioned in these documents but which is necessary for proper operation of the works / system, shall be considered to have been so specified and accordingly shall be provided by the Contractor as part of the Contract.

The Contractor shall be solely responsible for ensuring proper functional requirements of various equipment and shall also be responsible for furnishing any additional piece of equipment and for making modification in the equipment as desired and / or approved by the Owner or his representative, to achieve proper coordination with various equipment offered in the bid and also those installed by others.

Approval of the Contractor's supplied equipment / installation works shall not relieve the Contractor of any of his obligations or liabilities under the Contract, except insofar as provided under the conditions of the Contract.

1.02 RULES AND REGULATIONS

The entire electrical installation / work shall be carried out by licensed contractor, authorized to undertake such work under the provisions of Electricity Act 1910 and The Electricity Rules 1937 as adopted and modified up to date by the Government of Pakistan.

All works shall be carried out in accordance with the latest edition of the Regulations of the Electrical Equipment of Buildings issued by the Institute of Engineering and Technology (IET), the Contract documents, the Electricity Rules 1937 and bye-laws that are in force from time to time. Any discrepancy between these specifications and any other rules and regulations shall be

brought to the notice of Owner or his representative, and his decision shall be final and conclusive.

The Contractor shall be responsible for completing all formalities and submitting the test certificates as per prevailing rules and regulations and shall have the installation passed by the Government Electric Inspector of that region. All requirements of the Electric Inspector and the Electric Company shall be complied with.

1.03 STANDARDS

The specification recommended practices, official standards and codes the non - restrictive List of which is given below.

- International Electro-technical Commission (IEC)
- British Standards (BS)
- National Electric Code (NEC)
- National Standards
- Local Electric / Utility Supply Company standards
- EN Standards for PAVA System
- NFPA 72
- EIA/TIA Standards for ICT System

In the event of conflict between standards, the most stringent shall prevail.

Whenever the electrical equipment to be installed, does not hold national standards, the Contractor shall take into account the specific standards chosen by the Owner and make sure that the equipment he has to install, meets these standards.

In addition, even if no mention is stipulated in this specification, it is implied that the equipment be tropicalized, if required, by the conditions of the site of installation.

In any case, the standards and codes to be taken into consideration are those in force at the date of delivery.

1.04 INSTALLATION AND SERVICE CONDITIONS:

1.04.1 Site Conditions:

Technical Specifications for Electrical, Wireless & HVAC Works

All material and equipment supplied and installed shall be designed, manufactured and tested to meet the following ambient conditions unless specifically stated otherwise for any material / equipment:

- | | | | |
|----|-------------------------------------|---|-------------|
| a. | Maximum outdoor ambient temperature | : | 45 degree C |
| b. | Minimum Indoor ambient temperature | : | 0 degree C |
| c. | Maximum relative humidity | : | 90 % |
| d. | Minimum relative humidity | : | 26 % |

1.04.2 Service Conditions:

Equipment shall be designed and built for continuous service with a minimum of supervision and maintenance.

1.05 DOCUMENTS TO BE SUBMITTED:

The contractor shall submit following documents at the time of approval bidding or as per instruction of the Engineer:

1. Documents and certificate to be submitted for approval, including:
2. Warranty
3. Packing and delivery
4. Marking
5. Testing, including:
 - Type tests.
 - Routine Tests.
 - Special test.
6. Technical data sheet
7. Maintenance and operation manual
8. Training Program

- END OF SECTION -

Section – E-02: Main Distribution Board

1.1. SUMMARY

Metal-enclosed, low-voltage, power circuit-breaker switchgear rated 1000V and less for use in ac systems.

1.1 Purpose

This section together with its appending documents, covers the minimum requirement for the design, construction and performance of factory built assemblies of LV switchboard.

1.2 Scope of Work

The work under this scope consists of supplying, installation, testing, connecting and commissioning of all material and services of the complete switchboard as specified herein and/ or shown in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with others for exact route, location and positions of electrical lines and equipment.

1.2. STANDARDS

Particular reference shall be made to:

IEC 60027	Letter symbols to be used in Electrical technology.
IEC 60051	Direct setting electrical measuring instruments.
IEC 60073	Color for indicator lights and push bottoms
IEC 60158	LV Switch gear and control gear.
IEC 60185	Current Transformers.
IEC 60186	Voltage Transformers.
IEC 60269	LV fuses.
IEC 60439	Factory built assemblies of LV switch gear and control gear.
IEC 60529	Degree of protection provided by enclosures.
IEC 60617	Graphic symbols for diagrams.
IEC 60947-2	LV Switch gear and Control gear.
BS 951	Earthing Clamps
BS 1433	Hard drawn bare copper conductor for earthing.
BS 2874	Nuts, Bolts, Washers and Rivets for use on copper.
BS 6346	PVC Insulated Cables.

CP 1013	Earthing
---------	----------

Any other standard referred to in above standards or these specifications.

1.3. PRODUCTS

A Ratings:

- (a) Nominal System Voltage: 415 V, 3 phase
- (b) Fabrication: Factory assembled and tested and complying with IEEE C37.20.1.
- (c) Indoor Enclosure: Steel.
- (d) Outdoor Enclosure: Galvanized steel.
 - Isolators.
 - Louvers for air circulation.
 - Hinged front door, interior light, and duplex receptacle.
 - Weatherproof internal aisle construction, with aisle access doors, space heaters, lights, and duplex receptacles.
- (e) Section barriers between main and tie circuit-breaker compartments.
- (f) Bus isolation barriers.
- (g) Circuit-breaker compartments.
- (h) Removable, hinged, rear covers panels.
- (i) Auxiliary Compartments:
 - Utility metering compartment.
 - Bus transition sections.
 - Incoming-line pull sections.
 - Hinged front panels

1.4. COMPONENTS

A Instrument Transformers:

- Potential transformers.
 - Current transformers.
- (a) Instruments: Multifunction digital-metering monitor.

- (b) Relays.
 - (c) Surge arresters.
 - (d) Control Power Supply: Dry-type transformer, 120 V.
 - (e) Circuit Breakers:
 - (f) Operating Mechanism: Mechanically and electrically trip-free, stored-energy type.
 - Normal closing speed.
 - Slow closing speed.
 - Stored-Energy Mechanism: [Manually] [Electrically] charged.
 - Operation counter.
 - Solid-state trip devices.
 - Auxiliary contacts.
 - Padlocking provisions.
 - Operating handle.
 - Electric close button.
 - Mechanical interlocking.
 - Key interlocks.
 - Under voltage Trip Devices: [Instantaneous] [Adjustable].
 - Shunt-trip devices.
 - Fused circuit breakers.
 - Indicating lights.
- B** Circuit-Breaker Removal Apparatus:
- Portable, floor-supported, roller-base carriage.
 - Identification: system power riser diagrams.

1.5. FIELD QUALITY CONTROL

Testing: [Contractor].

1.6. Installation and Service Conditions

For general site conditions refer to Section - E- 1, Clause 4.

Switchboard shall be installed indoor. The equipment shall be capable of operation under the prevailing ambient conditions without any deleterious effect of any kind. Switchboard shall be suitable for continuous operation at full load rating under combined variation of both voltage and frequency as stated in Section - E-1, Clause 5.1.

Transient voltage depression down to 80% of rated voltage shall not affect the performance of the equipment and dip voltage must be within permissible limit.

2. MAIN ELECTRICAL CHARACTERISTICS

2.1. Power Supply System

Main characteristics of power supply system applicable to all switchboards are:

- Voltage 400 V $\pm$ 10%
- Phase 3 ϕ , 4 Wire
- Frequency 50 Hz $\pm$ 1 Hz
- Neutral system Solidly grounded
- Peak asymmetrical SCC To be specified by the bidders
- RMS symmetrical SCC To be specified by the bidders

Main characteristics of auxiliary supply system are:

- Control / Command system 24 VDC
- Space heater system 230 VAC

2.2. Ratings

The equipment shall be capable of carrying the specified current on a continuous basis of 24 hours / day, without exceeding the permitted temperature.

The current ratings of all equipment must be guaranteed at the specified design temperature. Equipment shall be fully rated and constructed for withstanding, making and breaking the specified short circuit duty.

3. GENERAL REQUIREMENTS

3.1. Concept

The Switchboard shall be of standard, prefabricated metal clad cubicle(s), floor mounting type, totally enclosed, dead front, dust tight and vermin proof requiring front access only. It shall complete in all respects with material and accessories, factory assembled, tested and finished all according to the specifications and to normal requirements. For indoor installations the international classification shall be IP42.

The Switchboard with all components and accessories shall be suitable for front operation only and shall:

- have a rated service short service breaking capacity, I_{cs} at 400 VAC, conforming to IEC 60947-2 unless otherwise stated in BOQ

Technical Specifications for Electrical, Wireless & HVAC Works

- be provided with adequate clearance from live parts so that flash over cannot be caused by switching, vermin, pests, etc.
- have all components rated for insulation class 600-volt minimum.
- be designed for flush mounting of all instruments on the front side.
- have all incoming or outgoing connections from the top or bottom as required. Have the components mounted so as to facilitate ease of maintenance from the front. Have common lamp test facility for all lamps.
- have wiring diagram on the inside of door of the switchboard. Be labeled with nameplate on the front side of door.
- have arrangements for extension of switchboard in future.

3.2. Accessibility

Switchboard shall preferably be arranged for bottom cable entries. Adequate space must be provided for cable entries and termination. It shall be possible to work easily and safely on cable of a main or control outgoing circuit in OFF position with the remainder of the board alive.

Adequate system shall be provided for installation and clamping of cables inside the cable compartment. Position of terminals and cables shall allow use of clamp ammeter.

Power and Control cable termination shall avoid obstruction to other cable termination and provide easy access for terminating cables. Cable supports shall be provided to avoid undue strain on cable termination. Easily accessible locations shall be reserved in the compartment for measuring transformers.

3.3. Name plates

On the front side, a name plate shall be provided at the top to indicate the name of manufacturer, system voltage and frequency and the current carrying capacity of switchboard.

Each breaker shall have a circuit identification label fitted below the breaker aperture or as suitable.

Drawing indicating the branch circuit names, breaker elements, cable sizes and connecting services shall be placed in a clear plastic pocket provided at the back of the front access.

Labels described shall have block letters 7 mm high on a white back ground, to be made from Traffolite and be fixed with screws.

Each incoming and outgoing circuit shall also be labeled with name plate 75 mm x 15 mm, as described above on the front side of door.

4. MECHANICAL DESIGN

4.1. General Construction

The switchboard shall be fabricated, welded; grinded, finished with angle iron framework and cladded with 14 SWG MS sheet, to form a rigid, free standing, flush mounting fronted assembly.

It shall be suitably divided into panels and compartments for accommodating the required number of circuit components, instruments and accessories. Each compartment shall be fully partitioned from its neighbor both horizontally and vertically, allowing safe cable routing / termination without shutting the switchboard down.

All live parts within cubicles, compartments or modules, which have to be accessible during normal maintenance operations, shall be adequately protected and / or barred to ensure protection of works and to avoid accidental contact. Barriers may be rigid, transparent, insulating material fitted with warning labels.

The doors shall be provided with hinges on the left-hand side and locking handles on the right hand side for fastening the door. The front assembly shall be fastened to the enclosure by means of self-locating fasteners for quick and easy fixing. The front and back door will not be exhaust fan/louvered, since the main door of electrical room has a louvered door so internal room temperature would be maintained.

All holes, cutouts shall be tool or jib manufactured and free from burrs and rough edges. All structural components shall be of standardized design to provide complete uniformity and interchangeability of common parts. Removable gland plates shall be provided at top and / or bottom as required.

The switchboard shall be supplied complete with foundation bolts and other installation materials as recommended by the manufacturer. Proper size cable clamping channels with galvanized steel clamps and brass cable clamps respectively for unarmored and armored cables shall be provided.

The cabling inside the Switchboard shall be suitably numbered and harnessed by means of straps or cords. Wiring to door mounted components shall be in flexible PVC conduit. All indicating, control and selecting equipment shall be suitably arranged and clearly labeled with indelible labels indicating the rating of fuses, switches, etc.

All metal work of the switchboard shall be cleaned down to bare shining metal, phosphate and the surfaces chemically prepared for powder coating. Then these shall be coated with powder of color RAL 7032 and then baked in oven. The thickness of powder coating shall not be less than 120 microns.

4.2. Bus Bars

Bus bars and droppers supported on non-hygroscopic material are to be high conductivity electrolytic tinned copper, completely isolated and mechanically braced and rated to withstand the specified short circuit currents for one second duration.

Bus bars and droppers shall be housed in a separate compartment and shall be clearly marked with their respective colors. Bus bars shall be provided for three phases, neutral and multi-terminal earth. The temperature rise shall not exceed 50 degree centigrade

at rated current. Neutral bus assembly shall consist of outgoing screw terminals with one terminal for every MCCB / MCB.

Neutral Bus bar should be of same ampere rating as phase bar.

Removable metal covers on the bus bar chamber shall be provided with suitably sized labels at regular intervals, fixed with self-tapping screws and warning of live metal work.

All bus connectors shall be tinned plated connections and joints. Horizontal bus bars shall be of the same current rating throughout their length.

4.3. Earthing

A copper earth bar of suitable section for the specified fault level shall extend the entire length of the Switchboard. Provisions shall be made for possible future extensions at both ends.

Earthing facilities shall be provided on each incoming and outgoing unit to permit earthing of the connections.

All metallic non-current carrying parts of the Switchboard shall be bonded together and connected to the Switchboard's earth bar.

Each circuit wiring shall be green / yellow color. Earthing mass continuity between withdrawable parts and fixed frame shall be correctly ensured whatever the withdrawable part position.

Provision shall be made adjacent to cable termination for earthing cable armor to the earth bus bar.

Earthing switch shall be provided wherever mandatory as per rules and regulations / codes and standards and shall be manually operated. An interlocking system shall provide the following locking and safety functions:

- Impossibility of closing the earth switch if the switching device is closed.
- Visual check of earthing switch positions to be possible.
- Possibility of locking the earthing switch operating handle in open and closed position.
- The earthing of the bus bar shall be done manually by the operator without provision of general earthing system.

5. DISTRIBUTION BOARDS

The enclosure of the LV Distribution Board shall be Surface Mounted, fabricated from electro-galvanized / zinc coated sheet steel.

The LV Distribution Board shall be fabricated with 16 SWG sheet steel recess mounting. All components shall be installed on a common component mounting plate made of 14 SWG sheet steel inside the enclosure and protected from the front with screwed sheet steel front plate. The door and dead front covers shall be made of 14 SWG sheet steel. The door shall be fully gasket

with hinges on the left hand side and locking handle on the right hand side for fastening the door. The locking handle should be detachable. The dead / front assembly shall be fastened to the enclosure by means of self - locating fasteners for quick and easy fixing.

The distribution board shall be supplied complete with all installation materials as recommended by the manufacturer. The incoming and outgoing cable connections shall be according to the wiring requirements. If required, an adapter box for accommodating the cables and conduits may be provided. The box shall be of the same material and finish as the Distribution Boards.

An earth bar or terminal strips shall be provided for connection of incoming and outgoing earth conductors. The earth bar or terminals shall be permanently connected to the body of Distribution Boards at two points. Flexible copper strip shall be provided for earthing of the door of Distribution Board.

Neutral bus assembly shall consist of outgoing screw terminals with one terminal for each MCB. All holes, cutouts, etc., shall be tool or jib manufactured and free from burrs and rough edges. Removable gland plates shall be provided at both the top and / or bottom, as required.

The cabling inside the distribution board shall be suitably numbered and harnessed by means of straps or cords. Wiring to door mounted components shall be in flexible PVC conduit. All indicating, control and selecting equipment shall be suitably arranged and clearly labeled with indelible labels indicating the rating of fuses, switches, etc.

All metal work of the distribution board shall be cleaned down to bare shining metal, phosphate and the surfaces chemically prepared for powder coating. Then these shall be coated with powder of color RAL 7032 and then baked in oven. The thickness of powder coating shall not be less than 120 microns.

6. COMPONENTS

The switchboards shall be provided with all components as specified in BOQ as necessary for the satisfactory operation of the Switchboard and of the electrical system. All components should comply with IEC 60947-2. Typical specifications are given hereunder:

6.1. Air Circuit Breaker (ACB)

Air circuit breaker should be three poles / four poles as mentioned in drawing suitable for making and breaking a fault condition. Operating mechanism shall be manually or motor operated charged spring with front drive grip handle. These shall be locally operative. Mechanically operative ON-OFF-OFF indicators positively driven in both directions shall be provided to indicate the position of the unit.

Overload and over current features / relays shall be of an adjustable, manually resettable type, according to manufacturer's standard range.

Each ACB shall have built in tester with the selection of Trip or Non-Trip Functions. Also with the facility of testing the ACB in field from single phase (220VAC) supply only. Each of the above function shall have separate LED Indicators and Alarm switches for trip monitoring of Overload, Short circuit, Pre trip alarm and Ground Fault. ACB shall be having Trip Memory.

The Breaking Capacity of ACB shall be 65KA. ACB breaking capacity shall be; $I_{cu}=I_{cs}=I_{cw}$.

The circuit breaker shall have two normally open and two normally closed auxiliary contacts rated for 10 Amps. 230 VAC. The circuit breaker shall also provide for ON-TRIP-OFF indicating lamps. The circuit breaker shall have specified rupturing capacity without the use of back-up fuses. Auxiliary release and trip coils shall be provided for desired operation and / or interlocking as shown and / or stated on to in BOQ

6.2. Molded Case Circuit Breaker

These shall be three pole 400 / 500 volts rating shown in BOQ. The breakers shall have both time delay over current and instantaneous short circuit protection.

The MCCBs shall be installed such that their switching levers are accessible through the dead front plate for operation. Circuit numbers / designation on all circuits shall be conspicuously marked to facilitate connection and maintenance.

The breaker shall have quick make - quick break toggle mechanism with positive 'ON', 'OFF' and intermediate 'Tripped' positions.

Trip mechanism shall be trip free on overload or short circuit ensuring that the breaker will not close / remain close even if the close command is given while the circuit breaker has tripped due to short circuit or continuing overload.

6.3. Miniature Circuit Breaker (MCB)

The MCBs with current rating from 3 to 80 amperes shall be conforming to BS EN 60-898 or IEC 60947-2. The circuit breakers shall be suitable for DIN-rail mounting, maintenance-free and fully tropicalized.

The MCBs shall be designed for horizontal or vertical mounting, or reverse feeding, without any adverse effect on electrical performance.

The operating mechanism shall be quick make, quick break type, trip free, with all poles opening and closing simultaneously (except for the neutral pole, which if required shall be of the advance-closing and late-opening type). The operating toggle shall clearly indicate the ON and OFF/TRIP positions.

The individual operating mechanism of each pole of a multiple MCB shall be directly linked within the MCB casing and not by the operating handle.

Each pole of the MCBs shall be provided with bimetallic thermal element for overload protection and a magnetic element for short circuit protection.

6.4. Load Break Switches

Load Break Switches and contractors shall be of AC3 type for motor loads. Air circuit breakers above 630A shall be housed in separate cubicles. Aluminum plate shall be provided for cable entry to ACBs / MCCBs cubicles of 630A and above rating.

7. PARTICULAR COMPONENT REQUIREMENTS

7.1. Current Transformers

Current transformers shall comply with the requirements of IEC 60185 (or equivalent).

Current Transformers shall be polyester resin insulated, ring type, air cooled having transformation ratio as indicated in BOQ. The Current Transformers shall be of suitable burden having accuracy class 1.0. The Current Transformers shall have rated secondary current as per the drawing as required.

Current Transformers shall mechanically and thermally withstand the specified short circuit capacity.

Test terminal blocks shall be provided for current Transformer secondary circuits having short circuiting provisions to allow portable apparatus to be connected.

7.2. Voltage Transformers

Voltage transformers shall comply with the requirements of IEC 60186 (or equivalent) and shall be of the same accuracy class as Current Transformers.

Voltage Transformers shall be equipped with primary fuses with an interrupting capacity of the incoming circuit breakers. Test terminal block shall be provided for each Voltage Transformer system.

7.3. Ammeters and Voltmeters

Indicating instruments shall be semi-flush Switchboard type, digital. The front dimensions shall be 144 x 144 mm for instruments on incoming side and 96 x 96 mm on all outgoing circuits.

Indicating instruments shall be 1.0 class percent of full scale basic accuracy class in accordance with IEC 60051.

The ammeter shall be suitable for connection to 5 Amp. Secondary of Current Transformer or directly through shunt.

7.4. Selector Switches

Ammeter and voltmeter selector switches shall be complete with front plate, grip handle, R-Y-B and OFF position for ammeter and RY-YB-BR-RN and OFF positions for voltmeters.

The selector switches for controls shall be rotary cam type and shall be provided complete with knob and front plate, showing all positions as required.

7.5. Push Buttons

The push buttons shall be momentary make / break contact type (normally open / normally close) and suitable for flush mounting. The push button for ON and OFF switching shall be red and green respectively.

7.6. HRC Fuses

HRC Fuses shall be provided complete with fuse bases, fuse, etc. The fuses shall have a fusing factor as specified for class QI in accordance with BS 88.

7.7. Pilot Lamps

Switchboard shall be provided with LED type phase indicating pilot lamps. The lamps shall be rated for 250 volts supply and suitable for flush mounting. The front of the lamps shall have colored rosettes for identification of phases.

7.8. Secondary Wiring

All wiring shall be copper conductor, thermoplastic insulated, at least 1.5 sq. mm flexible, neatly arranged and clipped in groups.

Each conductor and its termination are to be identified and marked with numbered ferrules. All live terminals are to be shrouded.

Secondary wiring for Current Transformers shall be carried out with not less than 2.5 sq. mm. Terminals shall be specially marked to avoid opening of the circuit by accident.

8. INSTALLATION

The LV Switchboard shall be installed at location shown on the drawing. The Contractor shall ensure coordination with civil works for providing any openings, holes, etc. to avoid any breakage to completed works. In case the provisions in civil works for the installation of electrical equipment are not made or made incorrect the same shall be rectified by the Contractor at his own cost and to the satisfaction of the Engineer In-charge. The Contractor shall provide foundation bolts and grout them in cement concrete floor using non-shrinkable material with the approval of Engineer In-charge.

All installation material for physically erecting the Switchboard, such as bolts, nuts, washers, supporting steel, etc., shall be provided and installed by the Contractor. The Switchboard shall be installed upright and in level and shall be firmly and rigidly bolted to the floor and concrete supports.

The switchboard shall be completely erected as per manufacturer's instructions and as approved by the Engineer In-charge. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking provided by the manufacturer for safe transportation shall be released only after the switchboard is erected in position. The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armor shall be connected effectively to ground.

The Switchboard body shall be connected to earth as per instructions given in section "Earthing" of these specifications. The Switchboard shall be tested and commissioned in the presence of the Engineer In-charge. The tests to be carried out shall be tested before energizing as per instructions contained in the article "Testing" of General Specifications of Electrical Works, of these specifications.

Note: Shop drawings of Distribution Boards should be submitted for review and approval prior to proceed further.

- END OF SECTION -

Section – E-03: Distribution Boards

1. SUMMARY

Service and distribution switchboards rated 600 V and less.

2. PRODUCTS

- A. Manufactured Units: front connected, front accessible with panel-mounted / fixed / individually mounted main device and panel-mounted branches.
- B. Manufactured Units: front and side accessible with fixed, individually mounted main device and panel mounted branches.
- C. Manufactured Units: front and rear accessible.
 - i. Main Devices: Fixed, individually, Draw out mounted.
 - ii. Branch Devices: Panel, individually, fixed and individually compartmented
 - iii. Nominal Voltage: 230/ 400V
 - iv. Main-Bus Continuous: 600A
 - v. Enclosure: Steel, NEMA Compliant
 - vi. Barriers: Between adjacent switchboard sections.
 - vii. Insulation and Isolation: Main bus of main section and main and vertical buses of feeder sections.
 - viii. Isolator.
 - ix. Utility metering compartment.
 - x. Bus transition and incoming pull sections.
 - xi. Removable, hinged rear doors and compartment covers.
 - xii. Hinged front panels.
 - xiii. Pull box on top of switchboard.
 - xiv. Buses and Connections: Three phase, four wire; Copper, Tin plated Copper / Aluminum
 - xv. Future device provisions.
 - xvi. Bus-bar insulation.

- D. Over current Protective Devices:

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- 1) Molded-Case Circuit Breaker: NEMA Compliant; thermal-magnetic adjustable / instantaneous-trip, electronic trip, current-limiting and integrally fused types.
 - i. Lugs: Mechanical, Compression style.
 - ii. Ground-Fault Protection: Integrally, Remote mounted.
 - iii. Communication Capability: Circuit-breaker-mounted, Universal-mounted, Integral, Din-rail-mounted, communication module.
 - iv. Shunt Trip: Set to trip at 55 / 75 percent of rated voltage.
 - v. Under voltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional (field-adjustable 0.1- to 0.6-second) time delay.
 - vi. Key interlock kit.
 - vii. Zone-selective interlocking.
- 2) Enclosed, Insulated-Case Circuit Breaker: Fixed mounting.
 - i. Two-step, stored-energy closing.
 - ii. Microprocessor-based trip units.
 - iii. Remote trip indication and control.
 - iv. Integral communication module.
 - v. Key interlock kit.
 - vi. Zone-selective interlocking.
 - vii. Control Voltage: 250V |AC, 110V DC
- 3) Bolted-Pressure Contact Switch: Rotary-mechanical-bolting action, with auxiliary switches, ground-fault relay, and open-fuse trip device.
- 4) High-Pressure, Butt-Type Contact Switch: Butt-type contacts, with auxiliary switches, ground-fault relay, and open-fuse trip device.
- 5) Fused Switch: NEMA Compliant
- 6) Instrumentation:
- 7) Instrument Transformers: NEMA and IEEE Compliant
 - i. Potential transformers.
 - ii. Current transformers.
 - iii. Control-power transformers.
 - iv. Current transformers for neutral ground and ground-fault current sensing.
 - v. Multifunction digital-metering monitor.
 - vi. Ammeters, voltmeters, and power-factor meters.
 - vii. Instrument switches.

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- viii. Feeder ammeters.
 - ix. Watt-hour meters.
 - x. Recording demand meter.
- 8) Control Power: 230 V with electrically / mechanically interlocked main and tie circuit breakers].
- 9) Accessories:
- i. Accessory set including tools.
 - ii. Portable test set.
 - iii. Circuit-Breaker Removal Mechanism: Portable elevating carriage, Overhead, mounted at top / front of switchboard.
 - iv. Spare-fuse cabinet.
 - v. Fungus proofing.
- 10) Identification: internally affixed schematic diagrams.

3. FIELD QUALITY CONTROL

Testing: Certifications by Principal, Contractor engaged agency, Factory acceptance testing

- END OF SECTION -

Section – E-04: Internal Lighting

1.0 SCOPE OF WORK

The work under this section consists of supplying, installation and commissioning of all material and services of the complete light fixtures as specified herein and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact route, location and positions of light fixtures.

The light fixtures with accessories shall also comply with the General Specifications for Electrical Works, and with other relevant provisions of the Tender document.

2.0 GENERAL

The description of light fixtures in given Bill of Quantities, and stated in the BOQs, and relevant material are described in this section. The determination of quality is based on certified photometric data covering the coefficient of utilization, light distribution curves, construction material, shape, finish, operation, etc.

The Contractor shall submit two samples of each and every light fixture specified and obtain approval of the Owner before purchasing. The quality and finishes of local make light fixtures (if mentioned in BOQ) shall be same as that of standard manufacturer.

All fixtures shall be finished in standard color schemes as mentioned in the manufacturer's catalogue for respective fixtures, unless specifically stated in the Specifications, or Bill of Quantities or directed by the Engineer In-charge

3.0 STANDARDS

In compliance to following standards where applicable

- IEC 60598 Luminaries.
- IEC 62031 LED modules for general lighting-Safety requirements.
- IEC 62384 DC or AC supplied electronic control gear for LED modules performance requirements.
- BSEN 1838 Emergency Lighting

Any other standard referred in this specification.

4.0 LED Light Fixtures

The light fixture shall be as stated in bill of quantities. The light fixture shall be finished in standard colors unless otherwise stated or directed by Engineer In-charge. All LED light fixtures shall be of international standard and quality. The type of fixtures with manufacturer catalogue reference is given on the fixture schedule and in Bill of Quantities. Equivalent fixture may be acceptable provided that the Contractor submits for review all necessary data indicating photometric curves to show that the fixture proposed are of the same type, construction and quality.

The lamps for light fixtures shall be Light Emitting Diodes with driver and shall be supplied and installed according to the wattage as indicated in BOQ. The guaranteed life expectancy and performance of all LED lighting fixtures shall conform to L70B20 requirements at 50,000 hours or better. The Color Rendering Index (CRI) shall be $R_a > 80$ or better.

Weather proof light fixture shall comprise of cast aluminum body and gasketed clear glass cover secured to the body by means of galvanized nuts / screws to give a weather proof and water tight fit.

The gasket shall be weather resistance type.

The LED light fixtures shall be supplied complete with driver and all accessories as per light fixture schedule and shall be installed in accordance with manufacturer's recommendations and sound engineering practice.

5.0 INSTALLATION

5.1 General

The mounting heights of light fixtures are indicated in the BOQs, and position of fixtures according to the mentioned scale.

The Contractor must ensure that the light fixtures are installed uniformly with respect to the dimensions of the area. Any modifications due to site conditions may be made with the approval of Engineer In-charge. All fixtures shall be carefully aligned before fixing in position. All fixing accessories such as ceiling rose, flexible cord, lamp holder, suspension rod; pipe or chain with suitable canopy, etc., shall be provided and installed.

The wiring between terminal box and the fixture shall be carried out with 3 core 0.75 sq. mm and 1 sq. mm copper conductor, PVC / PVC cable respectively for circuits protected by 10 amps and 15 / 20 amps MCBs. The wiring inside light fixture body shall be done with heat resistant cables or PVC insulated cable in heat resistant sleeves as approved by the Engineer In-charge.

Glasses, shades, reflectors, diffuses, etc., must be in a clear condition after installation.

All light fixtures shall be earthed by an earth wire connected to the earth terminal in the fitting.

5.2 Indoor Light Fixtures

The indoor light fixture shall be installed on the surface of ceiling or wall by means of nylon plugs and galvanized steel screws, such that their back finish flush with the surface for exposed conduits and flush with outlet box for concealed conduit system. Wherever convenient, screws for fixing light fixtures shall be screwed into the holes of the outlet box. The light on false ceiling shall be installed in accordance with manufacturer's recommendations and in coordination with ceiling installation.

5.3 Outdoor Lighting

For illumination around buildings during dark hours, light fittings in various arrangements shall be provided in accordance with these specifications.

The Contractor shall essentially use the standard products of a manufacturer, regularly engaged in the manufacture of the product and shall meet the requirement of the specifications.

- END OF SECTION -

Section – E-05: Conduits and Pipes

1.01 SUMMARY

The Contractor shall ensure exact location and route of conduit and pipes in coordination with as per site requirements and as directed by the Engineer In-charge

The quality and material for the accessories of conduits and pipes such as sockets, elbows, bushings, bends, inspection / pull boxes, round boxes, etc., necessary for the completion shall be similar to that of conduit or pipes. All the accessories shall be supplied by the Contractor without any extra cost and deemed to have been included in the price of conduits / pipes.

Note: The Contractor shall ensure exact location and access panel in coordination with other services as per site requirements and as directed by the Engineer In-charge

1.02 STANDARDS

In compliance to following standards where applicable

BS 31 Steel Conduit and accessories

BS 1378 Galvanized Iron Pipes and accessories.

BS 3595 PVC Pipes and accessories.

BS 4607 PVC Conduits and accessories.

Any other standard referred to in above standards or these specifications.

- END OF SECTION -

Section – E-06: Low Voltage Cables and Wires

1.01 SCOPE OF WORK

The work under this scope consists of supplying, installation, testing, connecting and commissioning of all material and services of low voltage cables and wires and the accessories as specified herein or and given in the Bill of Quantities.

1.02 GENERAL

All multicore and single core wires for light circuits, socket outlets and circuits operating upto 250 volts shall be 300 / 500 volts grade. All single core sheathed cables shall be of 450 / 750 volt grade and upto 50sqmm and above shall be of 600/1000V. Power cables for main feeders, main to sub main feeders, power equipment, etc. shall be of 600 / 1000 volts grade. Armouring of cables shall be done with appropriate size galvanized steel wire as per codes. Cable should be capable of running 125% of full load current without any damage.

1.03 STANDARDS

Any other standard referred to in above standards or these specifications. Latest editions and amendments of the below mentioned standards and codes:

- IEC 227 : Power and Lighting PVC insulated cable.
- IEC 228 : Conductors of insulated cables
- IEC 502 : Extruded solid dielectric insulated power cables for rated voltages from 1 kV up to 30 kV.
- IEC 331 : Fire resisting characteristics of electrical cables (where specified)
- IEC 332 : Tests on electric cables under fire conditions.
- IEC 811 : Common test methods for insulating and sheathing of electrical cable.
- IEC 287 : Calculation of the continuous current rating of cables.
- BS 4066 : Test on electric cables under fire conditions.
- BS 6346 : PVC insulated cables for electricity supply.
- BS 6004 : PVC insulated cables (non armoured) for electric power and lighting.
- BS 801 : Composition of lead and lead alloy sheaths of electric cables.
- EEMUA 133 : Underground cable protected against solvent penetration and corrosive attack.
- BS 5467 : XLPE insulated armoured cables for electrical supply.

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- BS 6724 : XLPE insulated armoured Single Core PVC Insulated Copper Conductor sheathed cables.
- BS 7211 : Single Core PVC Insulated Copper Conductor non armoured cables / wires.
-

1.04 MATERIAL

A. Conductors and Cables:

Conductors: Copper (or Aluminium - only when specifically mentioned in BoQ).

- **Conductor Insulation:**

- Multi-core cables – XLPE
- Single-core cables – XLPE (PVC – only when specifically mentioned in BoQ).
- Single-core building wires up to 6 sq. mm – PVC

- **Single and Multi-conductor Cable:**

Armoured/ Unarmoured cable, Type AC, Metal-clad cable, Type MC, Mineral-insulated, metal-sheathed cable, Type MI, Nonmetallic-sheathed cable, Type NM, Type SO and Type USE with ground wire.

A. Connectors and Splices: Factory fabricated.

B. Sleeves for Raceways and Cables:

1. Steel pipe sleeves.
2. Cast-iron pipe sleeves.
3. PVC and uPVC sleeves
4. Sleeves for rectangular openings.

D. Sleeve Seals: EPDM, NBR sealing elements, plastic, carbon-steel, stainless/steel pressure plates, and carbon, stainless/steel connecting bolts and nuts.

B. CONDUCTOR MATERIAL APPLICATIONS

Feeders: Copper, Solid for 4.0 sq. mm and smaller; stranded for 6.0 sq. mm and larger. Branch

Circuits: Copper, Solid for 4.0 sq. mm and smaller; stranded for 6.0 sq. mm and larger.

1.05 CONDUCTOR AND INSULATION APPLICATIONS

A. Service Entrance: Single conductors in raceway, Mineral-insulated, metal-sheathed cable, multi-conductor cable in raceway.

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- B. Exposed Feeders: Single conductors in raceway, Unarmored cable, Metal-clad cable, Mineral-insulated, metal-sheathed cable, Nonmetallic-sheathed cable.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Single conductors in raceway, Unarmored cable, Metal-clad cable, Mineral-insulated, metal-sheathed cable, Nonmetallic-sheathed cable.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and underground: Single conductors in raceway, Underground feeder cable.
- E. Feeders in Cable Tray: Single conductors in raceway, Armored/Unarmored cable, Metal-clad cable, Mineral-insulated, metal-sheathed cable, Nonmetallic-sheathed cable.
- F. Exposed Branch Circuits, Including in Crawlspace: Single conductors in raceway, Unarmored cable, Metal-clad cable, Mineral-insulated, metal-sheathed cable, Nonmetallic-sheathed cable
- G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Single conductors in raceway, Unarmored cable, Metal-clad cable, Mineral-insulated, metal-sheathed cable, Nonmetallic-sheathed cable.
- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and underground: Single conductors in raceway, Underground branch-circuit cable.
- I. Branch Circuits in Cable Tray: Single conductors in raceway, Unarmored cable, Metal-clad cable, Mineral-insulated, metal-sheathed cable.
- J. Cord Drops and Portable Appliance Connections: Hard service cord with strain relief device at terminations to suit application.
- K. Class 1 Control Circuits: In raceway.
- L. Class 2 Control Circuits: In raceway, Power-limited cable, concealed in building finishes and in raceway/cable tray.

1.06 FIELD QUALITY CONTROL

- A. Testing: Contractor is responsible to perform all testing as per applicable standards, mentioned in Testing and Commissioning or required by the Engineer or utility company (K-Electric).
- B. Cables for Conduit Wiring: All cables / wiring in concealed or surface mounted PVC Class-D or steel conduits shall be single core PVC insulated of specified grade and size, unless specifically shown in BOQ.
- C. Cables on Surface: Cables for distribution system to be installed on surface, in cable ducts, in concrete trenches or on trays shall be single or multicore PVC insulated and PVC sheathed of specified voltage grade and size, unless specifically shown in BOQ.
- D. Underground installation: Cables for laying directly underground shall be PVC insulated, PVC sheathed and armoured with galvanized steel wire. Cables fully installed in underground ducts / pipes and mechanically protected from end to end shall be PVC insulated and PVC sheathed unless specifically shown in BOQ.

- END OF SECTION -

SPECIFICATIONS OF LED PANEL LIGHT ;

Recessed/surface mounted LED panel light of size 600 mm × 1200 mm (2 ft × 4 ft) with high efficiency LED technology, suitable for commercial and institutional lighting applications. The luminaire shall provide uniform glare-controlled illumination with low power consumption and long operational life with following minimum specifications:

Type: LED Panel Light

Size: 2 ft × 4 ft (600 × 1200 mm)

Power Consumption: 38–45 Watts

Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement

Luminous Flux: minimum 5400 lumens

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.90

Operating Voltage: 220–240V AC, 50/60Hz

Protection Class: minimum IP20

Housing: powder coated metal body

Life Span: minimum 50,000 operating hours

Warranty: minimum 2 years replacement warranty

Compliance: IEC 60598 or equivalent international standards

The rate shall include driver, mounting accessories, connectors, suspension/fixing hardware, wiring connections, testing and commissioning, and all associated works required for complete installation and satisfactory operation

SPECIFICATIONS OF COB LED STRIP/COVE LIGHTING

Flexible COB LED strip/cove lighting complete with driver, V-profile aluminium channel and diffuser, suitable for decorative and architectural lighting applications. The LED strip shall provide continuous dot-free illumination with high color consistency and uniform light distribution with following minimum specifications:

Type: Flexible COB LED Strip Light

Color Temperature (CCT): 3000K (Warm White) or approved as per site requirement

Power Consumption: minimum 10–14 W/m

Luminous Flux: minimum 700–1250 lm/m

Color Rendering Index (CRI): ≥ 80

Protection Rating: IP20 or above

LED Type: COB continuous light technology for uniform illumination

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Life Span: minimum 50,000 operating hours

Driver: suitable electronic driver/power supply compatible with strip load

Compliance: IEC/Equivalent international standards

Warranty: minimum 2 years replacement warranty

The scope includes supply of LED strip, driver, aluminium V-profile, diffuser, mounting clips, connectors, soldering, wiring, fixing, testing and commissioning, along with all accessories, consumables and labour required for complete installation and satisfactory operation,

SPECIFICATIONS OF LED PANEL SIZE 1 FT × 4 FT (300 MM × 1200 MM)

Recessed/surface mounted LED panel light of size 1 ft × 4 ft (300 mm × 1200 mm) suitable for office, commercial and institutional lighting applications. The luminaire shall provide uniform, glare-controlled and flicker-free illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications:

Type: LED Panel Light

Size: 1 ft × 4 ft (300 × 1200 mm)

Power Consumption: 30–40 Watts

Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement

Luminous Flux: minimum 3600–4000 lumens

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.90

Operating Voltage: 220–240V AC, 50/60Hz Protection Class: minimum IP20

Mounting: recessed/surface/suspended compatible

Life Span: minimum 50,000 operating hours

Compliance: IEC 60598 or equivalent international standards

Warranty: minimum 2 years replacement warranty

The rate shall include LED driver, mounting accessories, connectors, suspension/fixing hardware, wiring connections, testing and commissioning, and all associated works required for complete installation and satisfactory operation

SPECIFICATIONS OF LED DOWN LIGHT 60WATT ;

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High efficiency surface mounted LED downlight suitable for commercial and institutional lighting applications. The luminaire shall provide uniform glare-controlled illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications:

Type: Surface Mounted LED Downlight

Power Consumption: at least 60 Watts

Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement

Luminous Flux: minimum 6600 lumens

Luminous Efficacy: minimum 100 lm/W

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.90

Input Voltage: 220–240V AC, 50/60Hz

Housing Material: die-cast aluminium body

Protection Rating: minimum IP65

Mounting: surface mounted type

Driver: integral electronic driver/power supply unit

Life Span: minimum 50,000 operating hours (L70B50)

Operating Temperature: -20°C to $+40^{\circ}\text{C}$

Compliance: IEC 60598 or equivalent international standards

Warranty: minimum 2 years replacement warranty

The rate shall include supply of luminaire, driver, mounting accessories, fixing hardware, connectors, wiring connections, testing and commissioning, and all associated labour, consumables and accessories required for complete installation and satisfactory operation

SPECIFICATIONS OF LED DOWN LIGHT 12-15WATT ;

Surface mounted LED downlight suitable for commercial and institutional lighting applications. The luminaire shall provide uniform, glare-controlled and flicker-free illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications:

Type: Surface Mounted LED Downlight

Power Rating: 12–15 Watts

Correlated Color Temperature (CCT): 3000K / 4000K / 6500K

Luminous Flux: minimum 1200 lumens

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.80

Operating Voltage: 220–240V AC, 50/60Hz

Protection Rating: minimum IP20

Mounting Type: surface mounted

Life Span: minimum 25,000 operating hours

Compliance: IEC 60598 or equivalent international standards

Warranty: minimum 2 years replacement warranty

The rate shall include LED driver/power supply unit, mounting accessories, connectors, fixing hardware, wiring connections, testing and commissioning, and all associated labour, consumables and accessories required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.

SPECIFICATIONS OF ELECTRIC DISTRIBUTION PANEL (NAME: P&LDB-1)

Electric Distribution Panel (Name: P&LDB-1), Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthing braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:-

Incoming Side 1

- 01 Nos. 100 Amp Three Pole MCCB ($I_{cu}=25kA$ $I_{cs}=100\%$ of I_{cu}) adjustable type
- 03 Nos. Indication Lights
- 03 Nos. 2 Amp SP MCB
- 1 No. Multimeter with required CT's Current Measurement on common busbar

Incoming Side 2

- 01 Nos. 80 Amp Three Pole MCCB ($I_{cu}=25kA$ $I_{cs}=100\%$ of I_{cu}) adjustable type
- 03 Nos. Indication Lights
- 03 Nos. 2 Amp SP MCB
- 1 No. Multimeter with required CT's Current Measurement on common busbar

Outgoing Side 1

- 20 Nos. 20A TP MCB 10kA
- 16 Nos. 16A DP MCB 10kA

Outgoing Side 2

- 20 Nos. 10A TP MCB 10kA
- 15 Nos. 16A DP MCB 10kA

Technical Specifications for Electrical, Wireless & HVAC Works

All cable links/bus bar links must be as per outgoing load. All Circuit Breakers must be compact size, as per specifications and complying with standards, complete in all respect as directed by Engineer In-charge

The vendor must submit shop drawings for approval of the Engineer before the manufacturing of the DB.

SPECIFICATIONS OF ELECTRIC DISTRIBUTION PANEL (NAME: MDB-1)

Electric Distribution Panel (Name: MDB-1), Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthing braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:-

Incoming Side

- 01 Nos. 400 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type
- 03 Nos. Indication Lights
- 03 Nos. 2 Amp SP MCB
- 1 No. Multimeter with required CT's Current Measurement on common busbar

Outgoing Side

- 02 Nos. 250A TP MCCB 25kA
- 02 Nos. 100A TP MCCB 25kA
- 02 Nos. 80A TP MCCB 25kA
- 01 Nos. 60A TP MCCB 25kA

All cable links/bus bar links must be as per outgoing load. All Circuit Breakers must be compact size, as per specifications and complying with standards, complete in all respect as directed by Engineer In-charge

The vendor must submit shop drawings for approval of the Engineer before the manufacturing of the DB.

SPECIFICATIONS OF HAND DRYER

automatic electric hand dryer suitable for washroom applications, designed for high-speed and energy-efficient hand drying operation. The unit shall be wall mounted type with durable construction and shall meet or exceed the following minimum specifications:

Type: Automatic sensor-based hand dryer

Technical Specifications for Electrical, Wireless & HVAC Works

Operating Voltage: 220–240V AC, 50 Hz

Power Rating: 1500–2000 Watts

Activation: Infrared automatic sensing

Air Speed: high-speed drying performance

Body Material: ABS/metallic corrosion-resistant housing

Noise Level: low noise operation

Safety Features: overheating and overload protection

Mounting: wall mounted complete with fixing accessories

The scope includes fixing, wiring connection from nearby power source, testing, commissioning and all associated accessories, consumables, labour and hardware required for complete installation and satisfactory operation

TECHNICAL SPECIFICATIONS FOR PASSENGER LIFT

Machine Room Less (MRL) passenger lift of 3 stops (Ground + 2) minimum capacity 630Kg, as per EN-81 safety standards, operational on 380-415 Volts, 3-phase, 50 Hz, 3 stops, with following Minimum features:

- Permanent magnet gearless hoisting motor capable of serving Ground + 2 Floors with microprocessor control panel, Car Operating Panels (COP)
- Floor operating panels (FOP) One (01) on each lift lobby equipped with up/down stainless steel call buttons with braille and buzzer, door tracks, sills, door drive mechanism and its complete control system
- Reservation services system inside each car
- Indicator flicker and chime before car arrival (Audible alert system in the car announcing the floor that the car has arrived at)
- Automatic control of the door's operating closing time according to the kind of floor and call.
- Automatic rescue device (ARD)/Emergency Landing Device,

Technical Specifications for Electrical, Wireless & HVAC Works

- Full length light curtain, with door closing force limiting device
- Weight overload buzzer
- All safety devices as per safety standards of EN-81
- Telephone intercom system
- Alarm bell
- Voice Prompt System for blind persons indicating each floor reached
- Further equipped with lights, fan, call bell, emergency backup for lights, fan, alarm and intercom
- Operation manual, maintenance manual and circuit diagrams (English Version). Two Hard Copies & One Soft copy in USB.
- In accordance with manufacturer's standard design/drawings and confirming to Technical Specifications and Data. Submission of Shop Drawings after work order and As-Built Drawings after completion

TECHNICAL SPECIFICATIONS FOR SOUND SYSTEM

SPECIFICATIONS OF 2-WAY SURFACE MOUNT SPEAKER SYSTEM

professional 2-way surface mount speaker system suitable for auditorium, public address and background music applications, complete with mounting bracket and all associated accessories. The speaker shall be designed for wall/ceiling mounting and shall provide clear voice intelligibility and high-quality music reproduction. The speaker system shall meet or exceed the following minimum specifications:

Type: 2-way surface mount speaker system

Speaker Size: low frequency driver with high frequency dome tweeter

Continuous Program Power: minimum 150W

Rated Noise Power: minimum 90W

Sensitivity: minimum 91 dB (1W/1m)

Frequency Response: 50 Hz – 20 kHz or better

Dispersion: minimum 100° × 100° coverage or better

Mounting: wall/ceiling mountable with adjustable steel bracket

Construction: heavy-duty enclosure

Operating Temperature: -10°C to +50°C

Certification: EN54-24 certified outdoor/weatherproof version where specified

SPECIFICATIONS OF COMPACT TWO-WAY WALL MOUNT SPEAKER SYSTEM

Compact two-way wall mount speaker system suitable for auditorium, conference and public address applications, designed for wide dispersion, high speech intelligibility and high-quality music reproduction. The speaker shall be complete with mounting bracket and all associated accessories and shall meet or exceed the following minimum specifications:

Type: Two-way bass reflex wall mount speaker

Rated Input: minimum 30 Watts

Power Handling Capacity: minimum 140W continuous program

Rated Impedance: 8 Ohms with 70V/100V line transformer tapping

Sensitivity: minimum 90 dB (1W/1m)

Frequency Response: 80 Hz – 20 kHz (-10 dB)

Input Terminal: push-in terminal type

Enclosure Material: HIPS resin or equivalent high durability enclosure

Mounting: wall/ceiling mountable with adjustable bracket

SPECIFICATIONS OF TWO-WAY WEATHERPROOF MUSIC HORN SPEAKER

Two-way weatherproof music horn speaker suitable for outdoor public address and background music applications, designed for high intelligibility, high efficiency and wide area sound coverage. The speaker system shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications:

Type: Two-way weatherproof music horn speaker

Rated Input Power: 60 Watts minimum

Line Voltage Operation: 70V/100V line transformer type

Sensitivity: minimum 100 dB (1W/1m)

Maximum Sound Pressure Level: minimum 117 dB at rated power

Frequency Response: 100 Hz – 20 kHz or better

Dispersion Angle: minimum 90° horizontal × 80° vertical

Speaker Components:

Low Frequency: minimum 6-inch cone type

High Frequency: dome tweeter type

Dust & Water Protection: minimum IP66 rated

Enclosure Material: weatherproof ABS resin or equivalent

Finish: UV resistant outdoor coating

Suitable for outdoor installations including stadiums, parking areas, corridors and public spaces

SPECIFICATIONS OF WEATHERPROOF HIGH-INTELLIGIBILITY DRIVER UNIT

Weatherproof high-intelligibility driver unit suitable for public address and outdoor announcement applications, designed for use with compatible horn flare assembly. The driver unit shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications:

Type: High impedance driver unit for horn speaker

Rated Input Power: 50 Watts minimum

Line Voltage Operation: 70V/100V line system

Sensitivity: minimum 110 dB (1W/1m)

Frequency Response: 150 Hz – 6 kHz or better

Dust & Water Protection: minimum IP65 rated (with compatible horn assembly)

Impedance Selector: external tap selector arrangement

Construction: corrosion resistant housing with powder coated finish

Horn Coupling: standard threaded coupling suitable for compatible horn flare

Suitable for outdoor public address and announcement systems

SPECIFICATIONS OF WEATHERPROOF LONG HORN SPEAKER SUITABLE FOR OUTDOOR PUBLIC ADDRESS

Weatherproof long horn speaker suitable for outdoor public address, emergency announcement and mass notification applications, designed for high intelligibility and long-distance sound projection. The speaker shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications:

Type: Long horn / reflex horn speaker

Rated Input Power: minimum 30–50 Watts

Line Voltage Operation: 70V/100V line system or equivalent

High sensitivity suitable for long-range coverage

Frequency Response: suitable for speech intelligibility and announcement applications

Weatherproof construction suitable for outdoor installation
 Corrosion resistant housing and mounting hardware
 Adjustable mounting bracket arrangement
 Suitable for continuous duty operation in outdoor environments

SPECIFICATIONS OF PROFESSIONAL MULTICHANNEL DIGITAL POWER AMPLIFIER

Professional multichannel digital power amplifier suitable for auditorium, public address and professional sound reinforcement applications. The amplifier shall be rack mountable and capable of delivering high power output with low distortion and reliable continuous operation. The unit shall meet or exceed the following minimum specifications:

Type: Class-D multichannel digital power amplifier
 Channels: 4 independent output channels
 Output Power:
 Minimum 1000W × 4 channels at 4Ω
 Minimum 650W × 4 channels at 8Ω
 Bridge Mode: minimum 2000W × 2 channels at 8Ω
 Frequency Response: 20 Hz – 20 kHz (±3 dB)
 Total Harmonic Distortion (THD): ≤ 0.1%
 Signal to Noise Ratio: ≥ 100 dB
 Input Impedance: 20kΩ balanced / 10kΩ unbalanced
 Input Connectors: XLR-F balanced input
 Output Connectors: NL4 Speakon speaker connectors
 LED Indicators: Protect, Clip, Signal, Power and level indicators
 Cooling System: forced air cooling front-to-rear airflow
 Power Supply: 100–240V AC, 50/60 Hz
 Power Consumption: maximum 2000W
 Mounting: standard 19-inch rack mount type
 Construction: heavy-duty metal chassis suitable for professional applications

SPECIFICATIONS OF PROFESSIONAL MIXER POWER AMPLIFIER SUITABLE FOR PUBLIC ADDRESS

Technical Specifications for Electrical, Wireless & HVAC Works

Professional mixer power amplifier suitable for public address, auditorium, mosque and background music applications, capable of high-quality speech and music reproduction with multi-input mixing and zone selection facility. The amplifier shall be rack/table mount type and shall meet or exceed the following minimum specifications:

Type: Mixer Power Amplifier

Rated Output Power: 240 Watts minimum

Microphone Inputs: minimum 6 balanced MIC/LINE inputs

AUX Inputs: minimum 5 AUX inputs

Simultaneous Mixing Capability: minimum 9 input sources

Recording Input/Output facility

Speaker Zones: minimum 2 selectable speaker zones

Speaker Output: 100V line and 4–16Ω low impedance output

Frequency Response: 50 Hz – 20 kHz (± 3 dB)

Distortion: $\leq 2\%$ at rated output

Signal Processing: provision for equalizer/processor connection

Tone Controls: independent bass and treble controls

Indicators: power, output level and zone selection LED indicators

Input Connectors: XLR/phone jack and RCA type combinations

Cooling: convection/forced air suitable for continuous operation

Power Supply: 220–240V AC, 50/60 Hz

Mounting: rack/table mountable heavy-duty chassis construction

SPECIFICATIONS OF PROFESSIONAL COMPACT DIGITAL/ANALOG AUDIO MIXING CONSOLE

Professional compact digital/analog audio mixing console suitable for auditorium, conference, studio and live sound reinforcement applications. The mixer shall provide high-quality audio processing, multi-channel mixing capability, integrated digital effects and USB audio interfacing for recording and playback applications. The unit shall meet or exceed the following minimum specifications:

Type: Professional compact mixing console

Input Channels: minimum 16 channels comprising:

12 Mic/Line input channels

4 Mic/Stereo-Line input channels

Technical Specifications for Electrical, Wireless & HVAC Works

Microphone Preamplifiers: low-noise professional grade preamps

Auxiliary Buses: minimum 6 AUX buses

Effects Processors: dual integrated digital stereo effects processors

Effects Presets: minimum 100 factory presets and 20 user programmable presets

Equalizer: 11-band stereo graphic equalizer

USB Audio Interface: professional 4-in/4-out USB interface

Audio Resolution: minimum 24-bit / 96 kHz

MIDI Interface: integrated MIDI input/output support

Frequency Response: 15 Hz – 70 kHz or better

THD: $\leq 0.01\%$

Phantom Power: +48V selectable phantom power

Display: OLED/LCD display for effects and system settings

Outputs: balanced XLR master outputs and monitor outputs

Controls: independent channel EQ, AUX, FX and gain controls

Construction: heavy-duty compact chassis suitable for portable and fixed installations

Power Supply: 100–240V AC, 50/60 Hz universal power supply.

SPECIFICATIONS OF PROFESSIONAL DYNAMIC HEADSET MICROPHONE

Professional dynamic headset microphone suitable for speech reinforcement, auditorium, presentation and live sound applications. The microphone shall provide clear voice reproduction, high gain-before-feedback and reliable hands-free operation. The unit shall meet or exceed the following minimum specifications:

Type: Dynamic close-talk headset microphone

Polar Pattern: Cardioid (unidirectional)

Frequency Response: 50 Hz – 15 kHz

Output Connector: 3-pin XLR male balanced output

Output Impedance: 150 Ω rated or better

Sensitivity: suitable for professional speech applications

Construction: lightweight adjustable wireframe headset with flexible boom arm

Cable: attached shielded microphone cable minimum 1.2 m length

Accessories: foam windscreen and cable clip

Finish: black or approved equivalent

Operation: no phantom power required

Suitable for indoor speech, stage and presentation applications

SPECIFICATIONS OF 27U FLOOR STANDING PA EQUIPMENT RACK

27U floor standing PA equipment rack fabricated from heavy-duty steel sheet with powder coated finish and front glass door, suitable for housing professional audio and communication equipment. The rack shall be complete with ventilation arrangement, cable management provision, mounting hardware and power distribution unit (PDU). The rack shall meet or exceed the following minimum specifications:

Rack Size: 27U standard 19-inch rack

Construction: heavy-duty MS/CRCA steel sheet

Finish: powder coated anti-corrosive finish

Front Door: lockable toughened glass door

Mounting Rails: adjustable equipment mounting rails

Ventilation: fan mounting/ventilation provision

Accessories: cable manager, shelves and mounting hardware

PDU: rack mountable power distribution unit

Base: floor standing type with levelling arrangement/casters

SPECIFICATIONS OF PROFESSIONAL HANDHELD WIRED DYNAMIC MICROPHONE

Professional handheld wired dynamic microphone suitable for public address, speech and vocal applications, complete with microphone holder, cable and standard accessories. The microphone shall provide clear voice reproduction and reliable performance and shall meet or exceed the following minimum specifications:

Type: Dynamic handheld wired microphone

Polar Pattern: unidirectional/cardiod

Frequency Response: suitable for speech and vocal applications

Output Connector: standard professional audio connector

Construction: rugged metal body suitable for continuous use

Switch: built-in ON/OFF switch

Cable: shielded low-noise microphone cable

Accessories: microphone holder/clip and carrying accessories

SPECIFICATIONS OF PROFESSIONAL IMPORTED MICROPHONE STAND

Professional imported microphone stand suitable for auditorium, conference, public address and recording applications, designed for stable support and flexible positioning of microphones. The stand shall be heavy-duty construction and shall meet or exceed the following minimum specifications:

Type: adjustable floor/table microphone stand

Construction: heavy-duty steel/metal body

Height Adjustment: adjustable

Base: stable tripod or heavy round base type

Finish: black powder coated/mat finish

Thread Compatibility: standard 5/8-inch or equivalent microphone mounting thread

Compatible with standard dynamic and condenser microphones

List of Approved Manufacturers/Sources of Equipment

S. No.	Equipment / Material	Recommended
1	Commercial Hand Dryer	a) Siemens b) Falin c) Alpina d) Airmate e) World Dryer Or Approved Equivalent
2	Distribution Board Panel	a) Hussain And Co. b) Unique Engineering c) Hra Switchgears c) Ra Engineering Taj Engineering d) Pakistan A To Zee, e) Pakistan Karimi Electromech System Or Approved Equivalent
3	Electric Power Cables	Pakistan Cables Fast Cables New Age Cables or approved equivalent Pioneer Cables Or Approved Equivalent

Technical Specifications for Electrical, Wireless & HVAC Works

4	Hangers & Supports	A) Hilti B) Inka C) Sikla D) Index or approved equivalent
5	Upvc Piping	a) Nepro, Uae b) Cosmoplast, Uae c) Jeddah Polymer d) Pakarab or approved equivalent
6	Pvc Conduit For Electrical Works (Power, Control & Communication Wiring - Concealed / Recessed Application) Gi Conduit For Electrical Works (Power, Control & Communication Wiring - Surfaced / Exposed / Above False Ceiling Application)	a) Hilal, Pakistan b) Premier, Pakistan c) Dadex, Pakistan d) Iil, Pakistan e) Jeddah Polymer f) Pakarab or approved equivalent
7	Circuit Breakers	b) Schneider Electric c) ABB or approved equivalent
8	Lights	A) Philips B) Pierlite C) Osram or approved equivalent
9	Sound System	a. TOA or approved equivalent
10	Passenger Lift	a) Mitsubishi b) Schindler c) Kone d) Suzhou Fuji or approved equivalent

NB: Bidder must submit the technical submittal of each item to the Engineer In-charge for approval before delivery of any material. The Bidder shall fill the name of only one manufacturer for each equipment/material on which the tender is based. He shall be bound to supply the equipment from the same manufacturer. In case, the Bidder gives names of more than one manufacturer against any equipment, the Engineer / Owner can ask the Bidder supply the equipment from any one of them.

* All Equipment/accessories shall be procured from OEM/ OEM Authorized agent.

TECHNICAL SPECIFICATIONS FOR WIRELESS AUDIO CONFERENCE SYSTEM

S.No	Description	Specifications
1	Audio Conference Controller/Central Unit (Wireless)	Fully digital; wireless or infrared system; Connects wireless/wired units;; Individual ID assignment; Supports up to 60 units; multiple mic management modes; External mic input; IEC 60065 compliant.
2	Wireless Chairman Unit	All features of Wireless Delegate microphones; Includes Chairman priority control; IEC 60065 compliant.
3	Wireless Delegate Unit	Cordless system; 2.4GHz+/Infrared technology; battery powered, Individual gain/sensitivity control; Independent ID address and setting; Zero interference from mobile/Bluetooth; IEC 60065 compliant.
4	Power Amplifier	Power rating $\geq 120W$; at least Min. 3 mic inputs (phantom power); Min. 2 Aux/line outputs; Individual mic level controls; Master volume,.
5	Wireless Transmitter/Receiver	Signal range > 6 m; Frequency ~2.4GHz/infrared; 360-degree directional communication; Secure/digitally protected transmission.
6	Battery Charging Unit	Charges at least 6 batteries simultaneously; Easy installation/removal; LED charging indicators. Charging time not more than 5 hours, Voltage 100-240V AC input and 24V DC output with LED indicators
7	Distributor Signal Distributor	Distributor Signal distributor used to expand the number of connectable transmitter/ receiver units For 2-branch distribution
8	Batteries	DC battery, at least 2000mAh, chargeable, maximum charging time 6 hours as per international standards
9	Dual Channel Cordless Microphone	Supply of Dual Channel Cordless Microphone Set with adjustable frequencies at least 2 channels. At least 100m range Includes one dual-channel receiver and two wireless transmitters with RF carrier power management. Causes no interference to Active Mobile Phones & Video Conferencing System
10	Handheld Wireless Microphone	Supply of Handheld Wireless Microphone. Professional wireless handheld microphone with tuner, with power/battery status indicators. No interference from active mobile phones & video conferencing system
11	Ceiling Speaker	Ceiling mounted, PA/BGM use, Rated power: wide frequency 20kHz - 80kHz or higher range; 70V/100V; Sensitivity 89 $\pm$ 6dB; flush mount design
12	Audio Rack	Size to accommodate all equipment; Front mirror-locking door; Cooling fan and ventilation; Moveable mechanism.

Technical Specifications for Electrical, Wireless & HVAC Works



TECHNICAL SPECIFICATIONS FOR HVAC WORKS

Following are the specifications of material. Bidder can also offer equivalent products, however, adequate documentation in the form of technical data sheets and type test certificates from independent laboratories stating the standards to which the product complies shall be furnished in the support of their being equivalent. **Bidder must submit the technical submittal of each item to the Engineer In-charge for approval before delivery of any material.** The Employer reserves the right to ask the bidder of additional documentation in this regard.

Technical Specification Sheet for AHU

		<u>AHU-1</u>	<u>AHU-2</u>
Placement Location		ROOF TOP	4TH FLOOR
FLOW RATE (CFM)		7200	18000
AIR ON (°F)	DBT	75	75
	WBT	62.5	62.5
AIR OFF (°F)	DBT	55	55
	WBT	54.3	54.3
MINIMUM COOLING COIL CAPACITY	TOTAL MBH	170	443
	SENSIBLE MBH	205.1	515.6
WATER TEMP. °F	IN	44	44
	OUT	56	56
WATER FLOW	GPM	44.3	103.12
MAX FACE VELOCITY	FPM	500	500
ESP	Pa	500	500
MAX OUTLET VELOCITY	FPM	1,500	1,500
MOTOR WITH VFD	kW	400/3/50	400/3/50

Technical Specification Sheet for Floor Standing Fan Coil Units

FLOW RATE (CFM)			1400
COOLING COIL	AIR ON (°F)	DBT	75.00
		WBT	62.50

Technical Specifications for Electrical, Wireless & HVAC Works

	AIR OFF (°F)	DBT	55.00
		WBT	54.30
	COOLING COIL CAPACITY	TOTAL MBH	48.00
		SENSIBLE MBH	42.00
	WATER TEMP. °F	IN	44.0
		OUT	56.0
	WATER FLOW	GPM	9.60
	MAX FACE VELOCITY	FPM	500
FAN	ESP	in	0.25
	MAX OUTLET VELOCITY	FPM	1,000
	MOTOR	kW	
	ELECTRICAL CHARACTERISTICS		220/1/50

NOTES:

- 1) Contractor to calculate actual external static pressure as per site conditions and submit for engineer's approval
- 2) All Air Handling Units shall be AHRI /AMCA /Eurovent certified. Provide Proof of certification along with submittals.
- 3) Room Dimensions for AHU # 02 are 16x9x11 ft. AHU selection must be in compliance with the room dimensions so that the AHU may easily fit in the room keeping the considerations for Ducting and Operation and Maintenance Requirements in view.

Identification for MEP Systems and Equipment

1.1 EQUIPMENT IDENTIFICATION PLATES:

1.1.1 The Contractor shall provide engraved signs with screws or adhesive backing, for equipment identification, in colors and sizes approved by the Owner and MEP Works Consultant.

1.1.2 The nameplate shall be 2.5 mm thick 90 mm by 40 mm high with black face and white centre. 5.5 mm high lettering in white.

1.1.3 The terminology should be matched to schedules as closely as possible for equipment designation but capacities shall be as per actual equipment. The following data must be included

- Equipment type,
- Equipment service
- Area/zone served
- Design capacity
- Other design parameters like pressure drop, entering and leaving conditions, speed etc.

1.1.4 Equipment markers shall be installed on or near major mechanical equipment including but not limited to:

- Water softeners, condensate return units, etc.
- Main control and operating valves, including safety devices and hazardous units such as gas outlets.
- Fire department hose valves and hose stations.
- Control System equipment panels.
- Meters, gauges, thermometers, transmitters, and similar units.
- Pumps, compressors, chillers, condensers, and similar motor-driven units.
- Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
- Fans, blowers, primary balancing dampers, and mixing boxes.
- Packaged HVAC central-station and zone-type units, air handlers and condensing units.
- Tanks and pressure vessels.
- Strainers, filters, humidifiers, water-treatment systems, air separators and similar equipment.

1.2 PIPE IDENTIFICATION DEVICES

1.2.1 The Contractor shall provide pre printed snap on type, wrap around or adhesive type pipe markers that shall indicate the service by system and zone, the line contents as well as have arrows indicating the direction of flow.

1.2.2 Pipe identification markers shall be provided in all occupied and unoccupied rooms as well as in all other spaces (such as shafts) in which piping may be viewed.

1.2.3 There should be one set of identification band per pipe in each space.

1.2.4 Pipe markers shall be located in a conspicuous manner at a minimum distance of every 12 mas follows:

- Upstream of each control valve and pressure regulating valve station.
- Downstream of every pressure regulating valve station.
- Near each branch.
- On both sides of a wall, floor, ceiling, or roof within 4 feet of the barrier.
- Near all origination and termination points of all equipment (tanks, pumps, etc.).
- Near the inside and outside of concealed points.
- Outdoors at each major elevation.

1.2.5 The band shall be printed in black letters of the following sizes:

- For 80 mm pipes and larger : 50 mm high letters
- For 65 mm pipes and smaller : 25 mm high letters

1.2.6 Bands shall have backgrounds of different colours for the various service groups as follows:

	<u>Colour</u>	<u>Stripe</u>
Water, Air Cond. Chilled	Blue	Green
Water, Air Cond. Tower, Condensor.	Green	Blue
Condensate (steam) Returns	Green	Orange

Technical Specifications for Electrical, Wireless & HVAC Works

Boiler Blow down	Green	Yellow & White
Steam, Low Pressure		
- (under 137.6 kPa/20 psi)	Orange	White
Steam, Medium Pressure		
- (137.6 688 kPa/20 100 psi)	Orange	Green
Steam, High Pressure		
- (over 688 kPa/100 psi)	Orange	Black
Refrigerants	Purple	
Fuel Oils No. 3 to 6	Yellow	
Fuel Oil, Diesel, Kerosene, No. 2	Yellow	Black
Gasoline	Yellow	Orange & Black

1.3 DUCT IDENTIFICATION DEVICES

- The contractor shall provide engraved laminated plastic markers that shall include the direction and quantity of airflow and duct device (supply, return etc.)
- Stamped Letters shall be a minimum of 50mm high

1.3.1 ELECTRICAL SYSTEM IDENTIFICATION DEVICES

1.3.1.1 Identify and label all electrical, lighting, power telephone/data and security equipment" and wiring. Circuit references shall be provided on all equipment including light fixtures, power sockets, fire alarm and security devices and controllers, etc.

1.3.1.2 Nameplates for distribution boards shall indicate the panel designation and the mains voltage, phase and location of feed.

1.3.1.3 Nameplates for transformers shall indicate the transformer designation, primary and secondary voltages and power sources.

1.3.1.4 Nameplates for disconnect switches, motor Starters and contactors shall indicate the equipment being controlled, the voltage and rating.

1.3.1.5 Nameplates shall be engraved black lamicoid with white letters, at least 19 mm high for switchboards, switchgear, MCC's, transformers and panel boards, and 6 mm high for switches, motor starters, contactors and panel board branch circuits.

Technical Specifications for Electrical, Wireless & HVAC Works

1.3.1.6 Nameplates shall be mechanically attached to the equipment with round head screws. Adhesive labels shall not be accepted. All equipment on or in the panels, cabinets, switch gears, controllers, racks and consoles shall be identified by lamicoid nameplates with white letters on a black background.

1.3.1.7 Use labels for feeder conduits, power security, and telephone/data cables and conductors, and telephone/data outlets to indicate their full circuit number or identification.

1.3.1.8 Labels shall be PVC cable markers in carrier types as follows:

- Black lettering on white background, for power, lighting and security conduit and cables.
- Green lettering on white background for telephone/data distribution cables.
- Blue lettering on white background for telephone/data riser cables.

1.3.1.9 Labels shall be located at each end of the run at all junctions and pull boxes and in each termination point/block from panels, controllers, devices, etc.

1.3.1.10 Use colored paint dabs on the inside of outlet boxes and paint interior side of the panel C covers as they are installed. In ceiling spaces, provide color to outside of boxes. Paint color to match system colors as defined in "Finishes". Paint color code shall be as follows:

- Red - Life Safety System
- Pink - Intercom and Public Address System
- Black - Annunciator and Buzzer System
- Green - 220V, 1 PH Circuits
- Purple - Telephone/data Communication System
- Blue - 220 V/380 V Circuits
- Orange - Security Alarm System

1.3.1.11 Use Plastic self-adhesive tape to identify incoming utility sources, feeders, sub-feeders and busbars in each switchboard.

1.3.1.12 Unless otherwise specified, tape color code shall be as follows:

- Red - Red Phase
- Yellow - Yellow Phase
- Blue - Blue Phase
- Black - Neutral

- Green - Earth

1.3.1.13 Complete all panel board and security directories with neat, type written lists of circuit numbers and items controlled. Directories shall be typed in Word or Excel, or similar, to the approval of the Engineer, after review, submit a copy of all directories on disk to the Engineer, in addition to the copies included with the manuals and installed on site.

1.3.1.14 For direct buried cables and duct runs under paved or grassed areas, identify location with concrete markers, flush with grade on 30 m centres, and at changes in direction.

1.3.1.15 All controllers for fire alarm, security intercom lighting completed with connection drawing and riser

PART THREE EXECUTION

2.1 Where identification is to be applied to surfaces that require insulation, painting, acoustical ceiling concealment or other covering or finish, install identification after completion of covering and painting. In addition, provide pipe markers only after each line has been completed, erected, purged, tested, and/or painted.

2.2 Marking shall be placed at each side of any wall, partition or floor, at 10m intervals on all exposed piping and ductwork and at each access panel or door. Marking shall be located so as to be in full view.

2.3 Marking shall be stencilled. Use black stencils on light coloured surfaces, yellow stencils on dark coloured surfaces except for fire lines, which shall be stencilled in accordance with Civil Defence requirements. Stencils shall have distinct edges. Blurred stencils are not acceptable. The name of the service shall be stencilled fully or with abbreviations standard to the industry. Non-standard abbreviations are not acceptable. All markings shall be clearly legible from 1.5m above the adjacent floor or platform.

2.4 Access doors for fire dampers shall be clearly identified.

2.5 As an alternate to stencil, approved type markers by Industrial Safety Supply Co. or approved equivalent shall be acceptable subject to review by the Engineer In-charge

2.6 Clean faces of mechanical identification devices.

MATERIAL

Material for painting shall be of high-grade products of well-known manufacturers, and when

approved, shall be delivered to the site in original unbroken packages, bearing the maker's name and brand. Paints of approved colour only shall be used for each application.

SERVICE CONDITIONS

All finish painting will be done under this Section, except where such pieces of equipment or material are specified to be shop painted or finished by the manufacturer. Clean and leave surfaces ready for Painting.

All exposed piping and equipment to be colour coded painted.

All plants, equipment's, pumps and motors shall be provided with three coats of enamel paint in the factory and shall be carefully cleaned and oiled after installation. In case the original paint has been damaged, fresh coats of enamel paint to match the original shall be given.

Where equipment is delivered with the final paint or finish applied by the manufacturer, repaint or refinish surfaces damaged during erection of shipment, so as to match the original surface and be unobtrusive.

Pre-painted equipment by manufacturer shall be to colors selected by the Engineer from standard finishes.

Equipment items, including pumps, air moving units, un-insulated pressure vessels, unit ventilators and convectors, shall have prime and final paint factory applied. Heat resistant paint shall be used where the conditions require this.

All pumps, motors, fans and all other factory manufactured and assembled apparatus shall be factory coated with one coat of primer and one coat of machinery enamel, and after installation shall be cleaned and touched up to repair any damage incurred during construction.

Coat interior of each outdoor air chamber with two coats of odorless, rust resisting, non-scaling paint.

The Contractor shall paint all plants, equipment, ducting, piping, hangers, bracing and other surfaces exposed to air as specified and he shall also be responsible for all finish painting. The minimum numbers of coats are specified herein under but sufficient coats shall be given to achieve desired finish.

All structural steel including hangers, brackets, supports and other ferrous metals shall be shop or factory prime painted. Wherever structural steel including brackets, supports, and other ferrous metal cannot be shop or factory prime painted, wire brush to remove all traces of rust, clean off all traces of dirt, oil and grease, apply one coat of an approved rust inhibiting primer and leave ready to receive finish paint.

All galvanized black iron steel pipe work and steel fittings shall be delivered to site undamaged and free from dirt and rust, and protected by factory applied varnish, lacquer or shop/factory applied prime paint.

Touch up all bolt heads, nuts, threads and previously unpainted connections. Touch up all damaged and abraded areas on pipe work and steel after erection, and wire brush all welds and cut ends. Apply one coat of approved rust inhibiting primer and leave ready to receive finish paint.

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Do not prime paint galvanized steel, except in visible locations. Treat all damaged and unprotected surfaces of galvanized steel with a zinc rich paint to a minimum of 50 micron thickness.

Provide a heavy field coat of black asphaltum paint on all steel pipe, cradles, vibration isolating mounts, and the like, that will be encased or partially encased in building construction, set in cement or fill, before items are built into the general construction.

SUBMITTALS

The Contractor shall provide manufacturer's application directions, performance guarantee, literatures and MSDS (Material Safety Data Sheets)

ELECTRIC MOTORS

Unless otherwise specified all motors shall be high efficiency, IE3, squirrel cage induction type with standard drip proof enclosure. Motors installed exposed to the outside shall have IP65 rating. Motors exposed to the outside shall be totally enclosed fan cooled motors. All motors in non-air-conditioned space shall be suitable for 50°C operation.

Unless noted otherwise, all motors shall have Class B (130°C) Insulation and shall be designed for continuous operation at 50°C. Motors with drip-proof enclosure shall have 1.15 service factor, totally enclosed fan cooled motors shall have 1.0 service factor.

Motor connection boxes shall be located on side of motor most easily accessible for maintenance and remote from belts, gears or driven equipment, If boxes are located on, wrong side of motor they shall be relocated.

Each multi-speed motor and associated switching device shall be circuited such that the overload device in the starter protects the motor on each step of the multi-speed switch. As an alternative to this requirement the motor may have integral overload protection.

Material submissions for all electric motors shall be in accordance with the section and article 'Shop drawings' and shall also incorporate the following information.

Horsepower

Voltage

Frequency

Speed

Starting Current and Torque Characteristics

Full Load Current

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Class of Insulation
 Enclosure Type
 Service Factor
 Ambient Temperature Reference
 Type of Bearings
 Locations of Connection Box

Motors 15 hp and larger shall have heat detector protection embedded in the windings for connection into the motor control circuit. Protection shall be Siemens Thermistor: 3UN7 or approved equal. Motors up to 1 hp shall have integral thermal overload protection.

Each electric motor shall be complete with a lamaroid name plate securely fastened in a conspicuous place on the motor. The name plate shall be 2.5mm thick laminated phenolic plastic 90mm long x 40mm wide with black face and white center, 5.5mm high letters shall be engraved through to the white lamination with the following:

Motor No.
 Mechanical Equipment Driven
 Circuit No.
 Panel No.

Clean thoroughly all fixtures and equipment from grease, dirt, plaster or any other foreign material. Chrome-plated fittings, piping and trimmings shall be polished upon completion.

The leakage testing of medium pressure ductwork shall comply with the following:

Air testing during erection shall include separate leakage air tests of each complete air riser, each completed horizontal distribution system, and, after all ductwork is installed and the central station apparatus is erected, leakage testing of the pressure side of the whole system up to the inlet of the variable air volume boxes.

The leakage test of the rectangular and conduit ductwork shall be made with pressure in the ductwork maintained at approximately 0.015kg/cm.² (6in), obtained by operation of the air supply fan or, if the fan cannot be operated, by use of the test blower.

OPERATION AND MAINTENANCE INSTRUCTIONS

Three (3) copies (binded) of complete operating and maintenance instructions for all mechanical \ equipment and systems, bound in hard covered manuals, shall be supplied.

Operating instructions shall include:

A general description of the system. Equipment included, and control operation.

Instructions on how to start and stop the plant, noting any safety and/or, sequencing arrangements.

A 'trouble-shooting' table, showing where to look for trouble under various conditions of malfunction.

Operating temperatures at critical points in the systems.

Maintenance schedule shall include:

- A list of all bearings with type and period of lubrication.
- Equipment manufacturer's printed data of care and maintenance of bearings.
- System wiring and control diagrams and detailed descriptions of the operation of control systems.
- The Operating and Maintenance Instructions shall be handed to the Engineer not later than at the end of the commissioning period.

FINAL REPORT

General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing Engineer In-charge Include a list of instruments used for procedures, along with proof of calibration.

Final Report Contents: In addition to certified field-report data, include the following:

- Pump curves.
- Fan curves.
- Manufacturers' test data.
- Field test reports prepared by system and equipment installers.
- Other information relative to equipment performance; do not include Shop Drawings and product data.

General Report Data: In addition to form titles and entries, include the following data:

- Title page.
- Name and address of the TAB team.
- Project name.
- Project location.
- Engineer's name and address.
- Engineer's name and address.
- Contractor's name and address.
- Report date.

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Signature of TAB supervisor who certifies the report.

Table of Contents with the total number of pages defined for each section of the report.

Number each page in the report.

Summary of contents including the following:

- a. Indicated versus final performance.
- b. Notable characteristics of systems.
- c. Description of system operation sequence if it varies from the Contract Documents.

Nomenclature sheets for each item of equipment.

Data for terminal units, including manufacturer's name, type, size, and fittings.

Notes to explain why certain final data in the body of reports vary from indicated values.

Test conditions for fans and pump performance forms including the following:

- a. Settings for outdoor-, return-, and exhaust-air dampers.
- b. Conditions of filters.
- c. Cooling coil, wet- and dry-bulb conditions.
- d. Face and bypass damper settings at coils.
- e. Fan drive settings including settings and percentage of maximum pitch diameter.
- f. Inlet vane settings for variable-air-volume systems.
- g. Settings for supply-air, static-pressure controller.
- h. Other system operating conditions that affect performance.

System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

Quantities of outdoor, supply, return, and exhaust airflows.
 Water and steam flow rates.
 Duct, outlet, and inlet sizes.
 Pipe and valve sizes and locations.
 Terminal units.
 Balancing stations.
 Position of balancing devices.

Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

Unit Data:

- a. Unit identification.
- b. Location.
- c. Make and type.
- d. Model number and unit size.
- e. Manufacturer's serial number.
- f. Unit arrangement and class.

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- g. Discharge arrangement.
- h. Sheave make, size in inches, and bore.
- i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
- j. Number, make, and size of belts.
- k. Number, type, and size of filters.

Motor Data:

- a. Motor make, and frame type and size.
- b. Horsepower and rpm.
- c. Volts, phase, and hertz.
- d. Full-load amperage and service factor.
- e. Sheave make, size in inches, and bore.
- f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

Test Data (Indicated and Actual Values):

- a. Total air flow rate in cfm.
- b. Total system static pressure in inches wg.
- c. Fan rpm.
- d. Discharge static pressure in inches wg.
- e. Filter static-pressure differential in inches wg.
- f. Preheat-coil static-pressure differential in inches wg.
- g. Cooling-coil static-pressure differential in inches wg.
- h. Heating-coil static-pressure differential in inches wg.
- i. Outdoor airflow in cfm.
- j. Return airflow in cfm.
- k. Outdoor-air damper position.
- l. Return-air damper position.
- m. Vortex damper position.

Apparatus-Coil Test Reports:

1. Coil Data:

- a. System identification.
- b. Location.
- c. Coil type.
- d. Number of rows.

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- e. Fin spacing in fins per inch o.c.
- f. Make and model number.
- g. Face area in sq. ft..
- h. Tube size in NPS.
- i. Tube and fin materials.
- j. Circuiting arrangement.

Test Data (Indicated and Actual Values):

- a. Air flow rate in cfm.
- b. Average face velocity in fpm.
- c. Air pressure drop in inches wg.
- d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
- e. Return-air, wet- and dry-bulb temperatures in deg F.
- f. Entering-air, wet- and dry-bulb temperatures in deg F.
- g. Leaving-air, wet- and dry-bulb temperatures in deg F.
- h. Water flow rate in gpm.
- i. Water pressure differential in feet of head or psig.
- j. Entering-water temperature in deg F.
- k. Leaving-water temperature in deg F.
- l. Refrigerant expansion valve and refrigerant types.
- m. Refrigerant suction pressure in psig.
- n. Refrigerant suction temperature in deg F.
- o. Inlet steam pressure in psig.

Fan Test Reports: For supply, return, and exhaust fans, include the following:

Fan Data:

- a. System identification.
- b. Location.
- c. Make and type.
- d. Model number and size.
- e. Manufacturer's serial number.
- f. Arrangement and class.
- g. Sheave make, size in inches, and bore.
- h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

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Motor Data:

- a. Motor make, and frame type and size.
- b. Horsepower and rpm.
- c. Volts, phase, and hertz.
- d. Full-load amperage and service factor.
- e. Sheave make, size in inches, and bore.
- f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
- g. Number, make, and size of belts.

Test Data (Indicated and Actual Values):

- a. Total airflow rate in cfm.
- b. Total system static pressure in inches wg.
- c. Fan rpm.
- d. Discharge static pressure in inches wg.
- e. Suction static pressure in inches wg.

Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

Report Data:

- a. System and air-handling-unit number.
- b. Location and zone.
- c. Traverse air temperature in deg F.
- d. Duct static pressure in inches wg.
- e. Duct size in inches.
- f. Duct area in sq. ft..
- g. Indicated air flow rate in cfm.
- h. Indicated velocity in fpm.
- i. Actual air flow rate in cfm.
- j. Actual average velocity in fpm.
- k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

Unit Data:

- a. System and air-handling unit identification.
- b. Location and zone.
- c. Apparatus used for test.

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- d. Area served.
- e. Make.
- f. Number from system diagram.
- g. Type and model number.
- h. Size.
- i. Effective area in sq. ft..

Test Data (Indicated and Actual Values):

- a. Air flow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary air flow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final air flow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

K. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

Unit Data:

- a. System and air-handling-unit identification.
- b. Location and zone.
- c. Room or riser served.
- d. Coil make and size.
- e. Flowmeter type.

Test Data (Indicated and Actual Values):

- a. Air flow rate in cfm.
- b. Entering-water temperature in deg F.
- c. Leaving-water temperature in deg F.
- d. Water pressure drop in feet of head or psig.
- e. Entering-air temperature in deg F.
- f. Leaving-air temperature in deg F.

INSPECTIONS

Initial Inspection:

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After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.

Check the following for each system:

- a. Measure airflow of at least 10 percent of air outlets.
- b. Measure water flow of at least 5 percent of terminals.
- c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
- d. Verify that balancing devices are marked with final balance position.
- e. Note deviations from the Contract Documents in the final report.

Final Inspection:

After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Engineer In-charge

The TAB team's test and balance engineer shall conduct the inspection in the presence of Engineer In-charge

Engineer shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.

If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.

If the second final inspection also fails, Engineer may contract the services of another TAB team to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB team's final payment.

Prepare test and inspection reports.

OPERATION AND MAINTENANCE CHARTS

The Contractor shall supply four copies (also provide in soft copies) each of charts indicating schedule of:

- Daily start-up and shut down
- Emergency shut down

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- Servicing and Maintenance, As well as charts listing
- Equipment model and serial Nos.
- Conditions of operation
- Normal settings of automatic and safety controls
- Data of accessories
- Motors manufacturer's name and address
- Reference No. of technical and spare part catalogues.



Air Handling Units (AHU)

PART ONE GENERAL

1.1 REFERENCE

1.1.1 Conform to General Requirements and Conditions for MEP Works, Division 1 Section 01 00 00.

1.1.2 Conform to Special Instructions for Mechanical Works Section 23 05 01.

All air handling units shall be ARI, AMCA or Eurovent certified. Provide Proof of certification along with submittals.

PART TWO PRODUCTS

2.1 QUALITY ASSURANCE

Furnish Double skin Central Station Modular Air Handling Units of type, size and capacity as set forth and called for in the equipment schedules. Units shall be constructed to comply with the requirements of material and workmanship according to the latest ASME Codes or equivalent. Units shall be tested before despatch and ready for installation, and their performance certified in accordance with ARI standard 430 or equivalent.

2.2 COMPONENTS

The units shall be complete with insulated casings, water proof insulated drain pan(s), coil(s), fan(s), motor and starter, adjustable motor and fan drives, V-belts, belt guards, filters, dampers as required, access doors, mixing box(es), vibration isolators and all other items necessary for satisfactory operation.

2.3 COORDINATION

The Contractor shall verify and confirm that the dimensions of the units offered by him are suitable for installation in the space available and he shall be responsible for ensuring that the units are capable of being installed in the available space.

2.4 DELIVERY, STORAGE AND HANDLING

Units shall be delivered factory assembled with protective crating and covering and their delivery coordinated in sufficient time to allow movement into building. The unit base shall be supplied with painted lifting lugs located to suit optimum hoisting stability. Units are to be handled as per manufacturer's written rigging and installation instructions for unloading and moving to final location. Units shall be shipped fully assembled (within freight limitations) on a minimum 10-gauge galvanized steel base rail/ housekeeping pad.

2.5 EXTRA MATERIALS

Furnish extra materials described below that match products offered/installed, are packaged with protective covering for storage, and are identified with labels describing contents.

Fan Belts: One set for each belt-drive fan.

Filters: One set of filters(as specified) for each unit.

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Fan Bearing: One set for each AHU.

2.6 COMPONENT FEATURES

2.7

2.8 UNIT CASING

2.9

2.9.1 GENERAL CONSTRUCTION

Unit shall be constructed of a complete frame with removable panels. Removal of side panels must not affect the structural integrity of each module. The casing must be able to withstand up to 6 in. positive or 4 in. negative static pressure. All exterior wall panels shall be made of minimum 18 gauge G90 galvanized steel. Closed- cell foam gasketing shall be provided where modules are joined to ensure that no thermal bridge occurs.

2.9.2 BASE AND FRAME

The unit base and upper frame shall be hot dipped galvanized.

2.9.3 WALL CONSTRUCTION

Units shall be double-wall constructed to prevent fiberglass erosion into the airstream and to allow cleaning of the unit interior. Interior wall shall be a minimum of 1 inch. thick of either 20-gauge solid plate galvanized steel.

Double-wall units shall be factory insulated with insulation of minimum density 12 lb/ft³ (48 kg/m³) insulation. The insulation thickness and density is to be selected by the manufacturer to ensure that the following minimum criteria are met:

Heat Transfer Coefficient: 0.20 Btu/h ft² °F (1.15 W/m² K)

Noise Attenuation Characteristics: As per table below

Frequency (Hz)	6	12	25	50	1 k	2 k	4 k	8 k	Overall
SPL (dB)	1	11	15	25	26	27	27	27	<30

No condensation to occur on unit

Exterior when air around unit is at: 100°F and 65% RH

All connecting channels shall be so designed and to insulated create thermal bridge to prevent sweating.

2.10 DRAIN PAN

Units shall have an insulated, double wall stainless steel pan under cooling coil section(s) for drainage of condensate. Minimum insulation requirements for the drain pan are as detailed in the section on >Wall Construction=. Drain connections are to be provided on both sides of the unit.

2.11 ACCESS DOORS AND PANELS

Full sized hinged removable double-wall access doors with two step safety handles shall be provided for quick access to the interior of the unit casing. Doors attached by screws or doors not continuously gasketed are not acceptable. All doors/panels shall be sealed with closed- cell foam gasketing.

2.12 SPACER

Each unit shall be provided with a 6" spacer section installed where scheduled.

2.13 VIEW WINDOW

An 8 x 10 in. view window shall be provided on modules where scheduled.

2.14 MARINE LIGHT

A marine light shall be provided on fan and access modules where scheduled.

2.15 PAINT

Units shall be finished with two coats of baked enamel/powder coating.

2.16 FANS

2.16.1 GENERAL

Fan(s) shall be rated in accordance with AMCA Standard 210. Fan(s) shall be indirectly connected with V-belt drive and selected to produce the capacity required at the static pressure indicated.

2.16.2 TYPE

Fan(s) shall be of the fully enclosed centrifugal type, double width, double inlet, forward curved, Class I; or backward inclined, Class I or II; or airfoil, Class I or II. Fan(s) shall be statically and dynamically balanced.

2.16.3 HOUSING

Fan housing shall be constructed of heavy gauge steel equipped with intake cones designed for smooth air flow. Fan discharge shall be connected to cabinet through a 6 in. deep canvas flexible connection

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Housed fan performance shall be certified as complying with ARI Standard 430-89. Centrifugal fans shall be dynamically balanced at the factory as a complete fan assembly (fan wheel, motor, drive and belts). Fan shafts shall not exceed 75 percent of their first critical speed at any cataloged rpm.

2.16.4 DRIVE

Drive assembly shall consist of a solid steel turned, ground, polished and greased shaft with heavy duty, self-aligning, re-lubricatable ball bearings. Bearing grease zerks shall be extended to fan drive side.

V-belt drives shall be designed for not less than 150 percent of the connected driving capacity. Sheaves shall have at least two grooves, selected to drive the fan(s) at the specified RPM. Motor sheave shall be of the fixed (or adjustable) type.

Units of over 20,000 CFM (34,000 m³/h) shall be provided with a totally enclosed galvanized expanded metal belt guard. The belt guard shall be rigidly attached to the bearing support structure and have a two-piece removable front panel. A tach hole shall be provided opposite the fan shaft. The belt guard shall be a universal size to accommodate any applicable drive.

2.16.5 BEARINGS

Fans shall be equipped with self-aligning, anti-friction pillow block bearings with a minimum life of L-50 200,000 hours. Bearings shall be equipped with grease lines allowing for lubrication from one side of the fan.

2.16.6 MOTORS

Fan motors shall be Totally Enclosed Fan Cooled (TEFC) motors, foot mounted (B3) 4 pole, protection class IP54, insulation Class >F= , rated for temperature rise of 176oF, 3 phase. Motor terminals to be arranged for DOL starting upto and including 5.5 KW and Star Delta start for sizes 7.5 KW and above.

2.16.7 ACOUSTIC PERFORMANCE

Minimum acceptable fan/AHU acoustic performance shall be as indicated in table below:

Frequency (Hz)	63	125	250	500	1 k	2 k	4 k	8 k	Over 8 k
Fan Lw (dBA)	55	67	75	80	80	78	74	67	85
AHU Lw (dBA)	54	65	69	72	71	65	54	44	76
SPL* (dBA)	43	54	58	61	60	54	43	33	65

* Sound Pressure computed at 3.28 feet (1.0 m), in free field space

2.17 COILS

2.17.1 GENERAL

Coils shall be designed with aluminum plate fins and copper tubes.

Fins shall have collars drawn, belled and firmly bonded to the tubes by means of mechanical expansion of the tubes. No soldering or tinning shall be used in the bonding process. Coils shall be mounted in the unit casing to be accessible for service and can be removed from the unit either through the side or top. Capacities, pressure drops and selection procedure shall be certified in accordance with ARI Standard 410.

2.17.2 WATER COOLING COILS

Water Cooling Coils shall be supplied where scheduled and shall conform to the following minimum specifications:

Coils shall be designed to operate at 250 psig (17.5 bar) design working pressure and up to 300°F. Coils shall be tested with 325 psig (22.75 bar) compressed air underwater.

Coil circuiting shall provide free draining and venting when installed, counter flow of air and water, with water velocities not to exceed 7FPS (128 m/min) and without exceeding the water pressure drops scheduled.

All coils shall be enclosed in a coil section. Coil headers and U-bends shall not be exposed. All coils must have same end connections regardless of the number of rows deep.

Coils shall have a supply header to ensure distribution of cold water to each tube of coil. Headers shall be either round copper or cast iron. Steel pipe headers are not acceptable.

Tubes shall be 2 in. or 5/8 in. OD.

2.18 HEAT PIPE /REHEAT COILS

2.18.1 GENERAL

Furnish and install the heat recovery units of the heat pipe air-to-air type as shown in the schedules.

Heat recovery units shall transfer heat between out-going and incoming air streams in counter flow arrangement.

2.18.2 HEAT PIPE HEAT EXCHANGER

Tube core shall be ID seamless, integrally finned aluminum tube with .166 inch (.42 cm) wall thickness.

Fin surface should be integral to the tube wall and should have a minimum of .017 inch (.043 cm) between fin thickness. Fin density is 11, 9, 7 or 5 fins per inch. Fin surface from root to the tip of the fin should have a minimum of .437 inch (1.11 cm) between fin height.

Circumferential capillary wick structure shall be integral to the inside wall of the tube. Capillary structure shall not interfere with the integrity of the wall of the tube.

Working fluid used shall be selected on the basis of heat pipe operating temperature and compatibility with tube and wick materials. Tubes shall be individually processed, charged, hermetically sealed and factory tested.

The exchanger frame shall be fabricated from minimum of 14 gauge galvanized steel. The frame shall be supplied with minimum 2 inches (5.1 cm) wide flanges on all four sides. Intermediate tube supports shall be furnished as required.

A partition shall be provided to isolate the outgoing and incoming air streams; there shall be no cross contamination. The partition shall be at the center unless specified. Partition shall be fabricated from a minimum 18 gauge galvanized steel and shall extend beyond the finned surface with 4 inches (10.2 cm) flanges [2 inches (5.1 cm) to supply side and 2 inches (5.1 cm) to exhaust side]. Both front and back to be flush with the frame.

End covers shall be provided to protect tube ends. Covers shall be fabricated in 18 gauge galvanized steel.

Each individual heat pipe shall be charged and tested at the actual maximum design air temperature before being installed within the frame.

2.18.3 INSTALLATION

2.18.3.1 INSTALLATION OF THE UNIT

The unit should be installed so that both fluids will be drawn up through the recovery cell.

2.18.3.2 LEVELING EXCHANGER

The heat exchangers could be installed with a slight slope, according to the manufacturers specifications..

2.18.3.3 SUPPORTING STRUCTURE

The exchangers should be secured rigidly, not to allow more than 1/8 inch (.32 cm) total deflection. The supply duct must never be fixed directly to the frame.

A support structure could be made to slide the unit for lceaning and installation purposes.

2.18.3.4 ACCESS DOORS:

Access doors should be provided to allow periodic inspection of the exchanger and to facilitate cleaning when necessary.

2.18.3.5 DRAIN PANS:

Sloped drain pans are recommended under the entire exchanger both as a condensed collection system and for cleaning purposes.

2.18.3.6 CODE REQUIREMENTS:

The installation of the exchanger should conform to all codes, laws and regulations applying at the job site.

2.19 FILTERS**2.19.1 GENERAL**

Air handling units are to be supplied complete with filters as scheduled, and having the following minimum specifications:

2.19.2 PERMANENT FILTERS

These filters shall be 2 in. thick, efficiency upto 35% all metal viscous imprisonment type, capable of operating up to 600 FPM (182.9) face velocity without loss of filter efficiency and holding capacity. Filter media shall be layers of cleanable wire maze. Filter frame shall be constructed of galvanized steel.

2.19.3 BAG FILTERS

These filters shall be fine fiber, all glass media with spun backing to keep glass fibers from eroding downstream. Stitching method shall permit bag to retain pleat shape

without the use of wire basket support. Bag filters to be furnished with pre-filter to extend life of bag filter. Manufacturer shall supply side access filter rack capable of holding bag filters and 2 in. pre-filters.

Bag Filters are to be provided of 85% efficiency. Efficiency of filter to be determined by ASHRAE Standard 52-76. Filters shall be rated UL Class 2.

2.20 DAMPERS, MIXING BOXES AND PLENUMS

2.20.1 OUTSIDE AIR/RETURN AIR DAMPERS

Outside air/return air dampers shall be provided to modulate the volume of outside and return air. Dampers shall be of airfoil design and shall be either parallel or opposed blade type with metal compressible jamb seals and extruded vinyl blade edge seals on all blades. Blades shall rotate on stainless steel sleeve bearings. Maximum damper blade length shall be 60 in. Leakage rate shall not exceed 5 CFM/ft² at 1 in. wg and 9 CFM/ft² at 4 in. wg

2.20.2 FACE AND BYPASS DAMPERS

Face and bypass dampers shall be of airfoil design opposed blade type. Dampers shall have metal compressible jamb seals and extruded vinyl blade edge seals. Both dampers shall rotate on stainless steel sleeve bearings. Dampers shall be jackshaft driven, with both dampers mechanically linked together. Leakage rate shall not exceed 5 CFM/ft² (0.79 m³/h m²) at 1 in. wg (25.4 mm Aq.) and 9 CFM/ft² (1.42 m³/h m²) at 4 in. wg (101.6 mm Aq.).

2.20.3 MULTI-ZONE DAMPERS

Multi-zone damper section is to be designed as a single assembly with airfoil type blades. Dampers shall have metal compressible jamb seals and extruded vinyl blade edge seals. Dampers shall rotate on stainless steel bearings. Leakage rate shall not exceed 9 CFM/ft² (1.42 m³/h m²) at 1 in. wg (25.4 mm Aq.).

2.20.4 MIXING BOX

A Mixing Box module as scheduled, shall be provided by the manufacturer engineered to be used with the unit. The mixing box shall meet or exceed cataloged mixing capabilities.

2.20.5 AIR PLENUMS

Air Plenums as scheduled, shall be provided by the manufacturer engineered to be used with the unit. Plenum sections shall be provided for:

Providing an empty spacer section of scheduled length.

Providing an access into the Air handling unit complete with access door on either or both sides as scheduled.

Providing a conversion of the air supply and return configuration from front to bottom.

2.21 HEAT PIPES

Heat Pipes shall be provided to control the humidity (50 – 55 %) of FAHU'S leaving air .

Each individual heat pipe shall be charged and tested at the actual maximum design air temperature before being installed within the frame.

End covers shall be provided to protect tube ends. Covers shall be fabricated in 18 gauge galvanized steel.

Working fluid used shall be selected on the basis of heat pipe operating temperature and compatibility with tube materials. Tube shall be individually processed, charged, hermetically sealed and factory tested as per above section 2.17.3.

2.22 COMMISSIONING & TESTING

The unit shall be commissioned and tested as per the Manufacturer's recommendations. Drives shall be adjusted to provide the required air flow rate and valves shall be adjusted for the proper water flows, etc. This Contractor shall be required to carry out tests, on forms to be supplied later by the Consultants, and obtain the Consultant's approval. Suppliers representative to be present during commissioning and testing to certify that units are commissioned as per manufacturers recommendations.

PART THREE EXECUTION

3.1 INSTALLATION

Install equipment in accordance with manufacturers written instructions. Provide letter from manufacturer certifying acceptance of installation.

Provide air-handling units in accordance with air handling unit's schedule.

Submit external static pressure calculations based on actual shop drawings for review before final selection or ordering of units.

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Provide neoprene isolators between base of unit and concrete supports.

Pipe condensate pan drain outlet to floor drain complete with minimum 75mm deep seal trap.

Manufacturers authorized representative to certify installation is as per manufacturer's recommendation and assist in testing, balancing and commissioning.



HVAC Ducts and Specialties

PART ONE GENERAL

1.1 REFERENCE

- 1.1.1 Conform to General Requirements for MEP Works, Division 1 Section 01 00 00.
- 1.1.2 Conform to Special Instructions for Mechanical Works Section 23 05 01.

1.2 SUMMARY

- 1.2.1 Metal Ductwork applicable to all indoor supply, return, toilet exhaust, kitchen exhaust, parking exhaust, smoke exhaust and all duct work on roof and in shafts (including supply air, return air, exhaust air and fresh air).

1.3 SUBMITTALS

- 1.3.1 Shop Drawings: Submit duct fabrication drawings indicating:
 - Fabrication, assembly, and installation details, including plans, elevations, sections, details of components, and attachments to other work.
 - Duct layout, indicating sizes in plan view.
 - Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.
 - Manufacturer's Installation Instructions: Submit special procedures for glass fiber ducts.
- 1.3.2 Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.4 QUALITY ASSURANCE

- 1.4.1 Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.
- 1.4.2 Construct ductwork to NFPA 90A and NFPA 96 standards.
- 1.4.3 For Pre-insulated Ducts, no relevant reduction of insulation, chemical or physical characteristics of the panels to be measurable, when conveying air in the temperature range of -35°C to +110°C and pressure of 1.75kPa.

1.5 ENVIRONMENTAL REQUIREMENTS

- 1.5.1 Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.
- 1.5.2 Maintain temperatures during and after installation of duct sealant.
- 1.5.3 Protect all duct openings from dust and debris during construction.

PART TWO PRODUCTS

2.1 GENERAL

- 2.1.1 Access doors of adequate size and proper design shall be provided in all ductwork and air chambers to permit inspection and maintenance of valves, controls, dampers, coils, filters and bearings and must be shown on drawings. Access doors to be provided at 3 metre centres in Kitchen exhaust ducts to allow access for regular cleaning. No access ducts or hatches are acceptable in the Lobby area.
- 2.1.2 Manual volume dampers shall be provided in each branch duct for balancing and must be shown on the drawings.
- 2.1.3 Instrument test holes shall be provided for balancing.

2.2 MATERIAL

- 2.2.1 Ducts shall be constructed of galvanised iron unless specifically noted otherwise. conforming to ASTM A-525 and having a minimum coating of 0.275kg/m² z-27. The galvanizing shall be carefully done and the sheets shall be of such quality that they may bend flat on themselves with no fracture to the coating or the base metal.
- 2.2.2 The recommendations of ASHRAE/SMACNA shall be used as a guide for sizing, minimum gauges, bracing and construction details.
- 2.2.3 Fibreglass ducts, bearing the UL label and constructed in accordance with SMACNA standards, may be considered for use in low pressure systems.
- 2.2.4 Duct work exposed in B.O.T.H. areas shall be galvanised and not fibreglass.
- 2.2.5 GI duct work will be applicable for exhaust duct work for parking area.
- 2.2.6 Provide Welded non-corrosive exhaust ducts in steam areas.
- 2.2.7 Where duct is acoustically lined, duct dimensions shown are net, clear internal dimensions.
- 2.2.8 All round ductwork shall be shop or factory fabricated conduit "consisting of helically wound galvanized iron strips with spiral lock seam. Each duct section and fitting shall have a plain end and a belled or swaged end to permit a sliding fit with overlap not less than 100mm. Ninety degrees elbows shall have smooth center line -radius of 1.5 times duct diameter. Alternatively, they may be of five pieces construction. Forty-five degree elbows shall be of three piece construction.
- 2.2.9 All kitchen exhaust ductwork is welded steel, pitched back toward the hood with cleaning access doors every ten feet and at each elbow. No turning vanes or dampers are allowed. Fire insulation, not less than two-hour rated (or the minimum required by code), is applied to ductwork. Provide the cooking exhaust fan housing with a drain connection at the bottom to allow the cleaning solution to manually drain.
- 2.2.10 Kitchen range hood duct work shall be constructed of black iron with welded seams and liquid-tight joints. The system shall be designed in full compliance with NFPA-96 and the applicable local codes having jurisdiction. Provide 50 mm foil faced mineral wool

solution around all grease exhaust ducts with 0.8 mm aluminum jacketing and as per Ashrae/NFPA/SMACNA codes. Cleanouts and access shall be provided as per NFPA 96.

- 2.2.11 Branch duct work from moisture emitting equipment, e.g., dishwashers, pot sinks, etc., and indoor swimming pools, shall be constructed of copper, stainless steel or aluminium, with water-tight joints, pitched back toward the equipment. Electrolytic isolation shall be provided at connections to iron duct work. Fire dampers shall be provided in branches where connections are made to the Kitchen hood exhaust duct work.
- 2.2.12 Fire dampers shall be installed where required by NFPA-90A and the applicable local codes having jurisdiction and must be shown on the drawings. A schedule of fire dampers is to be provided as part of the maintenance manuals.
- 2.2.13 Flexible ducts
- Flexible Ducts shall be used as shown on drawings.
 - They shall not pass through floors or fire walls and shall not exceed 1.5 m in length. Flexible ducts shall not be installed in inaccessible locations, such as above gypsum board ceilings without prior approval from the consultant.
 - The flexible duct shall have a flame spread not exceeding 25 and smoke development not exceeding 50 per UL 723 test method.
 - Thermal resistance of duct shall be more than R-1.06
 - The flexible duct shall have an air leakage not exceeding 0.00151l/s at 11.94kPa static pressure
 - The duct shall be rated for a maximum air velocity of 12.5 m/s.
 - Flexible insulated ducts shall be UL 181 listed. Exterior jacket shall be metalized polyester vapor barrier with 2 ply black polyester core with aluminium foil exterior finish. Insulation shall be fiberglass, R-0.74 Core shall be double ply polyester laminated with carbon steel wire helix. The flexible duct shall have an inner air barrier factory applied insulation equal 40 mm thick flat insulation

PART THREE EXECUTION

- 3.1.1 All sheet metal ducts shall be as per size and location on drawings. If changes of size or location of ducts are found necessary because of building construction, these may be done with prior submission to and approval by the consultant.
- 3.1.2 All laps shall be in the direction of air flow and all edges and slips hammered down so as to leave smooth finished surface inside the ducts.
- 3.1.3 All ducts shall be braced and stiffened and shall be tight so that they will not breathe, rattle, vibrate or sag. Cross-break or transverse bead all rectangular ducts with heights or widths of 300mm or larger.
- 3.1.4 Duct sealant by an approved manufacturer shall be used. Brush joints with the compound before and again after assembly. Exposed ducts shall be sealed on the inner surfaces only.
- 3.1.5 Flexible duct connections shall be by an approved manufacturer and shall be provided at

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each building expansion joint, air handling unit and fan duct connection. Connections shall be 20 oz. minimum fire retardant canvas. For fan discharge connections in excess of 1000 Pa or where located outdoors, provide connections of fire retardant glass fibre cloth with a neoprene coating. Connection material shall be reviewed by the Engineer before installation.

- 3.1.6 Flexible duct connections shall be Class 1, corrugated aluminum flexible duct suitable for 120°C and 1.5 kPa and shall be Underwriters Laboratories listed. Flexible duct connections shall be insulated with 25mm insulation complete with vapor barrier.
- 3.1.7 Bends in flexible ducts shall have centre line radius of not less than 10 x diameter. Collars to which flexible ducts are attached shall be a minimum of 50mm in depth. Insulation and vapour barriers on factory-fabricated ducts shall be fitted over cone connection and supplementally secured with a drawband.
- 3.1.8 Where ductwork passes through a wall or floor, other than when a fire damper is required, pack around the duct using a fire resistant material to ensure a sound and air tight joint.
- 3.1.9 Access ports (32 mm round) at convenient locations in all main ducts and main branch take offs, complete airtight covers and extension sleeves through insulation shall be provided to allow air meter readings.
- 3.1.10 Manual duct dampers as shown and as required for proper balancing of the system shall be provided and installed. Dampers shall be of galvanized steel 18 U.S. ga: or heavier. Dampers for ducts up to 300mm deep shall be single blade carried on a 10mm square steel rod mounted inside the duct. Dampers for ducts of greater depth than 300mm shall be multi-blade, opposed-acting type and shall have blades mounted in 40mm channel frame, and interconnected for operation from one locking type hand quadrant.
- 3.1.11 Splitter dampers as shown and as required for proper balancing of the system shall be provided. The splitter shall be made of at least the same thickness of galvanized steel as the duct in which it is installed, down to a minimum of 20 U.S. gauge, and shall be securely hinged at the air leaving edge, and made of two thicknesses, so that the entering edge presents a round nose to the air flow. The length of the splitter shall be at least 1.0 times the width of the smaller branch duct, but in no case less than 300mm long. Splitter hinge shall be attached and hinged to the splitter near the air entering edge, and shall pass through a clamp on the side of the duct which is most accessible for adjustment, to permit positioning and anchoring of the damper.
- 3.1.12 Gravity backdraft dampers shall be multi-blade louver type, constructed of light grade aluminum. Blades shall be joined with a tie bar and have rust-proof shafts rotating in oil impregnated bronze or plastic bushings.
- 3.1.13 Motorized dampers for control operation are specified under specification Division 25, Building Management System.
- 3.1.14 Fire dampers shall be UL listed. Unless otherwise permitted by the Engineer all curtain-type fire dampers shall be Type B with curtain completely clear of the air stream. Fire dampers shall be installed the manner in which they were twisted and shall meet all applicable codes. Fusible links shall be rated for 100°C unless otherwise damper shall have the same fire rating as the wall in which they are installed Fire dampers installed in duct where air flow may still exist during a fire shall be dynamic type.
- 3.1.15 Access panels as shown on drawings and as required for convenient access shall be

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provided at all fire dampers, gravity dampers, motorized dampers, coils, fan' bearings or similar equipment requiring occasional maintenance or inspection. Panels shall be 600mm x 450mm or full width of duct if less than 450mm width. Panels shall be of double wall construction shall be internally insulated on insulated ducts. Frame shall be of structural angle welded corners, gasketed to receive the panel. Panel shall be held in place with 4 win o sash locks. All access doors for fire dampers shall be labeled "Fire Damper and their location shall be indicated on "shop" and "as-built" drawings.

3.1.16 All ductwork shall be installed securely and in a rigid manner with hangers provided as per schedules below:

1.1.1. HORIZONTAL RECTANGULAR DUCT	
Max. Duct Dimension (mm)	Hanger Construction Dimensions (mm)
Up to 500	two 25 x 16 U.S. ga. straps on 2400 mm centers with, two screws on side of duct, one on bottom
501 to 1500	25 x 25 x 6 trapeze hanger with two 10 mm rods on 2400 mm centers.
1501 to 3000	50 x 50 x 6 trapeze hanger with two 10 mm rods on -2400 mm centers.
3001 to 6000	63 x 63 x 5 trapeze hanger with two 10 mm rods on 1200 mm centers.

1.1.2. HORIZONTAL ROUND DUCT if any	
1.1.3. Duct Diameter, 41 (mm)	1.1.4. Hanger Construction Dimensions (mm)
up to 150	one 25 x 16 U.S. ga. hanger ring supported from one 25 x 16 U.S. ga hanger strap on 2400 mm centers.
151 to 450	one 25 x 14 U.S. ga. hanger ring supported from one 25 x 14 ga. hanger strap on 2400 mm centers.
451 to 900	one 25 x 12 U.S. ga. hanger ring supported from one 25 x 12 U.S. ga hanger strap on 2400 mm centers
901 to 1200	one 38 x 12 U.S. ga. hanger ring supported from one 38 x 12 U.S. ga. Hanger strap on 2400 mm centers
1201 to 2100	two 38 x 12 U.S. ga. hanger connected to the 32 x 32 x 3 mm angle girth reinforcing of duct, hangers on, 2400 mm centers

3.1.17 All vertical ducts shall be supported at each floor with angles, riveted to the ducts.

3.1.18 Construct low pressure rectangular duct as follows:

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Low pressure ducts: duct velocities less than $0.944\text{m}^3/\text{s}$ and static
Pressures in duct 5.97 kPa or less.

Dimension Longest Side (mm)	Sheet Metal all 4 sides (U.S. g.a.)	Reinforcing Between Joints (Angle)	Joints and Reinforcing at Joints	Height of Standing Leg (mm)
0 to300	24	None	Drive slip(sides only) Plain "S" Slip	25
301-450	24	None	as above	25
451-760	24	25 x 25 x 3 at 1500 centers	Hemmed "S" Slip Bar Slip3040 centres	25
761-1060	22	25 x 25 x 3 at 1500 centers	Alternate or reinforced 25x3 Bar Slip 3040 centres	25
1061-1370	22	38 x 38 x 3 at 1200 centers	Alternate or reinforced 38x3 Bar Slip2400 centres	38
1371-1520	20	38 x 38 x 3 at 1200 centers	Reinforced 38x3 Bar Slip 2400 centres	38
1521-2130	20	38 x 38 x 3 at 600 centers	Reinforced 38x3 Bar slip 1200 centres	38
2131-2430	18	38 x 38 x 3 at 600 centers angles	Companion 38x38x3 at 1200 centres	38
2431-3040	18	50 x 50 x 4 at 600 centers angles	Companion 50x50x4 at 1200 centers	50

- 3.1.19 Bracing spacing shown above shall be maximum spacing between two bracings or between bracing and joint. Locate bracings mid-way between joints.
- 3.1.20 Pre insulated Ductwork shall be installed, using supports, as described in DW144 & according to manufacturer's requirements. Maximum distance between supports shall not exceed:
- 4000 mm for ducts with section not exceeding 1200 x 1000 mm.
 - 2000 mm for ducts with section exceeding 1200 x 1000 mm.
- 3.1.21 Longitudinal joints shall be Pittsburgh lock seam at edge of duct and grooved seam on face of duct.
- 3.1.22 Construct medium pressure rectangular ducts as follows:

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<i>Max Duct Dimension (mm)</i>	<i>Sheet Metal (U.S. ga.)</i>	<i>Transverse Join Connection and Bracing Dimensions (mm)</i>
<i>up to 300</i>	<i>24</i>	<i>25 standing seam, 16 welded flange, 1 pocket lock no bracing</i>
<i>301 to 450</i>	<i>24</i>	<i>25 standing seam, 22 welded flange, 1 pocket lock, bracing 25 x 25 x 16 U.S. ga. at 1200</i>
<i>451 to 600</i>	<i>22</i>	<i>38 standing seam, 35 welded flange, 28 pocket lock, bracing 25 x 25 x 3 at 1200</i>
<i>601 to 900</i>	<i>22</i>	<i>38 standing seam, 38 pocket lo'1k, bracing 25 x 25 x at 800</i>
<i>901 to 1200</i>	<i>22</i>	<i>50 standing seam or 50 flanged joint, bracing 12 x 3 at 760</i>
<i>1201 to 1500</i>	<i>20</i>	<i>38 standing seam or 38 flanged joint with tie rod in centre, bracing and 50 x 50 x 3 at 600</i>
<i>1501 to 1800</i>	<i>20</i>	<i>50 standing seam or 38 flanged joint with tie rod in centre, bracing 63 x 63 x 5 at 600</i>
<i>1801 to 2100</i>	<i>18</i>	<i>50 standing seam or 38 flanged joint with tie rod in centre, bracing 63 x 63 x 5 at 600</i>
<i>2101 to 2400</i>	<i>18</i>	<i>50 standing seam or 38 langed joint with tie rod In centre, bracing 38 x 38 x 3 at 600, with tie rod in centre</i>
<i>Over 2400</i>	<i>18</i>	<i>50 standing seam or 50 langed joint with tie rod at 1200, bracing 50 x 50 x 3 at 600 with rod in centre</i>

- 3.1.23 Bracing spacing shown above shall be maximum spacing between two bracing or between bracing and joint. Bracings shall be located mid-way between joints.
- 3.1.24 Longitudinal joints shall be Pittsburgh lock seam at end of duct and grooved seam on face of duct.
- 3.1.25 The joints between the pre insulated ducts shall be using aluminum invisible flanges and slide-in-channel and to be connected by special cover corners, having a holding pin, which goes inside the flange and the insulation, to avoid any field connection and to give the system more strength.
- 3.1.26 All ductwork, exposed to view wilt be painted as per Division 1, Section 099000.

HVAC Insulation

PART ONE GENERAL

1.1. Reference

- 1.1.1. Conform to General Requirements and Conditions for MEP Works, Division 1 Section 01 00 00.
- 1.1.2. Conform to Special Instructions for Mechanical Works Section 23 05 01.
- 1.1.3. Refer to detail sheet in the drawing package.

1.2. REFERENCE STANDARDS

- 1.2.1. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- 1.2.2. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- 1.2.3. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - ASTM C168 - Terminology Relating to Thermal Insulation Materials.
 - ASTM C518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - ASTM C553 - Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
 - ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
 - ASTM C1104 - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
 - ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
 - ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
 - ASTM E84 - Surface Burning Characteristics of Building Materials.
 - ASTM E96 - Water Vapor Transmission of Materials.
 - ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

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- ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- NFPA 255 - Surface Burning Characteristics of Building Materials.
- SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- UL 181 - Standard for Factory-Made Air Ducts and Air Connectors.
- UL 723 - Surface Burning Characteristics of Building Materials.
- ASTM E2336 - Standard for Grease Ducts.
- ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

1.3. QUALITY ASSURANCE

- 1.3.1. All HVAC items requiring insulation shall be insulated as specified herein and as required for a complete system. In each case, the insulation shall be equivalent to that specified and materials applied and finished as described in these Specifications.
- 1.3.2. All insulation required for the work shall be new, of first-class quality and shall be furnished, delivered, erected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality is specified, a first-class standard article as approved by the Architect shall be provided.
- 1.3.3. All piping and Ductwork Insulation shall be Rigid Insulation, and must meet Greenhouse Gas and Ozone Depletion Potential: Only use CFC- and HCFC- free products.
- 1.3.4. Flame Retardants: must be PBDE-free products.
- 1.3.5. All insulation, jacket, adhesives, mastics, sealers, etc., utilized in the fabrication of these systems shall meet NFPA for fire resistant ratings (maximum of 25 flame spread and 50 smoke developed ratings) and shall be approved by the insulation manufacturer for guaranteed performances when incorporated into their insulation system, unless a specific product is specified for a specific application and is stated as an exception to this requirement. Certificates to this effect shall be submitted along with Contractor's submittal data for this Section of the Specifications. No material may be used that, when tested by the ASTM E84-89 test method, is found to melt, drip or delaminate to such a degree that the continuity of the flame front is destroyed, thereby resulting in an artificially low flame spread rating.
- 1.3.6. All insulation shall be applied by mechanics skilled in this particular Work and regularly engaged in such occupation.
- 1.3.7. All insulation shall be applied in strict accordance with these Specifications and with factory printed recommendations on items not herein mentioned. Unsightly, inadequate, or sloppy Work will not be acceptable.

1.4. SUBMITTALS

- 1.4.1. Product Data:
- 1.4.2. Provide product description, list of materials, "k" value, "R" value, mean temperature range, and thickness for each service and location.
- 1.4.3. Operation and Maintenance Data:

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Samples: When requested, submit three (3) samples of any representative size illustrating each insulation type.

Manufacturer's Installation Instructions: Indicate procedures that ensure acceptable standards will be achieved. Submit certificates to this effect.

1.5. DELIVERY, STORAGE AND HANDLING

- 1.5.1. Deliver, store, protect, and handle products to the Project Site under provisions of Division 01.
- 1.5.2. Deliver materials to Site in original factory packaging, labeled with manufacturer's identification including product thermal ratings and thickness.
- 1.5.3. Store insulation in original wrapping and protect from weather and construction traffic. Protect insulation against dirt, water, chemical, and mechanical damage.
- 1.5.4. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics and insulation cements.

PART TWO PRODUCTS

2.1. INSULATION SCHEDULE

Insulation shall be as per following schedule:

2.1.1. CHILLED & HOT WATER

- | | |
|--------------------|---|
| Piping below 50mmØ | Elastomeric Foam Insulation 40mm thickness. |
| Piping above 50mmØ | Elastomeric Foam Insulation 50mm thickness. |

2.1.2. CONDENSATE PIPING

- | | |
|-----------------|--|
| Cold Condensate | Elastomeric Foam Insulation 25mm thickness |
| FCU Condensate | Elastomeric Foam Insulation 25mm thickness |

2.1.3. STEAM AND STEAM CONDENSATE PIPING

- | | |
|-----------------------|---------------------------------------|
| Piping below 1-1/2" Ø | Glass fiber Insulation 38mm thickness |
| Piping above 2" Ø | Glass fiber Insulation 75mm thickness |

2.1.4. SHEET METAL DUCTWORK

- | | |
|------------------------|---|
| Indoor | Closed Cell Elastomeric Insulation 25mm thickness. |
| Exposed cold air ducts | Closed cell elastomeric Insulation 50 mm thick. |
| Outdoor | Closed Cell Elastomeric Insulation 25 mm thick. |
| Fire Ducts | Rockwool Blanket with GI wire mesh 96 Kg/m ³ density finished insulating cement and painted. |
| Kitchen Hood Ducts | Calcium silicate block insulation wire mesh and finished with insulating cement and painted. |

2.1.5. EQUIPMENT

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Material and Finishes

Hot water converters and hot water expansion tanks 50mm thick, 96 kg/m³ density, rigid board, fibreglass insulation.

Expansion tanks, 25mm thick, Elastomeric Insulation.

Emergency generator exhaust gas flue piping and generator muffler. 50mm thick asbestos free, calcium silicate block insulation.



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2.2. ACOUSTIC DUCT LINER

2.2.1. Fibre glass duct liner with fabric on air side, to ASTM C1071 type 2 rigid board type, 48kg / m³ density; 121°C maximum service temperature: maximum face velocity on fabri side 20.3m/s; non combustible; 25mm thick.

2.2.2. Application: 25mm thick where shown on drawings.

2.3. GLASS FIBER INSULATION

2.3.1. Insulation: ASTM C547; rigid molded, noncombustible.

- 'k' ((btu*in)/(hr*ft²*deg F)) value : ASTM C335

Temperature (degrees F)	Maximum 'k' value (btu*in)/(hr*ft ² *deg F))
75	0.23
100	0.24
150	0.25
200	0.28
300	0.34
400	0.42
500	0.51

- Minimum Service Temperature: 0 degrees F.
- Maximum Service Temperature: 1000 degrees F.
- Maximum Moisture Absorption: 0.2% by volume.

2.3.2. Vapor Barrier Jacket

- ASTM C1136, White kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
- Moisture Vapor Transmission: ASTM E96; 0.02 perms.
- Secure with self-sealing longitudinal laps and butt strips.
- Secure with outward clinch expanding staples and vapor barrier mastic.

2.3.3. Vapor Barrier Lap Adhesive: MIL-A-3316C, Class 2, Grade A compliant. Compatible with insulation. VOC Limit 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3.4. Insulating Cement: ASTM C195; hydraulic setting on mineral wool. VOC Limit 70 g/L (multipurpose construction adhesive).

2.3.5. Fibrous Glass Fabric: Cloth, untreated; 9 oz/sq yd weight with 1.0 lb/cu ft density blanket.

2.3.6. Indoor Vapor Barrier Finish: Vinyl emulsion type acrylic, compatible with insulation, white color. VOC Limit 50 g/L.

2.4. CELLULAR ELASTOMERIC FOAM

2.4.1. Insulation: ASTM C534; flexible, cellular elastomeric, molded or sheet.

- 'k' ((btu*in)/(hr*ft2*deg F)) value: ASTM C177 or C518; 0.22 to 0.28 at 60 degrees F.
- Minimum Service Temperature: -20 degrees F.
- Maximum Service Temperature: 180 degrees F.
- Maximum Moisture Absorption: ASTM C209; 0.2 percent by volume.
- Moisture Vapor Transmission: ASTM E96; 0.08 perm inches.
- Maximum Flame Spread: ASTM E84; 25.
- Maximum Smoke Developed: ASTM E84; 50.
- Connection: Waterproof vapor barrier adhesive.
- Provide documentation indicating that product contains no urea formaldehyde.
- Fittings: Pre-fabricated closed cell fittings of like material and thickness as adjacent pipe insulation.
- In all exposed finished areas without jacketing, provide white insulation, otherwise use black.

2.4.2. Elastomeric Foam Adhesive:

- MIL-A-24179A, Type II, Class I, compliant. Air dried, contact adhesive, compatible with insulation. VOC Limit: 50 g/L or less when calculated according to 40 CFR 59, Subpart D.

2.4.3. Foam Hangers:

- Closed-cell, lightweight polymeric rigid, high-compressive strength foam insulating pipe support, that is lined with closed-cell EPDM foam rubber, and encased in a zero-perm, weather-proof, corrosion-proof, EPDM polymer membrane with a high-performance pressure-sensitive closure system.
- Insulation will not compress or crush under loads imposed by active piping systems and their contents resting on the insulation material between the pipe and the pipe hanger.
- Shall provide an anti-abrasion surface for contact with all types of piping materials, and absorb the vibrations associated with operational pipe systems.
- Shall be UV and moisture resistant.

2.4.4. Outdoor Duct Insulation;

- Service temperature range from -60 degrees F to 180 degrees F.
- Meets ASTM C 177 or C 518 and shall have minimum 'k' value of 0.27 Btu-in. / hr-ft2-degrees F at minimum density measurement of 3 lb/cu ft.
- The insulation and outside surface must be protected with a flexible clad/membrane system like white Thermo Plastic Rubber Membrane or as approved by consultant, that must be formulated to:

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- Be resistant to UV, and ozone, acid rain, and physical elements produced from outdoor weather per ASTM E 96 Procedure A.
- Have a flame spread rating of 25 or less and a smoke developed rating of 50 or less when tested in accordance with the test method for surface burning in ASTM E 84.
- Show no evidence of continued erosion, delaminating, cracking, flaking, or peeling when tested in accordance with the test method for erosion resistance in UL181. Be resistant to mold growth resistance, ASTM G 21/C 1338 resistant to fungi, and resistant to bacteria growth per ASTM G 22.

2.5. INSULATION BLANKETS FOR STEAM AND CONDENSATE FLANGED VALVES AND EXPANSION JOINTS

- 2.5.1. Insulation: Tight-fitting, reusable insulation blanket consisting of high-density insulation (fiberglass, mineral wool, ceramic fiber) covered on outside with coated glass fabric having heavy adjustable straps with buckles. Inside of blanket shall be covered with fabric suitable to specified temperature of stainless steel square mesh woven wire cloth. Insulation shall be a minimum of 1-1/2" thick and shall be suitable for temperatures up to 500 Deg. F.

2.6. JACKETS AND FACINGS

2.6.1. PVC Plastic

- Jacket: ASTM C921, One piece molded type fitting covers and sheet material, white color.

2.6.2. Minimum Service Temperature: 0 degrees F.

- Maximum Service Temperature: 150 degrees F.
- Moisture Vapor Transmission: ASTM E96; 0.002 perm inches.
- Maximum Flame Spread: ASTM E84; 25.
- Maximum Smoke Developed: ASTM E84; 50.
- Thickness: 20 mil.
- Connections: Brush on welding adhesive or pressure sensitive color matching vinyl tape.
- Covering Adhesive Mastic: Compatible with insulation and PVC jacket. VOC Limit 50 g/L according to 40 CFR 59, Subpart D (EPA Method 24).
- Aluminum Jacket: ASTM B209.
- Thickness: 0.040 inch.
- Finish: Smooth.
- Joining: Longitudinal slip joints and 2 inch laps.
- Fittings: PVC pre molded fittings.
- Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel.

PART THREE EXECUTION

3.1. EXAMINATION

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- 3.1.1. Verify that piping and ducting has been tested before applying insulation materials.
- 3.1.2. No installation shall be applied to any surface, until all foreign matter has been removed from the surface to be installed. All insulations shall be applied in a manner consistent with good practice and method.

3.2. INSTALLATION

- 3.2.1. Install materials in accordance with manufacturer's instructions.
- 3.2.2. Painting of cellular foam insulation is not allowed.
- 3.2.3. On exposed piping, locate insulation and cover seams in least visible locations. For cellular foam insulation tape ALL visible seams with tape matching insulation color.
- 3.2.4. Insulation shall be continuous through floors, walls, partitions, etc. except when otherwise indicated or specified. Where space will not permit application of insulation in wall or slab chase, the chase shall be packed full of 85% magnesium mineral wool asbestos rope, or fiber glass and protected with covers plates as approved by the consultants.
- 3.2.5. For cold air ducts, fiberglass insulation shall have vapour barrier jacket with approved quality adhesive as specified in Section 2.4 above. Care shall be taken such that vapour barrier is not damage / pierced during installation, and any damage will be repaired with the same quality of vapour barrier. The installation shall be firmly fixed on the ducting / plenums with approved quality adhesive compound recommended by the installation manufacturer's or as specified above. Adhesive to be approved by Consultant. The adhesive shall cover at least 25% duct area on the side and top, and 50% area at the bottom. All circumferential and longitudinal joints shall be lapped at least 50 mm and fully sealed with adhesives. Where rectangular ducts are 600 mm in width or greater, the insulation shall further mechanically secured to the ducts, and at least 25 mm wide metal bands shall be applied at the corners so that the mechanical fastener does not pierce the insulation and vapour barrier.
- 3.2.6. The insulation shall be applied to the full length of the ducts, including portions where internal sound absorber liner etc is fixed.
- 3.2.7. All access doors and removable panels shall be insulated and jacketed separately. The insulation jacket ends on the duct and door or panel shall be sealed with 50 mm wide PVC vapour seal self-adhesive type tape to prevent damage to the insulation due to use and servicing. External and weather exposed insulated ducting shall be insulated as specified and then protected with a jacket of 20 kg roofing felt, all joints sealed with hot bitumen PBS PB4 or approved equal. The jacket shall be further mechanically secured to the duct with 6 mm wide soft aluminum bands, generally spaced at 450 mm. Indigenous coarse cloth, canvas roofing felt and asphalt impregnated kraft paper of approved quality are to be used.
- 3.2.8. All cements and adhesives shall be as recommended by the manufacturer of the insulation. Insulation, insulation jacket, canvas and adhesive shall be fire retardant with a flame spread not larger than 25 and a smoke developed rating not larger than 50 11 when tested in accordance with standard E 84-61 of the ASTM. All adhesives must meet the acceptable VOC limits <50 g/L.
- 3.2.9. Insulation shall be installed in accordance with the manufacturer's printed installation instructions.
- 3.2.10. Valves and fittings shall be insulated with the same material as the pipe.

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- 3.2.11. At each hanger or support for chilled water piping, the contractor shall install a section of high-density insulation between the pipe protection saddle and the pipe. Only the lower half of insulation, at hanger, will be replaced by an insert of high-density material so the top of pipe insulation and vapour barrier can be continuous. The high-density insulation shall be calcium silicate or a polymeric rigid EPDM foam rubber. Seal with vapour barrier mastic.
- 3.2.12. Insulation for diesel or gas engine exhaust pipe and muffler shall be 50mm (2") thick calcium silicate. Do not insulate expansion bellows. Insulation shall be protected with 1.0mm aluminum cladding.
- 3.2.13. Where pipes are exposed to outside or unconditioned exposed spaces, they shall be covered with 0.8 mm thick Aluminium cladding.
- 3.2.14. Insulation for pipes, duct and other equipment in mechanical rooms and where exposed to weather; shall be enclosed in 0.8mm thick aluminum cladding with all joints sealed and arranged to shed water.
- 3.2.15. Where thermal insulation is applied to the outside, equipment and plant used to convey, store or generate fluids or gases at temperatures lower than the design ambient dew point temperature a water vapour barrier shall be provided. The vapour barrier shall be applied such that it is continuous and gives protection to the whole surface of the insulation, which it protects. It shall not be pierced or otherwise, damaged by supports or by the application of external cladding. At points of support, means of load distribution shall be provided as necessary.
- 3.2.16. Apply insulation in strict accordance with manufacturer's recommendation including all seals and adhesive taking care of compatibility of such adhesives with the insulation. Submit manufacturer's data and compatibility recommendations for review.
- 3.2.17. Fiberglass insulated dual temperature pipes or cold pipes conveying fluids below ambient temperature:
- Provide vapor barrier jackets, factory applied or field applied.
 - Insulate fittings, joints, flanges, unions, strainers, flexible connectors, and valves with molded insulation of like material and thickness as adjacent pipe. PVC or aluminum covers are required in all exposed locations as in mechanical rooms.
 - Finish with glass cloth and vapor barrier adhesive.
 - Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
 - Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- 3.2.18. Cellular foam insulated dual temperature pipes or cold pipes conveying fluids below ambient temperature:
- Insulate fittings, joints, flanges, unions, strainers, flexible connectors, and valves with molded insulation of like material and thickness as adjacent pipe. PVC or aluminum covers are required in all exposed locations as in mechanical rooms.
 - Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.

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- Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
 - Provide rigid foam hangers as specified above between hanger and pipe.
- 3.2.19. Fiberglass insulated pipes conveying fluids above ambient temperature:
- Provide vapor barrier jackets, factory applied or field applied.
 - Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. PVC covers are required in all exposed locations.
 - Finish with glass cloth and adhesive.
 - Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
 - For hot piping conveying fluids, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
 - For steam and condensate piping, insulate flanges and unions.
- 3.2.20. Finish insulation at supports, protrusions, and interruptions.
- 3.2.21. For pipe exposed below 10 feet above finished floor, finish with PVC jacket and PVC fitting covers.
- 3.2.22. For piping exposed in mechanical rooms below 10 feet above finished floor, finish with aluminum jacket and aluminum fitting covers.
- 3.2.23. All valves in insulated systems shall have valve stem extensions. Insulation installer shall notify the contractor and Owner if valves without stem extensions are encountered. All valves without stem extensions in areas where stem extensions are required shall be replaced.
- 3.2.24. Install insulation blanket on steam and condensate valves.
- 3.2.25. Provide insulation clearance and access to valves and fittings in hangers and from structure and other equipment. Insulation shall be continuous through all hangers and supports.
- 3.2.26. Foam or closed cell insulation on black or galvanized iron pipe operating below ambient temperature is not permitted.

Pipes, Fittings and Valves**PART ONE GENERAL**

- All chilled water & condenser water piping shall be Seamless Black Steel Schedule 40 conforming to ASTM A53 and shall be provided as per List of Approved Manufacturer.
- Fittings for steel pipes through 2 inches shall be screwed conforming ANSI B16.3 and larger than 2 inches shall be flanged conforming ANSI B 16.9. Welded fittings shall be seam-less, butt welding type, compatible to the schedule of the pipes.
- Flanges shall be slip on type and shall conform to ANSI16.5. All fittings & flanges shall be suitable for 300 psi (20.7 bar) working pressure.
- Condensate drain piping shall be uPVC class E ASTM D1785 or BS3505 with solvent welded fitting for installation inside the building and GI pipe class B (medium) BS1387 with threaded fittings for roof and outside the building installation. Pipe shall be provided as per List of Approved Manufacturer.
- Copper piping shall be seamless pipe ASTM B88 type K plain ends with wrought copper fitting ANSI B16.22

PIPE SUPPORTS:

General: pipe hangers, brackets, saddles, inserts, clamps and pipe rolls including rods, bolts, turn buckles, bases and protection shields shall conform to standard recommended engineering practice, using stock or production parts wherever possible. Chain, wire, strap or other makeshift devices will not be permitted as hangers or supports.

- a) Accurate weight balance calculations shall be made to determine the required supporting force at each hanger location and pipe weight load at each equipment connection. Pipe hangers shall be capable of supporting the pipe in all conditions of operations. They shall allow free expansion and contraction of the piping and prevent extra stress resulting from transferred weight being included in the pipe or connected equipment. Hangers shall be supported from beams, clamps, concrete inserts Phillips concrete fasteners, and power actuated drive pins. Concrete inserts when used shall be installed in the exact location prior to the pouring of the concrete.
- b)
 - (a) Suspended Horizontal Piping: shall be supported by adjustable hangers or supports, which shall provide a means of vertical adjustment after erection. Unless otherwise indicated on drawings maximum spacing between pipe

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supports for straight runs of pipe shall be in accordance with recommended spacing shown in accordance with recommended spacing shown in the table given below:

c)

Nominal Pipe Size	0.5	0.75	1	1.5	2	2.5	3	4	5	6	8	10
Inches (mm)	13	20	25	40	50	65	75	100	125	150	200	250
Maximum Span Feet (Meters)	5	6	7	9	10	11	12	14	16	17	19	22
	1.5	1.8	2.1	2.7	3	3.3	3.6	4.2	4.8	5.2	5.8	6.7
Rod Size dia. mm.	10	10	10	10	10	13	13	16	16	19	22	22

d)

- e) Pipe hangers and supports shall be spaced not over 5 feet (1.5m) apart at heavy fittings and valves.

f)

- g) A hanger shall be installed not over 1 foot (0.3m) from each change in direction of piping. Where necessary to prevent vibration transmission, the support closest to the sources of vibration shall be spring cushion, or other approved type of isolation hanger. Where the piping system is subject to shock loads, such as thrusts imposed by the actuation of safety valves, hanger design shall include provision of shock absorbing devices of approved design. Hangers shall be designed so that they cannot become disengaged by movements of the supported pipe.

h)

- (c) Vertical Piping: shall be guided or supported in the center of each riser but not over 15 feet on center and shall be supported at the base of the riser on a base elbow or tee with a pipe stand only where required. For un-insulated brass or copper pipe or tubing, the riser clamp shall be compatible nonferrous or electrolytically coated steel as for hangers.
- (d) Piping in trenches: Pipes shall rest on suitable wall floor supports with rollers.
- (e) Pipe Sleeves: Pipes passing through concrete or masonry walls or concrete floors or roofs shall be provided with pipe sleeves fitted into place at the time of construction or afterwards if necessary. Each sleeve shall extend through its respective wall, floor or roof and shall be cut flush with each surface. Sleeves shall be of such size as to provide a minimum of 1/4" all around clearance between bare pipe and sleeve or between jacket over insulation and sleeve. Sleeves in bearing walls shall be steel or cast iron pipe. Sleeves in non-bearing walls, floors, or ceiling may be steel pipe, cast iron pipe or G.I. sheet metal gauge

14, with lock type longitudinal seam. Sleeves in bearing walls shall be steel or cast iron pipe.

INSTALLATION:

- (a) General: Chilled water piping shall include all piping and connections between water chillers, pumps and terminal units.

- i)

- j) All stop valves, check valves, globe valves, (calibrated balancing valves) control valves, drain cocks, expansion joints, compensators, automatic air vents, thermometers, pressure gages, strainers and other specialties required for proper operation of the whole system shall be provided, even if not indicated on the drawings.

Pipes shall be cut accurately to measurements established at the job site and worked into place without springing or forcing, properly clearing all windows, doors and other openings. Excessive cutting or other weakening of the building structure to facilitate piping insulation will not be permitted without written approval. Layout drawings required under the title of "APPROVAL OF MATERIAL AND EQUIPMENT" shall show locations of all supports, the load imposed on each fastening or anchor, typical details for special anchorage, and details for special anchorage for supports attached to metal roof decking, for suspended piping, valves, tank, pumps, converters, and other mechanical equipment. Supports shall be attached to metal decking. Where supports are required between structural framing shall be provided and detailed. Pipe shall have burrs removed by reaming and shall be installed to permit free expansion and contraction without damage to joints and hangers. Changes in direction shall be made with fittings, except that bending of pipe bender is used and wide sweep bends are formed. The centerline radius of bends shall not be less than 6 diameters of the pipe. Bent pipe showing kinks wrinkles, flattening or other malformations will not be accepted. All piping shall be installed with sufficient pitch to ensure adequate drainage and venting. Piping connections to equipment shall be provided with unions or flanges. Open ends of pipelines or equipment shall be properly capped or plugged during installation to keep dirt and other foreign matters out of the system.

- (b) Screwed joints shall be used on pipes of diameter 2" and below. Screwed joints shall be made with tampered threads properly cut. Joints shall be made tight with a stiff mixture of litharge and glycerin, or polytetrafluoroethylene tape, or approved thread joint compound applied to the male thread only. Not more than three threads shall show after the joint is made up.
- (c) Welded joints shall be used on pipes of diameter above 2" Welded joints shall be fusion-welded by metal arc welding method unless otherwise required. Changes in direction of piping shall be made with welding fittings only. Mitering or

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notching pipe to form elbows and tees or other similar construction will not be permitted. Branch connections shall be made with welding tees or forged welding tees or forged welding outlets.

- k) Field and shop bevels shall be in accordance with the recognized standards and shall be done mechanically by means of flame cutting. Where beveling is done by flame cutting, surfaces shall be cleaned of scale and oxidation prior to welding.

Before welding, the component parts to be welded shall be aligned so that no strain is placed on the weld when finally positioned. Height shall be so aligned that no part of the pipe wall is offset by more than 29% of the wall thickness. Flanges and branches shall be set true. This alignment shall be preserved during the welding operation.

Removing and replacing defective welds shall be at no additional cost to the Owner. Repairing of defective welds by adding new material over the defects or by penning will not be permitted. Electrodes shall be stored in a dry heated area and shall be kept free of moisture or dampness during fabrication operations. Electrodes that have lost part of their coating shall be discarded.

- (d) Flanges and Unions shall be faced true. Flanges shall be provided with compressed fibre gasket, and made square and tight. Except where copper tubing is used, unions or flanged joints shall be provided in each line immediately preceding the connection to each piece of equipment such as coils, pumps, control valves and other similar items.
- (e) All Anchors, nuts, bolts, screws, fasteners and rivets shall be of from approve manufacturer's list.

VALVES:**GATE VALVES:**

Gate valves upto 2 inches shall be with threaded ends, bronze body, with union bonnet, non-rising stem and wedge disc. Hand wheel nut, packing nut, gland, stuffing box, bonnet, bonnet ring, disc and body shall be of bronze. Hand wheel shall be of malleable iron. Packing shall be graphited asbestos. Stem shall be manganese bronze.

Gate valves 2.5 inches and above shall be cast iron body bronze mounted with flanges ends.

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These shall be of solid wedge disc type, with outside screw and yoke. Body and bonnet shall be of cast iron. Wedge shall be of cast iron with bronze disc. Seat rings shall be bronze. Packing gland shall be cast iron. Yoke shall be of cast iron and yoke nuts shall be of bronze. Hand wheel shall be of cast iron.

All valves shall be rated for ANSI 150 Lbs., 300 psig & 200°F working pressure and temperature, shall be provided as per List of Approved Manufacturer.

GLOBE VALVES:

Globe valves up to 2 inches shall be bronze with threaded ends. Body, bonnet, disc holder, stems lock nut; packing nut and disc lock nut shall be of bronze. Hand wheel shall be malleable iron with stem of manganese bronze. Renewable composition disc shall be provided suitable for water & steam. Packing shall be graphited asbestos.

Globe valves 2.5 inches and above shall be cast iron body; bronze faced disc and yoke bonnet, and shall be flanged. Hand wheel, gland, bonnet and body shall be of cast iron. Stem shall be of manganese bronze. Packing shall be graphited asbestos. Stem lock nut, disc and seat ring shall be of bronze. Disc shall be renewable composition type.

All valves shall be rated for ANSI 150 Lbs. 300 psig & 200°F working pressure and temperature, shall be provided as per List of Approved Manufacturer.

SWING CHECK VALVES:

Check valves up to 2 inches shall be with threaded ends Cap, hinge pin, body, hinge, disc nut and disc shall be of bronze.

Check valves larger than 2 inches shall be of cast iron body, including valve cap and disc. Hinge pin, seat ring and disc ring shall be of bronze. Ends shall be flanged.

All valves shall be rated for ANSI 150 Lbs. 300 psig & 200°F working pressure and temperature, and shall be provided as per List of Approved Manufacturer.

BALANCING VALVES:

Calibrated Balancing Valves: shall be furnished & installed where shown on the drawings. The valves shall have NPT connections (Internal Threads) suitable for 362 psig (25 bar) for pipe size 50 mm or below, or flanged connections suitable for 300 psig (20.7 bar) for pipe size 65 mm or above, as required. The Valves shall be suitable sized between 3.0 to 6.0 Pa at fully open position. The balancing valves shall have measuring points for connecting a direct flow rate read-out meter. The measuring points shall be self-sealing type to prevent system fluid loss during balancing/monitoring. The measuring points shall be easily accessible for measuring purpose, especially on the flanged valves; it should be located on the flanged. Each balancing valve shall have a

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calibrated digital hand wheel for easy determination of location of the hand wheel by directly reading the number of turns on the top of the hand wheel. Each balancing valve shall have a nameplate to assure specific value settings and shall be constructed with internal spindle seals (EPDM O-rings) to prevent leakage around the rotating element.

Balancing Valves shall be provided as per List of Approved Manufacturer.

Y-STRAINERS:

Strainers shall be "Y" types, with bronze body and threaded ends up to 2 inches. Screen shall be of 20 mesh monel.

Strainers above 2 inches shall have cast iron body with flanged ends. Screen cover shall be provided with blow off tapping. Screen shall be of perforated stainless steel, 233 holes per sq. inch, with 0.045 inch diameter holes and 0.016 inch thick screen.

All strainers shall be rated for ANSI 150 Lbs. 300 psig & 200°F working pressure and temperature, shall be provided as per List of Approved Manufacturer.

Fan Coil Units (FCU)

PART 1 – GENERAL

1.1. Section Includes

- A. Vertical Fan Coil Units.

1.2. Reference Standards

- A. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
- B. AHRI 260 – Standard Sound Rating of Ducted Air Moving and Conditioning Equipment.
- C. AHRI 350 – Standard Sound Rating of Non-Ducted Air Moving and Conditioning Equipment.
- D. AHRI 410 – Standard for Forced-Circulation Air-Cooling and Air-Heating Coils.
- E. AHRI 440 – Standard for Performance Rating of Room Fan-Coils.
- F. ASHRAE 62.1 – Standard for Ventilation for Acceptable Indoor Air Quality.
- G. ASHRAE 79 – Standard Method of Test for Fan-Coil Units
- H. ASTM C1338 – Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- I. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- J. ASTM E488/E488M – Standard Test Methods for Strength of Anchors in Concrete Elements.
- K. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
- L. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
- M. UL 181 – Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.

1.3. Submittals

- N. Product Data shall be provided with data indicating configuration, general assembly, and materials used in fabrication, including catalog performance ratings that indicate airflow, static pressure, sound power levels, electrical characteristics, and connection requirements.
- O. Shop Drawings shall indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
- P. Manufacturer shall include schedules listing sound power level for each of second through eighth octave bands at the specified static pressures.
- Q. Certificates shall be issued to certify that the airflow, coil capacities, pressure drops, and selection procedures meet or exceed specified requirements or fan coils are tested and rated in accordance with AHRI 440.
- R. Manufacturer's Installation Instructions shall indicate support and mounting details, installation instructions, recommendations, and service clearances required.
- S. Project Record Documents shall record actual locations of units and controls components and locations of access doors.

- T. Operation and Maintenance Data shall include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists.
- U. Manufacturer's warranty shall be submitted and ensure forms have been completed in Owner's name and registered with manufacturer.
- V. Maintenance Materials shall be furnished for the Owner's use in maintenance of the project.

1.4. Quality Assurance

- W. Manufacturer Qualifications shall be specified in this section, with minimum ten years of documented experience.
- X. Product Listing Organization Qualifications: The manufacturer shall be listed with an organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and be acceptable to authorities having jurisdiction.

1.5. Warranty

- Y. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- Z. Provide 18 month manufacturer warranty from date of shipment for air fan coil units, integral sound attenuators, integral heating coils, and integral controls.

PART 2 – PRODUCTS

2.1. General

AA. Basis of Design: Price Industries, Inc.

1. Vertical Fan Coil Unit, Concealed: FCVC.
2. Vertical Fan Coil Unit, Exposed, Flat-Top: FCVE
3. Vertical Fan Coil Unit, Exposed, Slope-Top: FCVS

BB. Performance Requirements:

1. Units shall have published sound power level data per AHRI 260 or AHRI 350 depending on production configuration.
2. Unit shall be performance certified with the latest edition of AHRI 440.
3. Units shall be ETL listed in compliance with UL 60335 standards.

2.2. Vertical Fan Coil Units, Exposed

CC. General:

1. Furnish and install Price FCVE Fan Coil Units where indicated on the plans and in the specifications.
 - a. **(Optional)** Furnish and install Price FCVS Fan Coil Units where indicated on the plans and in the specifications
2. Units shall be completely factory assembled, tested and shipped as a single piece.
3. All units shall be capable of meeting AHRI performance for the scheduled capacities for cooling, heating and air delivery.

4. All unit dimensions for each model and size shall be considered maximums.

DD. Construction:

1. Unit Casing:

- a. The unit casing shall be fabricated of 18-gauge galvanized steel panels with powder coating.
- b. All units shall have a stamped louver discharge.
 - ii. **(Optional)** All units shall have a Price 610 series single deflection grille
 - iii. **(Optional)** All units shall have a Price LBP linear bar grille
- a. All exterior panels will be uninsulated
- b. All panels of the interior unit downstream of the forward curve fans shall be insulated with 1/2-inch thick insulation.

3. Blower:

- a. The blower shall be a dynamically balanced, forward curved, double width/double inlet (DWDI) centrifugal type, constructed of zinc coated galvanized steel for corrosion resistance.

4. Motor:

- a. The unit shall be supplied with an electronically commutated motor (ECM), complete with a single phase integrated controller/inverter that operates the wound stator and senses motor position to electronically commutate the stator.
- b. The motor rotor shall be permanent magnet type with near zero rotor losses.
- c. The motor shall be permanently lubricated with ball bearings, maintaining a minimum of 70% efficiency over its entire operating range.
- d. The ECM shall be furnished with factory programming:
 1. High Turndown Flow Program
 - a. A modulating high turndown flow program shall be provided to allow the ECM to operate with constant torque to vary the airflow with fluctuations in external static pressure

5. Motor Controller:

- e. **(Optional)**: The motor shall be supplied complete with a manual fan speed controller for field adjustment of fan air flow set-point.
 1. The speed controller shall accept as standard a [0-10VDC], or [4-20mA] signal for remote fan adjustment from a building automation system.
- f. **(Optional)**: The motor shall be supplied complete with a 3-speed fan speed controller for field adjustment of fan air flow set-point.
 1. The speed controller shall accept as standard low voltage 3-speed thermostat signal [24 VAC] for energizing one of the three speeds.

6. Drain Pans:

- a. All units shall be supplied with primary and auxiliary condensate drain pans with single wall, galvanized steel for corrosion resistance.
- b. The primary drain pan shall extend under the entire cooling coil
- c. The auxiliary drain pan shall be mounted to for condensate from the primary drain pan and optional piping packages. The
- d. Drain pans shall be of one-piece construction and be positively sloped for condensate removal.
- e. Drain pans shall be externally insulated with fire retardant foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating

Technical Specifications for Electrical, Wireless & HVAC Works

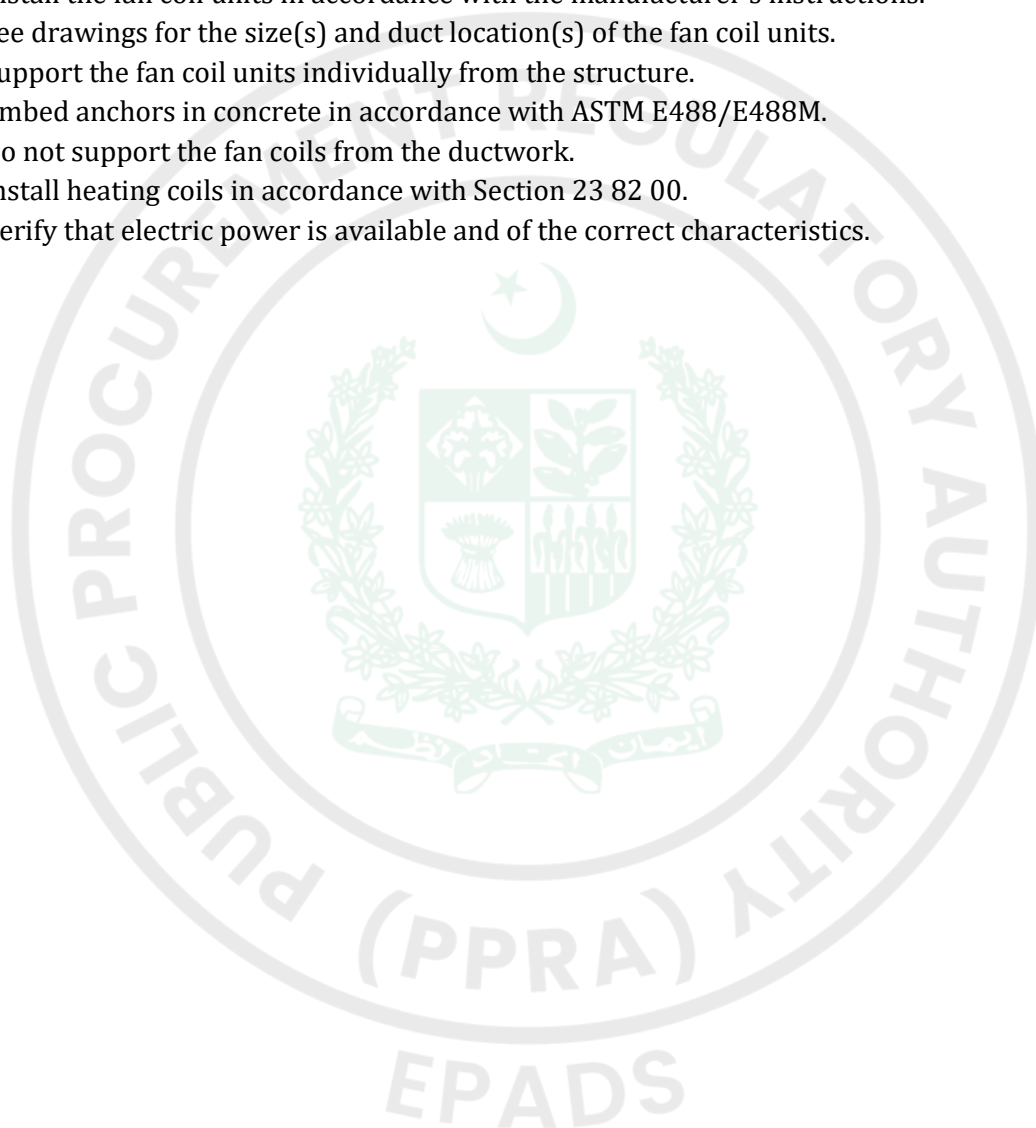
- per ASTM E84 and UL 723 and an Antimicrobial Performance Rating of zero with no observed growth per UL 181.
- f. **(Optional):** Provide primary and auxiliary drain pan with type 304 stainless steel construction for superior corrosion resistance. Stainless steel drain pans shall be externally insulated and meet or exceed the requirements stated above.
 - g. **(Optional):** Provide a secondary drain connection on the auxiliary drain pan for condensate overflow.
7. Filters:
- i. All units shall be furnished with a minimum two inch thick nominal pleated filter.
 - ii. The filter shall have a Minimum Efficiency Reporting Value (MERV) of MERV8.
 - iii. **(Optional):** The units shall be furnished with a two inch pleated [MERV13] filter.
8. Electrical:
- a. Units shall be furnished with single point power connection.
 - b. Units shall be furnished with a NEMA 250, Type 1 electrical enclosure.
9. Unit Options and Accessories:
- b. Water Cooling and Heating Coils:
 1. All water coils shall be tested with the assembly, rated and certified in accordance with the current edition of AHRI 440 and AHRI 410, and shall bear the AHRI seal on the unit casing.
 2. All cooling and heating coils shall optimize rows and fins per inch to meet the specified capacity.
 3. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin.
 4. Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.
 5. All water coils shall be hydrostatically tested to a minimum 390 pounds per square inch, with a minimum burst pressure of 1800 pounds per square inch at ambient temperature. All water coils are rated for a maximum of 300 pounds per square inch working pressure at 200 degrees Fahrenheit.
 - c. Liners **(select one)**:
 1. Fiberglass Liner – FG:
 - a. Insulation shall comply with the requirements of UL 181 (erosion), ASTM C1338 (fungi resistance), ASHRAE 62.1, and ASTM C1071, having a maximum flame/smoke spread of 25/50 for both the insulation and the adhesive when tested in accordance with ASTM E84 and NFPA 90A. The insulation shall comply with Antimicrobial Performance Rating of 0 with no observed growth, per UL181.
 1. The insulation shall be secured with adhesive.
 2. Insulation edges exposed to the airstream shall be coated with NFPA approved sealant.
 2. Closed Cell Polymeric Foam Insulation – FF
 - a. Insulation shall conform to UL 181 (erosion) and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E84 or UL 723.
 - b. The insulation shall be secured with adhesive.
 - a. Unit Mounting:

1. The unit shall be mounted with the use of wall anchors supplied by others. The manufacturer shall supply anchor holes on the 20-gauge zinc coated back panel

PART 3 – EXECUTION

3.1. Installation

- EE. Install the fan coil units in accordance with the manufacturer's instructions.
- FF. See drawings for the size(s) and duct location(s) of the fan coil units.
- GG. Support the fan coil units individually from the structure.
- HH. Embed anchors in concrete in accordance with ASTM E488/E488M.
- II. Do not support the fan coils from the ductwork.
- JJ. Install heating coils in accordance with Section 23 82 00.
- KK. Verify that electric power is available and of the correct characteristics.



List of Approved Manufacturers/Sources of Mechanical Equipment

* All Equipment shall be procured from Principal Authorized agents / distributors / resellers

Bidder must submit the technical submittal of each item to the Engineer In-charge for approval before delivery of any material. The Bidder shall fill the name of only one manufacturer for each equipment/material on which the tender is based. He shall be bound to supply the equipment from the same manufacturer. In case, the Bidder gives names of more than one manufacturer against any equipment, the Engineer / Owner can ask the Bidder supply the equipment from any one of them.

During the execution stage if the material from any supplier is found defective / substandard the Engineer / Owner reserves the right to ask the successful bidder to replace his choice of manufacturer / supplier for that particular equipment.

Any change in manufacturer / supplier shall only be entertained if there is sufficient reason that adhering to the original choice of manufacturer / supplier shall be detrimental to either the project quality or project timeline. Proper approval shall have to be sought for change in the choice manufacturer / supplier at least 1 month before the equipment is to be procured.

S.NO.	EQUIPMENT / MATERIAL	RECOMMENDED MANUFACTURERS
1	Thermometers / Pressure Gages	Trerice, Weksler, Weiss (USA)
2	Air Handling Units	Carrier, York, Samsung, LG, Daikin, Trane
3	Gate Valves, Globe Valves, Strainers, Check Valves, Ball Valves	Kitz Japan Crane UK Tour Andersson USA Hattersley UK
4	GI SHEET FOR DUCTS	a) PAKISTAN STEEL, PAKISTAN b) ISL, PAKISTAN
5	FLEXIBLE DUCT CONNECTOR	a) DURODYNE b) DUCTMATE
6	XLPE FOAM INSULATION SHEET	a) AEROFOAM b) GULF-O-FLEX c) DURKFLEX d) INCOFLEX - WEITINAM

Technical Specifications for Electrical, Wireless & HVAC Works

7	AIR DISTRIBUTION OUTLETS	a) MEHRAN b) THERMEC c) STEEL CRAFT d) ENGINEERING AIR PRODUCTS (EAP)
8	VOLUME DAMPERS	a) MEHRAN b) THERMEC c) STEEL CRAFT e) ENGINEERING AIR PRODUCTS (EAP)
9	FIRE DAMPERS	a) MEHRAN b) THERMEC c) STEEL CRAFT e) ENGINEERING AIR PRODUCTS (EAP)
10	CLOSED CELL FOAM INSULATION (NBR)	a) AEROFLEX b) GULF-O-FLEX c) DURKFLEX d) INCOFLEX - WEITINAM
11	HANGERS & SUPPORTS	a) HILTI b) INKA c) SIKLA d) INDEX
12	MOTOR CONTROL CENTER (MCC), DISTRIBUTION BOARD (DB)	HUSSAIN AND CO. UNIQUE ENGINEERING HRA SWITCHGEARS RA ENGINEERING TAJ ENGINEERING, PAKISTAN A TO ZEE, PAKISTAN KARIMI ELECTROMECH SYSTEM OR APPROVED EQUIVALENT
13	ELECTRIC POWER CABLES	PAKISTAN CABLES FAST CABLES NEW AGE CABLES PIONEER CABLES

Technical Specifications for Electrical, Wireless & HVAC Works

		OR APPROVED EQUIVALENT
14	Chilled Water Piping	a) Huffaz Pakistan b) Lontrin China c) Protek China d) Hebei China
15	UPVC PIPING FOR CONDENSATE	g) NEPRO, UAE h) COSMOPLAST, UAE i) JEDDAH POLYMER
16	PVC CONDUIT FOR ELECTRICAL WORKS (POWER, CONTROL & COMMUNICATION WIRING - CONCEALED / RECESSED APPLICATION) GI CONDUIT FOR ELECTRICAL WORKS (POWER, CONTROL & COMMUNICATION WIRING - SURFACED / EXPOSED / ABOVE FALSE CEILING APPLICATION)	GALCO DADEX JEDDAH POLYMER OR APPROVED EQUIVALENT
17	VIBRATION ISOLATOR	a) KINETICS, USA b) MASON, USA
18	ADHESIVE AND SEALANT	a) ZAHABIYA b) CLARIANT c) DUCTMATE
19	REINFORCED UL LISTED FSK FACING ALUMINIUM FOIL TAPE	a) ABRO b) 3M c) NASHUA d) SCAPA
20	SHUTT OFF VALVE	a) DANFOSS, DENMARK

SPECIFICATIONS OF LED PANEL LIGHT ;

Recessed/surface mounted LED panel light of size 600 mm × 1200 mm (2 ft × 4 ft) with high efficiency LED technology, suitable for commercial and institutional lighting applications. The luminaire shall provide uniform glare-controlled illumination with low power consumption and long operational life with following minimum specifications:

Type: LED Panel Light

Size: 2 ft × 4 ft (600 × 1200 mm)

Power Consumption: 38–45 Watts

Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement

Luminous Flux: minimum 5400 lumens

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.90

Operating Voltage: 220–240V AC, 50/60Hz

Protection Class: minimum IP20

Housing: powder coated metal body

Life Span: minimum 50,000 operating hours

Warranty: minimum 2 years replacement warranty

Compliance: IEC 60598 or equivalent international standards

The rate shall include driver, mounting accessories, connectors, suspension/fixing hardware, wiring connections, testing and commissioning, and all associated works required for complete installation and satisfactory operation

SPECIFICATIONS OF COB LED STRIP/COVE LIGHTING

Flexible COB LED strip/cove lighting complete with driver, V-profile aluminium channel and diffuser, suitable for decorative and architectural lighting applications. The LED strip shall provide continuous dot-free illumination with high color consistency and uniform light distribution with following minimum specifications:

Type: Flexible COB LED Strip Light

Color Temperature (CCT): 3000K (Warm White) or approved as per site requirement

Power Consumption: minimum 10–14 W/m

Luminous Flux: minimum 700–1250 lm/m

Color Rendering Index (CRI): ≥ 80

Protection Rating: IP20 or above

LED Type: COB continuous light technology for uniform illumination

Technical Specifications for Electrical, Wireless & HVAC Works

Life Span: minimum 50,000 operating hours

Driver: suitable electronic driver/power supply compatible with strip load

Compliance: IEC/Equivalent international standards

Warranty: minimum 2 years replacement warranty

The scope includes supply of LED strip, driver, aluminium V-profile, diffuser, mounting clips, connectors, soldering, wiring, fixing, testing and commissioning, along with all accessories, consumables and labour required for complete installation and satisfactory operation,

SPECIFICATIONS OF LED PANEL SIZE 1 FT × 4 FT (300 MM × 1200 MM)

Recessed/surface mounted LED panel light of size 1 ft × 4 ft (300 mm × 1200 mm) suitable for office, commercial and institutional lighting applications. The luminaire shall provide uniform, glare-controlled and flicker-free illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications:

Type: LED Panel Light

Size: 1 ft × 4 ft (300 × 1200 mm)

Power Consumption: 30–40 Watts

Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement

Luminous Flux: minimum 3600–4000 lumens

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.90

Operating Voltage: 220–240V AC, 50/60Hz Protection Class: minimum IP20

Mounting: recessed/surface/suspended compatible

Life Span: minimum 50,000 operating hours

Compliance: IEC 60598 or equivalent international standards

Warranty: minimum 2 years replacement warranty

The rate shall include LED driver, mounting accessories, connectors, suspension/fixing hardware, wiring connections, testing and commissioning, and all associated works required for complete installation and satisfactory operation

SPECIFICATIONS OF LED DOWN LIGHT 60WATT ;

Technical Specifications for Electrical, Wireless & HVAC Works

High efficiency surface mounted LED downlight suitable for commercial and institutional lighting applications. The luminaire shall provide uniform glare-controlled illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications:

Type: Surface Mounted LED Downlight

Power Consumption: at least 60 Watts

Correlated Color Temperature (CCT): 4000K (Neutral White) or approved as per site requirement

Luminous Flux: minimum 6600 lumens

Luminous Efficacy: minimum 100 lm/W

Color Rendering Index (CRI): ≥ 80

Power Factor: ≥ 0.90

Input Voltage: 220–240V AC, 50/60Hz

Housing Material: die-cast aluminium body

Protection Rating: minimum IP65

Mounting: surface mounted type

Driver: integral electronic driver/power supply unit

Life Span: minimum 50,000 operating hours (L70B50)

Operating Temperature: -20°C to $+40^{\circ}\text{C}$

Compliance: IEC 60598 or equivalent international standards

Warranty: minimum 2 years replacement warranty

The rate shall include supply of luminaire, driver, mounting accessories, fixing hardware, connectors, wiring connections, testing and commissioning, and all associated labour, consumables and accessories required for complete installation and satisfactory operation

SPECIFICATIONS OF LED DOWN LIGHT 12-15WATT ;

Surface mounted LED downlight suitable for commercial and institutional lighting applications. The luminaire shall provide uniform, glare-controlled and flicker-free illumination with high energy efficiency and long operational life. The fitting shall meet or exceed the following minimum specifications:

Type: Surface Mounted LED Downlight

Power Rating: 12–15 Watts

Correlated Color Temperature (CCT): 3000K / 4000K / 6500K

Luminous Flux: minimum 1200 lumens

Color Rendering Index (CRI): ≥ 80

Technical Specifications for Electrical, Wireless & HVAC Works

Power Factor: ≥ 0.80

Operating Voltage: 220–240V AC, 50/60Hz

Protection Rating: minimum IP20

Mounting Type: surface mounted

Life Span: minimum 25,000 operating hours

Compliance: IEC 60598 or equivalent international standards

Warranty: minimum 2 years replacement warranty

The rate shall include LED driver/power supply unit, mounting accessories, connectors, fixing hardware, wiring connections, testing and commissioning, and all associated labour, consumables and accessories required for complete installation and satisfactory operation, complete in all respects as directed by the Engineer In-Charge.

SPECIFICATIONS OF ELECTRIC DISTRIBUTION PANEL (NAME: P&LDB-1)

Electric Distribution Panel (Name: P&LDB-1) , Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthing braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:-

Incoming Side 1

- 01 Nos. 100 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type
- 03 Nos. Indication Lights
- 03 Nos. 2 Amp SP MCB
- 1 No. Multimeter with required CT's Current Measurement on common busbar

Incoming Side 2

- 01 Nos. 80 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type
- 03 Nos. Indication Lights
- 03 Nos. 2 Amp SP MCB
- 1 No. Multimeter with required CT's Current Measurement on common busbar

Outgoing Side 1

- 20 Nos. 20A TP MCB 10kA
- 16 Nos. 16A DP MCB 10kA

Outgoing Side 2

- 20 Nos. 10A TP MCB 10kA
- 15 Nos. 16A DP MCB 10kA

Technical Specifications for Electrical, Wireless & HVAC Works

All cable links/bus bar links must be as per outgoing load. All Circuit Breakers must be compact size, as per specifications and complying with standards, complete in all respect as directed by Engineer In-charge

The vendor must submit shop drawings for approval of the Engineer before the manufacturing of the DB.

SPECIFICATIONS OF ELECTRIC DISTRIBUTION PANEL (NAME: MDB-1)

Electric Distribution Panel (Name: MDB-1), Wall mounted finished with 16/14 SWG MS sheet, front and back doors, drawing pocket, transparent sheet, powder coated paint of RAL 7032 approved color, moveable & lockable handles of suitable brand, flush type hinged door with Earthling braid consisting of danger plate with handle, complete internal power and control wiring, MCCB Safety Plates as per DB Gauge, fixing material nut bolts, Lugs, glands and with following components:-

Incoming Side

- 01 Nos. 400 Amp Three Pole MCCB (Icu=25kA Ics=100% of Icu) adjustable type
- 03 Nos. Indication Lights
- 03 Nos. 2 Amp SP MCB
- 1 No. Multimeter with required CT's Current Measurement on common busbar

Outgoing Side

- 02 Nos. 250A TP MCCB 25kA
- 02 Nos. 100A TP MCCB 25kA
- 02 Nos. 80A TP MCCB 25kA
- 01 Nos. 60A TP MCCB 25kA

All cable links/bus bar links must be as per outgoing load. All Circuit Breakers must be compact size, as per specifications and complying with standards, complete in all respect as directed by Engineer In-charge

The vendor must submit shop drawings for approval of the Engineer before the manufacturing of the DB.

SPECIFICATIONS OF HAND DRYER

automatic electric hand dryer suitable for washroom applications, designed for high-speed and energy-efficient hand drying operation. The unit shall be wall mounted type with durable construction and shall meet or exceed the following minimum specifications:

Technical Specifications for Electrical, Wireless & HVAC Works

Type: Automatic sensor-based hand dryer

Operating Voltage: 220–240V AC, 50 Hz

Power Rating: 1500–2000 Watts

Activation: Infrared automatic sensing

Air Speed: high-speed drying performance

Body Material: ABS/metallic corrosion-resistant housing

Noise Level: low noise operation

Safety Features: overheating and overload protection

Mounting: wall mounted complete with fixing accessories

The scope includes fixing, wiring connection from nearby power source, testing, commissioning and all associated accessories, consumables, labour and hardware required for complete installation and satisfactory operation

TECHNICAL SPECIFICATIONS FOR PASSENGER LIFT

Machine Room Less (MRL) passenger lift of 3 stops (Ground + 2) minimum capacity 630Kg, as per EN-81 safety standards, operational on 380-415 Volts, 3-phase, 50 Hz, 3 stops, with following Minimum features:

- Permanent magnet gearless hoisting motor capable of serving Ground + 2 Floors with microprocessor control panel, Car Operating Panels (COP)
- Floor operating panels (FOP) One (01) on each lift lobby equipped with up/down stainless steel call buttons with braille and buzzer, door tracks, sills, door drive mechanism and its complete control system
- Reservation services system inside each car
- Indicator flicker and chime before car arrival (Audible alert system in the car announcing the floor that the car has arrived at)
- Automatic control of the door's operating closing time according to the kind of floor and call.

Technical Specifications for Electrical, Wireless & HVAC Works

- Automatic rescue device (ARD)/Emergency Landing Device,
- Full length light curtain, with door closing force limiting device
- Weight overload buzzer
- All safety devices as per safety standards of EN-81
- Telephone intercom system
- Alarm bell
- Voice Prompt System for blind persons indicating each floor reached
- Further equipped with lights, fan, call bell, emergency backup for lights, fan, alarm and intercom
- Operation manual, maintenance manual and circuit diagrams (English Version). Two Hard Copies & One Soft copy in USB.
- In accordance with manufacturer's standard design/drawings and confirming to Technical Specifications and Data. Submission of Shop Drawings after work order and As-Built Drawings after completion

TECHNICAL SPECIFICATIONS FOR SOUND SYSTEM

SPECIFICATIONS OF 2-WAY SURFACE MOUNT SPEAKER SYSTEM

professional 2-way surface mount speaker system suitable for auditorium, public address and background music applications, complete with mounting bracket and all associated accessories. The speaker shall be designed for wall/ceiling mounting and shall provide clear voice intelligibility and high-quality music reproduction. The speaker system shall meet or exceed the following minimum specifications:

Type: 2-way surface mount speaker system

Speaker Size: low frequency driver with high frequency dome tweeter

Continuous Program Power: minimum 150W

Rated Noise Power: minimum 90W

Sensitivity: minimum 91 dB (1W/1m)

Frequency Response: 50 Hz – 20 kHz or better

Dispersion: minimum 100° × 100° coverage or better

Mounting: wall/ceiling mountable with adjustable steel bracket

Construction: heavy-duty enclosure

Operating Temperature: -10°C to +50°C

Certification: EN54-24 certified outdoor/weatherproof version where specified

SPECIFICATIONS OF COMPACT TWO-WAY WALL MOUNT SPEAKER SYSTEM

Compact two-way wall mount speaker system suitable for auditorium, conference and public address applications, designed for wide dispersion, high speech intelligibility and high-quality music reproduction. The speaker shall be complete with mounting bracket and all associated accessories and shall meet or exceed the following minimum specifications:

Type: Two-way bass reflex wall mount speaker

Rated Input: minimum 30 Watts

Power Handling Capacity: minimum 140W continuous program

Rated Impedance: 8 Ohms with 70V/100V line transformer tapping

Sensitivity: minimum 90 dB (1W/1m)

Frequency Response: 80 Hz – 20 kHz (-10 dB)

Input Terminal: push-in terminal type

Enclosure Material: HIPS resin or equivalent high durability enclosure

Mounting: wall/ceiling mountable with adjustable bracket

SPECIFICATIONS OF TWO-WAY WEATHERPROOF MUSIC HORN SPEAKER

Two-way weatherproof music horn speaker suitable for outdoor public address and background music applications, designed for high intelligibility, high efficiency and wide area sound coverage. The speaker system shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications:

Type: Two-way weatherproof music horn speaker

Rated Input Power: 60 Watts minimum

Line Voltage Operation: 70V/100V line transformer type

Sensitivity: minimum 100 dB (1W/1m)

Maximum Sound Pressure Level: minimum 117 dB at rated power

Frequency Response: 100 Hz – 20 kHz or better

Dispersion Angle: minimum 90° horizontal × 80° vertical

Speaker Components:

Low Frequency: minimum 6-inch cone type

High Frequency: dome tweeter type

Dust & Water Protection: minimum IP66 rated

Enclosure Material: weatherproof ABS resin or equivalent

Finish: UV resistant outdoor coating

Suitable for outdoor installations including stadiums, parking areas, corridors and public spaces

SPECIFICATIONS OF WEATHERPROOF HIGH-INTELLIGIBILITY DRIVER UNIT

Weatherproof high-intelligibility driver unit suitable for public address and outdoor announcement applications, designed for use with compatible horn flare assembly. The driver unit shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications:

Type: High impedance driver unit for horn speaker

Rated Input Power: 50 Watts minimum

Line Voltage Operation: 70V/100V line system

Sensitivity: minimum 110 dB (1W/1m)

Frequency Response: 150 Hz – 6 kHz or better

Dust & Water Protection: minimum IP65 rated (with compatible horn assembly)

Impedance Selector: external tap selector arrangement

Construction: corrosion resistant housing with powder coated finish

Horn Coupling: standard threaded coupling suitable for compatible horn flare

Suitable for outdoor public address and announcement systems

SPECIFICATIONS OF WEATHERPROOF LONG HORN SPEAKER SUITABLE FOR OUTDOOR PUBLIC ADDRESS

Weatherproof long horn speaker suitable for outdoor public address, emergency announcement and mass notification applications, designed for high intelligibility and long-distance sound projection. The speaker shall be suitable for continuous outdoor operation and shall meet or exceed the following minimum specifications:

Type: Long horn / reflex horn speaker

Rated Input Power: minimum 30–50 Watts

Line Voltage Operation: 70V/100V line system or equivalent

Technical Specifications for Electrical, Wireless & HVAC Works

High sensitivity suitable for long-range coverage
 Frequency Response: suitable for speech intelligibility and announcement applications
 Weatherproof construction suitable for outdoor installation
 Corrosion resistant housing and mounting hardware
 Adjustable mounting bracket arrangement
 Suitable for continuous duty operation in outdoor environments

SPECIFICATIONS OF PROFESSIONAL MULTICHANNEL DIGITAL POWER AMPLIFIER

Professional multichannel digital power amplifier suitable for auditorium, public address and professional sound reinforcement applications. The amplifier shall be rack mountable and capable of delivering high power output with low distortion and reliable continuous operation. The unit shall meet or exceed the following minimum specifications:

Type: Class-D multichannel digital power amplifier
 Channels: 4 independent output channels
 Output Power:
 Minimum 1000W × 4 channels at 4Ω
 Minimum 650W × 4 channels at 8Ω
 Bridge Mode: minimum 2000W × 2 channels at 8Ω
 Frequency Response: 20 Hz – 20 kHz (±3 dB)
 Total Harmonic Distortion (THD): ≤ 0.1%
 Signal to Noise Ratio: ≥ 100 dB
 Input Impedance: 20kΩ balanced / 10kΩ unbalanced
 Input Connectors: XLR-F balanced input
 Output Connectors: NL4 Speakon speaker connectors
 LED Indicators: Protect, Clip, Signal, Power and level indicators
 Cooling System: forced air cooling front-to-rear airflow
 Power Supply: 100–240V AC, 50/60 Hz
 Power Consumption: maximum 2000W
 Mounting: standard 19-inch rack mount type
 Construction: heavy-duty metal chassis suitable for professional applications

SPECIFICATIONS OF PROFESSIONAL MIXER POWER AMPLIFIER SUITABLE FOR PUBLIC ADDRESS

Professional mixer power amplifier suitable for public address, auditorium, mosque and background music applications, capable of high-quality speech and music reproduction with multi-input mixing and zone selection facility. The amplifier shall be rack/table mount type and shall meet or exceed the following minimum specifications:

Type: Mixer Power Amplifier

Rated Output Power: 240 Watts minimum

Microphone Inputs: minimum 6 balanced MIC/LINE inputs

AUX Inputs: minimum 5 AUX inputs

Simultaneous Mixing Capability: minimum 9 input sources

Recording Input/Output facility

Speaker Zones: minimum 2 selectable speaker zones

Speaker Output: 100V line and 4–16 Ω low impedance output

Frequency Response: 50 Hz – 20 kHz (± 3 dB)

Distortion: $\leq 2\%$ at rated output

Signal Processing: provision for equalizer/processor connection

Tone Controls: independent bass and treble controls

Indicators: power, output level and zone selection LED indicators

Input Connectors: XLR/phone jack and RCA type combinations

Cooling: convection/forced air suitable for continuous operation

Power Supply: 220–240V AC, 50/60 Hz

Mounting: rack/table mountable heavy-duty chassis construction

SPECIFICATIONS OF PROFESSIONAL COMPACT DIGITAL/ANALOG AUDIO MIXING CONSOLE

Professional compact digital/analog audio mixing console suitable for auditorium, conference, studio and live sound reinforcement applications. The mixer shall provide high-quality audio processing, multi-channel mixing capability, integrated digital effects and USB audio interfacing for recording and playback applications. The unit shall meet or exceed the following minimum specifications:

Type: Professional compact mixing console

Input Channels: minimum 16 channels comprising:

Technical Specifications for Electrical, Wireless & HVAC Works

12 Mic/Line input channels

4 Mic/Stereo-Line input channels

Microphone Preamplifiers: low-noise professional grade preamps

Auxiliary Buses: minimum 6 AUX buses

Effects Processors: dual integrated digital stereo effects processors

Effects Presets: minimum 100 factory presets and 20 user programmable presets

Equalizer: 11-band stereo graphic equalizer

USB Audio Interface: professional 4-in/4-out USB interface

Audio Resolution: minimum 24-bit / 96 kHz

MIDI Interface: integrated MIDI input/output support

Frequency Response: 15 Hz – 70 kHz or better

THD: $\leq 0.01\%$

Phantom Power: +48V selectable phantom power

Display: OLED/LCD display for effects and system settings

Outputs: balanced XLR master outputs and monitor outputs

Controls: independent channel EQ, AUX, FX and gain controls

Construction: heavy-duty compact chassis suitable for portable and fixed installations

Power Supply: 100–240V AC, 50/60 Hz universal power supply.

SPECIFICATIONS OF PROFESSIONAL DYNAMIC HEADSET MICROPHONE

Professional dynamic headset microphone suitable for speech reinforcement, auditorium, presentation and live sound applications. The microphone shall provide clear voice reproduction, high gain-before-feedback and reliable hands-free operation. The unit shall meet or exceed the following minimum specifications:

Type: Dynamic close-talk headset microphone

Polar Pattern: Cardioid (unidirectional)

Frequency Response: 50 Hz – 15 kHz

Output Connector: 3-pin XLR male balanced output

Output Impedance: 150 Ω rated or better

Sensitivity: suitable for professional speech applications

Technical Specifications for Electrical, Wireless & HVAC Works

Construction: lightweight adjustable wireframe headset with flexible boom arm

Cable: attached shielded microphone cable minimum 1.2 m length

Accessories: foam windscreen and cable clip

Finish: black or approved equivalent

Operation: no phantom power required

Suitable for indoor speech, stage and presentation applications

SPECIFICATIONS OF 27U FLOOR STANDING PA EQUIPMENT RACK

27U floor standing PA equipment rack fabricated from heavy-duty steel sheet with powder coated finish and front glass door, suitable for housing professional audio and communication equipment. The rack shall be complete with ventilation arrangement, cable management provision, mounting hardware and power distribution unit (PDU). The rack shall meet or exceed the following minimum specifications:

Rack Size: 27U standard 19-inch rack

Construction: heavy-duty MS/CRCA steel sheet

Finish: powder coated anti-corrosive finish

Front Door: lockable toughened glass door

Mounting Rails: adjustable equipment mounting rails

Ventilation: fan mounting/ventilation provision

Accessories: cable manager, shelves and mounting hardware

PDU: rack mountable power distribution unit

Base: floor standing type with levelling arrangement/casters

SPECIFICATIONS OF PROFESSIONAL HANDHELD WIRED DYNAMIC MICROPHONE

Professional handheld wired dynamic microphone suitable for public address, speech and vocal applications, complete with microphone holder, cable and standard accessories. The microphone shall provide clear voice reproduction and reliable performance and shall meet or exceed the following minimum specifications:

Type: Dynamic handheld wired microphone

Polar Pattern: unidirectional/cardiod

Frequency Response: suitable for speech and vocal applications

Output Connector: standard professional audio connector

Technical Specifications for Electrical, Wireless & HVAC Works

Construction: rugged metal body suitable for continuous use

Switch: built-in ON/OFF switch

Cable: shielded low-noise microphone cable

Accessories: microphone holder/clip and carrying accessories

SPECIFICATIONS OF PROFESSIONAL IMPORTED MICROPHONE STAND

Professional imported microphone stand suitable for auditorium, conference, public address and recording applications, designed for stable support and flexible positioning of microphones. The stand shall be heavy-duty construction and shall meet or exceed the following minimum specifications:

Type: adjustable floor/table microphone stand

Construction: heavy-duty steel/metal body

Height Adjustment: adjustable

Base: stable tripod or heavy round base type

Finish: black powder coated/mat finish

Thread Compatibility: standard 5/8-inch or equivalent microphone mounting thread

Compatible with standard dynamic and condenser microphones

List of Approved Manufacturers/Sources of Equipment

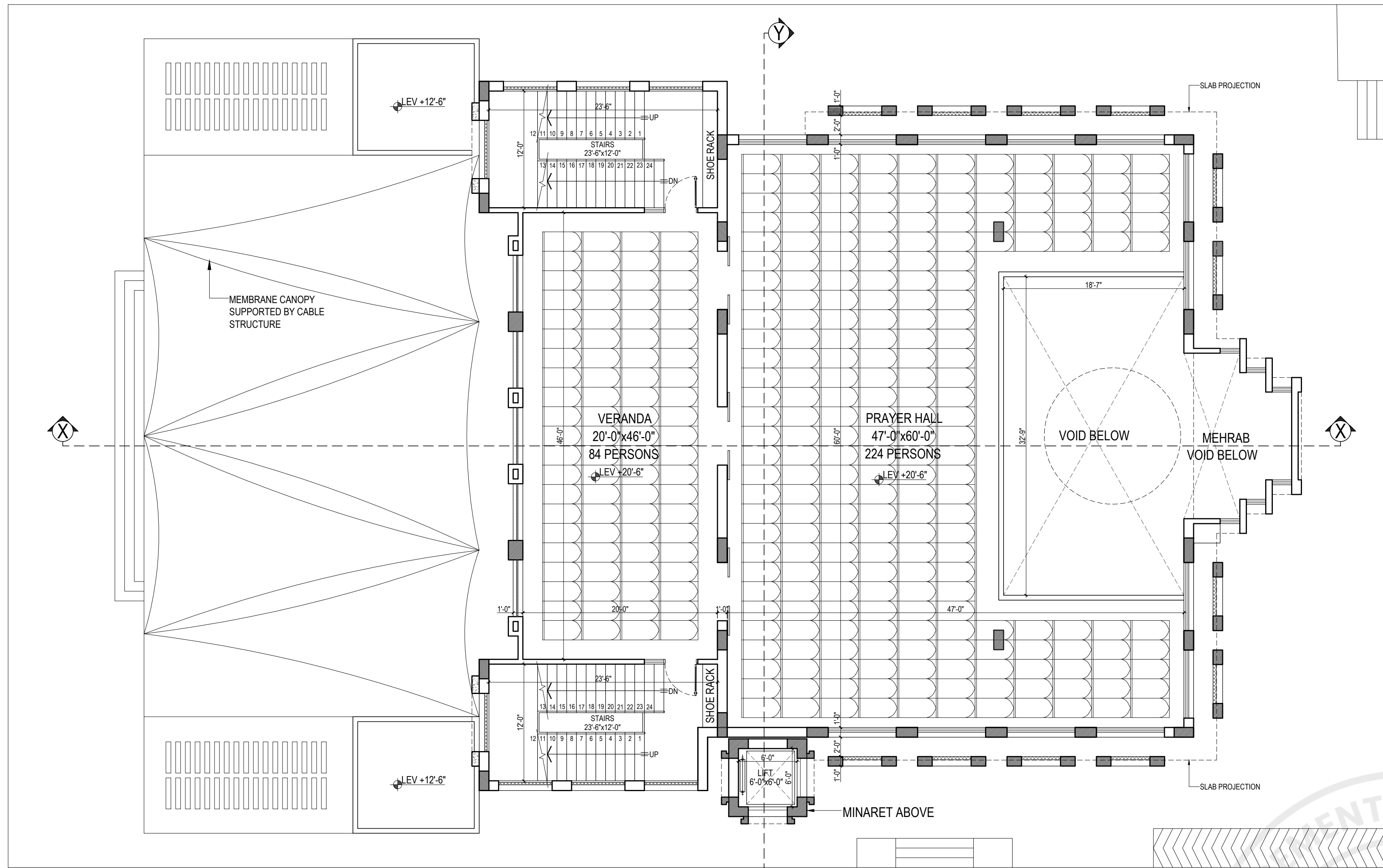
S. No.	Equipment / Material	Recommended
1	Commercial Hand Dryer	f) Siemens g) Falin h) Alpina i) Airmate j) World Dryer Or Approved Equivalent
2	Distribution Board Panel	a) Hussain And Co. b) Unique Engineering c) Hra Switchgears c) Ra Engineering Taj Engineering d) Pakistan A To Zee, e) Pakistan Karimi Electromech System Or Approved Equivalent

Technical Specifications for Electrical, Wireless & HVAC Works

3	Electric Power Cables	Pakistan Cables Fast Cables New Age Cables or approved equivalent Pioneer Cables Or Approved Equivalent
4	Hangers & Supports	A) Hilti B) Inka C) Sikla D) Index or approved equivalent
5	Upvc Piping	j) Nepro, Uae k) Cosmoplast, Uae l) Jeddah Polymer m) Pakarab or approved equivalent
6	Pvc Conduit For Electrical Works (Power, Control & Communication Wiring – Concealed / Recessed Application) Gi Conduit For Electrical Works (Power, Control & Communication Wiring – Surfaced / Exposed / Above False Ceiling Application)	d) Hilal, Pakistan e) Premier, Pakistan f) Dadex, Pakistan d) Iil, Pakistan n) Jeddah Polymer o) Pakarab or approved equivalent
7	Circuit Breakers	b) Schneider Electric c) ABB or approved equivalent
8	Lights	D) Philips E) Pierlite F) Osram or approved equivalent
9	Sound System	b. TOA or approved equivalent
10	Passenger Lift	e) Mitsubishi f) Schindler g) Kone h) Suzhou Fuji or approved equivalent

NB: Bidder must submit the technical submittal of each item to the Engineer In-charge for approval before delivery of any material. The Bidder shall fill the name of only one manufacturer for each equipment/material on which the tender is based. He shall be bound to supply the equipment from the same manufacturer. In case, the Bidder gives names of more than one manufacturer against any equipment, the Engineer / Owner can ask the Bidder supply the equipment from any one of them.

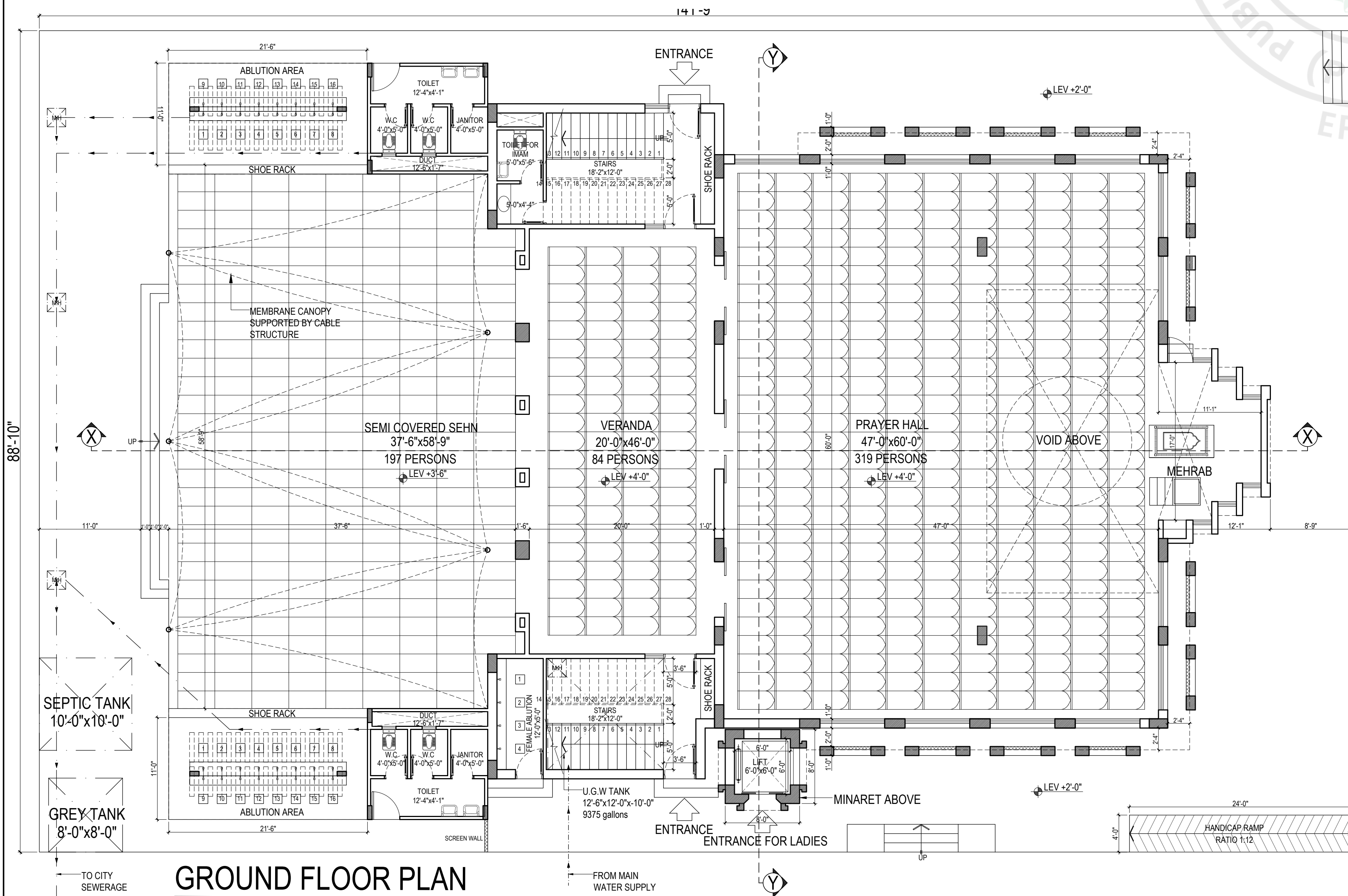
* All Equipment/accessories shall be procured from OEM/ OEM Authorized agent.



FIRST FLOOR PLAN

308 PERSONS

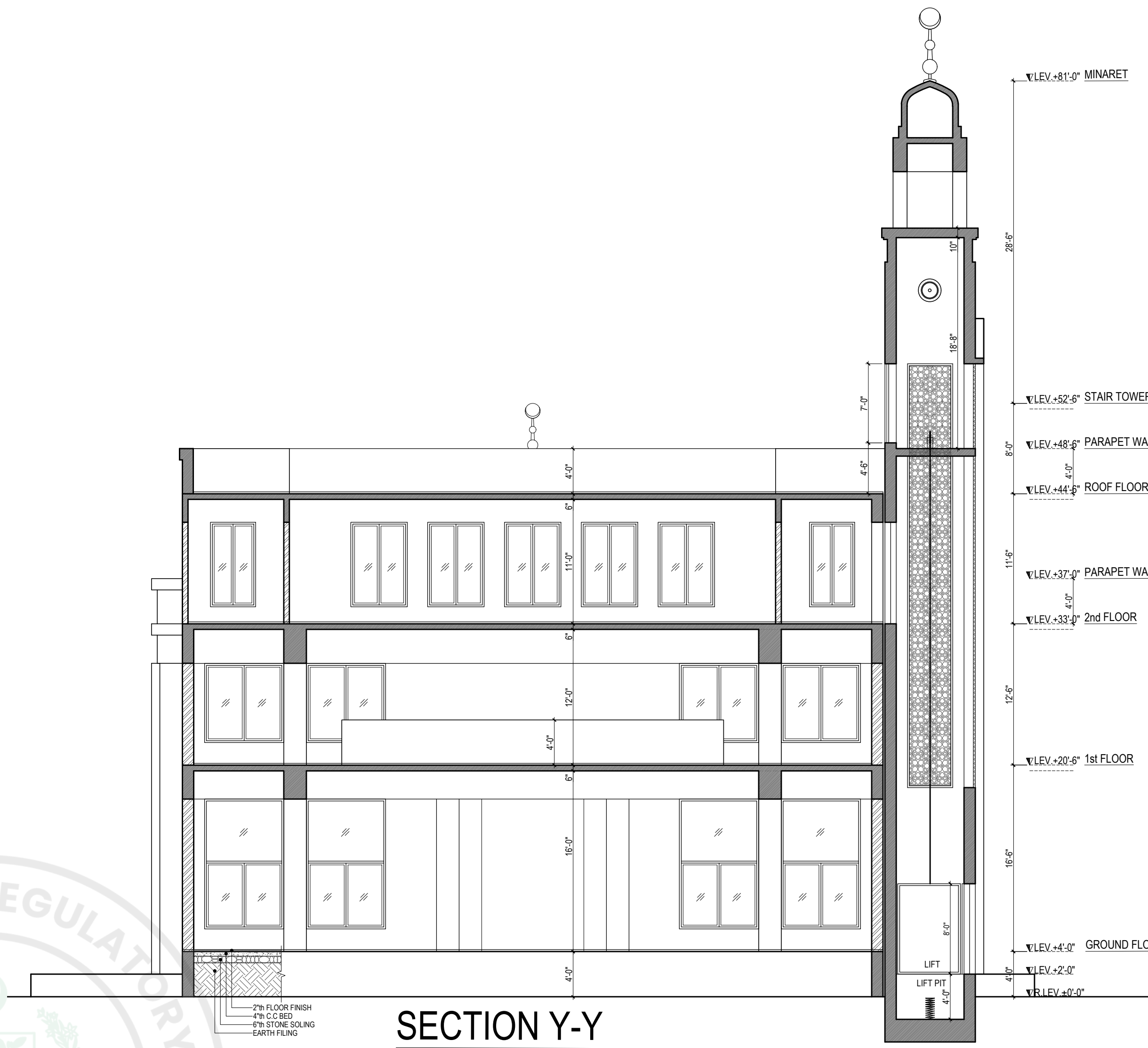
SCALE: 1/8"=1'-0"



GROUND FLOOR PLAN

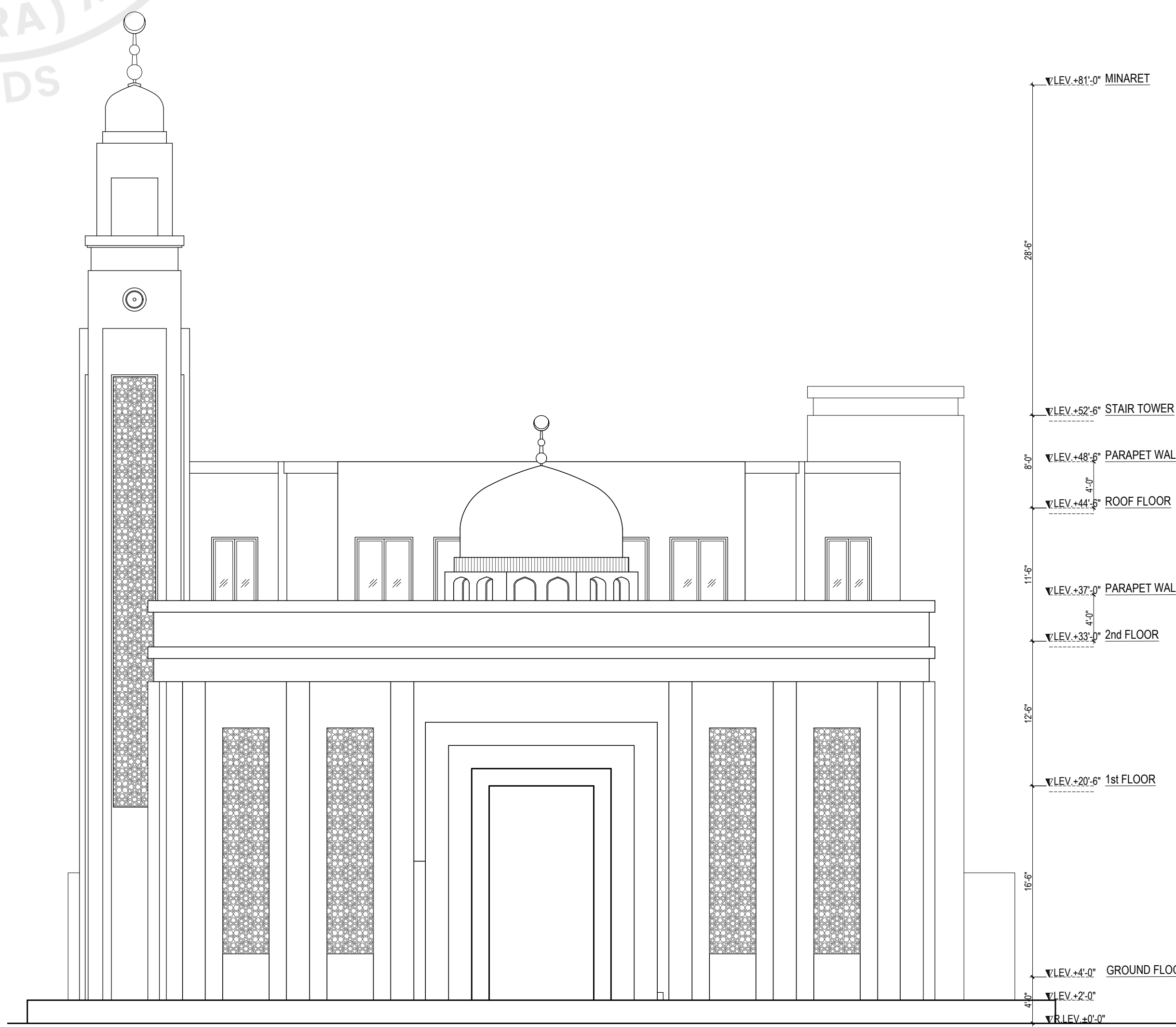
600 PERSONS

SCALE: 1/8"=1'-0"



SECTION Y-Y

SCALE: 1/8"=1'-0"



FRONT ELEVATION

SCALE: 1/8"=1'-0"

SCHEDULE OF AREA	
DETAIL OF COVERED AREA	
AREA OF GROUND FLOOR	= 5457.75 sq.fts
AREA OF 1st FLOOR	= 5212.00 sq.fts
AREA OF 2nd FLOOR	= 3310.25 sq.fts
AREA OF STAIR TOWER	= 677.50 sq.fts
AREA OF LIFT MACHINE ROOM	= 64.00 sq.fts
TOTAL COVERED AREA	= 14721.50 sq.fts

DETAIL AREA OF GROUND FLOOR	
A = 34'-06" x 12'-00" x 2	= 828.00 sq.fts
B = 25'-06" x 05'-06"	= 140.25 sq.fts
C = 23'-06" x 08'-00"	= 188.00 sq.fts
D = 20'-06" x 46'-00"	= 943.00 sq.fts
E = 23'-06" x 13'-06"	= 317.25 sq.fts
F = 10'-01" x 62'-00"	= 625.00 sq.fts
G = 42'-04" x 64'-04"	= 2723.00 sq.fts
H = 08'-00" x 08'-00"	= 64.00 sq.fts
I = 42'-00" x 02'-04"	= 97.75 sq.fts
J = 03'-01" x 20'-00"	= 61.50 sq.fts
K = 02'-08" x 16'-00"	= 42.50 sq.fts
L = 03'-00" x 12'-00"	= 36.00 sq.fts
DEDUCTION	= 6066.25 sq.fts
1 = 18'-07" x 32'-09"	= 608.50 sq.fts
TOTAL	= 5457.75 sq.fts

DETAIL AREA OF FIRST FLOOR	
A = 25'-06" x 13'-06"	= 344.25 sq.fts
B = 22'-00" x 46'-00"	= 1012.00 sq.fts
C = 25'-06" x 08'-00"	= 204.00 sq.fts
D = 23'-06" x 05'-06"	= 129.25 sq.fts
E = 42'-04" x 02'-04"	= 98.50 sq.fts
F = 50'-04" x 62'-00"	= 3120.00 sq.fts
G = 41'-05" x 02'-05"	= 100.00 sq.fts
H = 08'-00" x 08'-00"	= 64.00 sq.fts
I = 03'-01" x 20'-00"	= 61.50 sq.fts
J = 02'-08" x 16'-00"	= 42.50 sq.fts
K = 03'-00" x 12'-00"	= 36.00 sq.fts
TOTAL	= 5212.00 sq.fts

DETAIL AREA OF SECOND FLOOR	
A = 25'-06" x 13'-06"	= 344.25 sq.fts
B = 22'-00" x 46'-00"	= 1012.00 sq.fts
C = 25'-06" x 08'-00"	= 204.00 sq.fts
D = 23'-06" x 05'-06"	= 129.25 sq.fts
E = 08'-06" x 62'-00"	= 527.00 sq.fts
F = 19'-11" x 44'-00"	= 876.00 sq.fts
G = 08'-00" x 08'-00"	= 64.00 sq.fts
H = (m ²) 07'-00" x 07'-00" x 3.14	= 153.75 sq.fts
TOTAL	= 3310.25 sq.fts

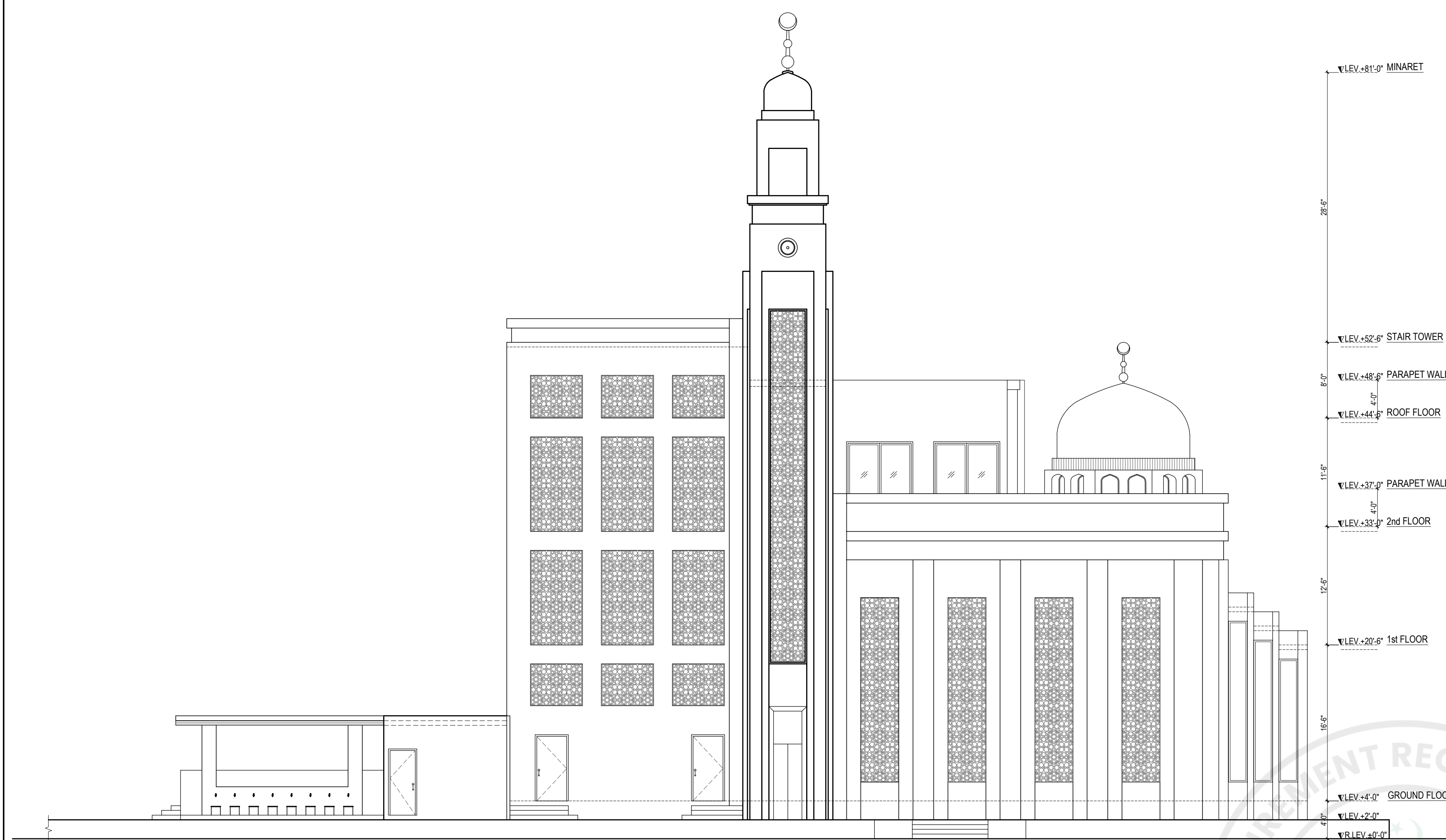
DETAIL AREA OF STAIR TOWER	
A = 25'-06" x 13'-06"	= 344.25 sq.fts
B = 25'-06" x 08'-00"	= 204.00 sq.fts
C = 23'-06" x 05'-06"	= 129.25 sq.fts
TOTAL	= 677.50 sq.fts

DETAIL AREA OF LIFT MACHINE ROOM	
C = 08'-00" x 08'-00"	= 64.00 sq.fts

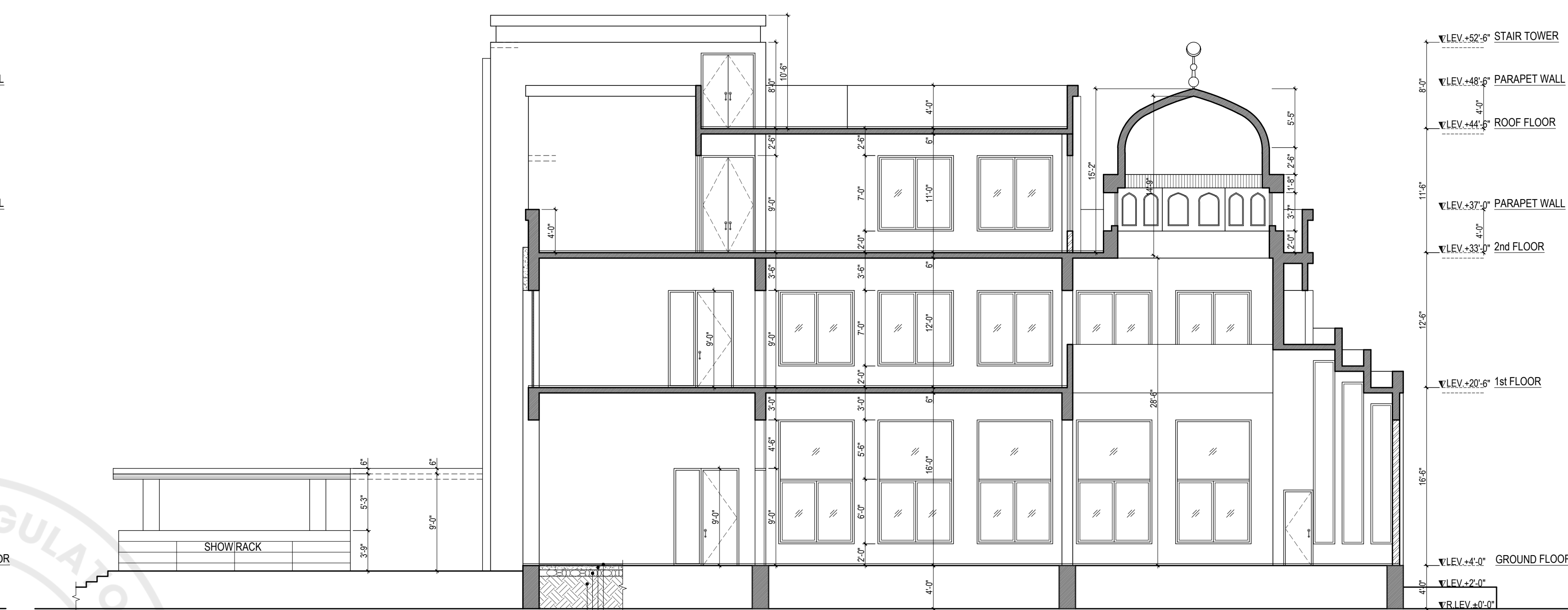
CALCULATION OF NUMBERS OF STEPS	
RISER = 7"	
TREAD = 1'-0"	
NUMBER OF STEPS REQUIRED FROM GROUND TO FIRST (RISER 6" TO 7")	= 28
NUMBER OF STEPS REQUIRED FROM FIRST TO SECOND (RISER 6" TO 7")	= 24

SCHEDULE OF DOORS / WINDOWS	
DOORS NOT LESS THAN	2' - 6" x 7' - 0"
WINDOWS NOT LESS THAN	2' - 0" x 4' - 0"
VENTILATORS NOT LESS THAN	2' - 0" x 2' - 0"

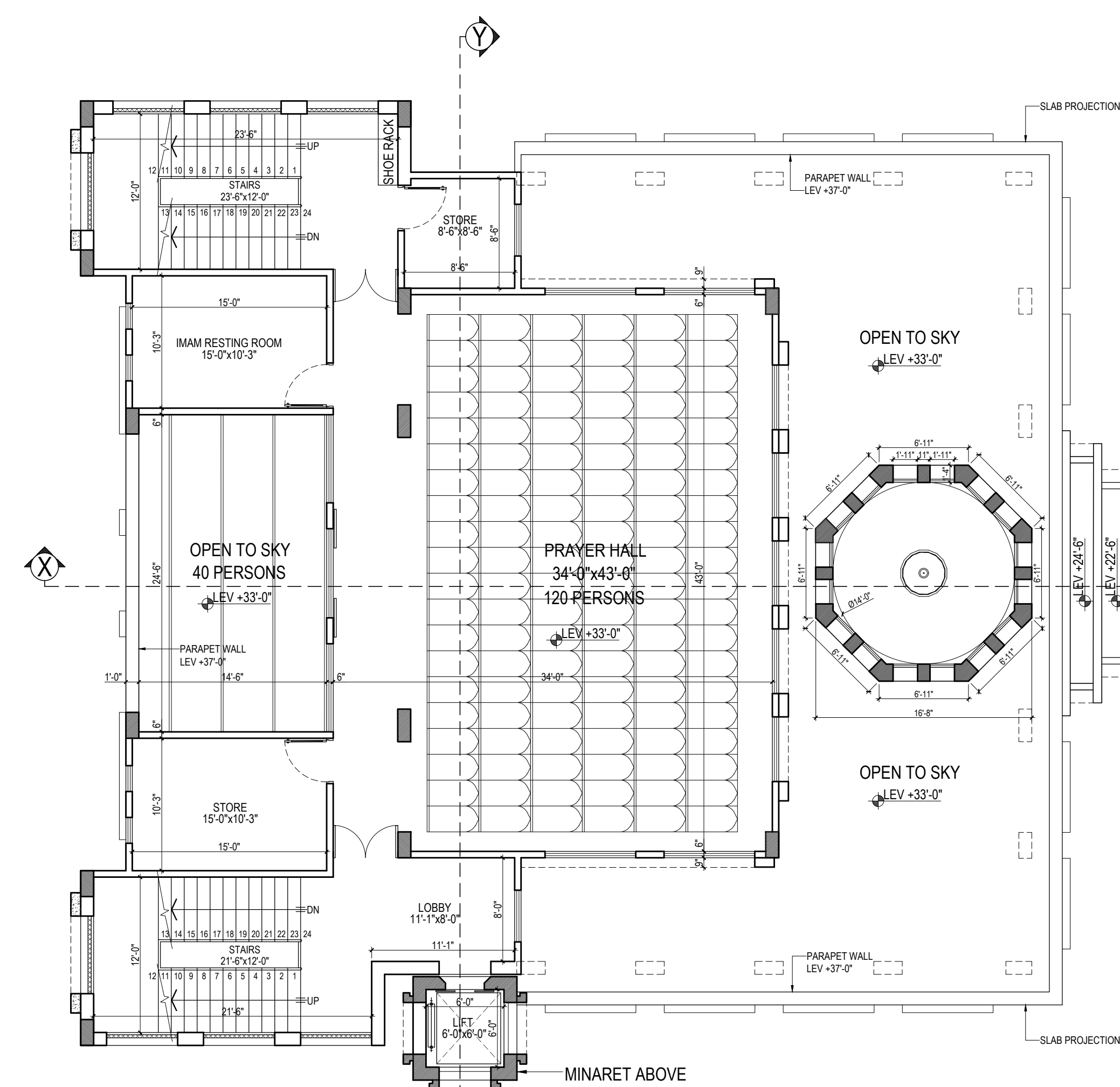
OWNER:	
ARCHITECT:	
STRUCTURE ENGINEER:	
PROJECT	
STATE BANK OF PAKISTAN HEAD OFFICE KARACHI	
TITLE	
SUBMISSION DRAWING	
JOB NO.	DRG. NO.
PRO / 324 / 25	SB - 01 / 03
NORTH	
CHECKED	
CAD BY	
SCALE	
DATE	
29-10-2025	
parc international	
ARCHITECTURE & PLANNING CONSULTANTS	
18/5, SOHRABH Commercial Centre - 11th Fl. D-11/5	
Karachi - Telephone: 35550307, 35550308	
Email: parcinternational@gmail.com	



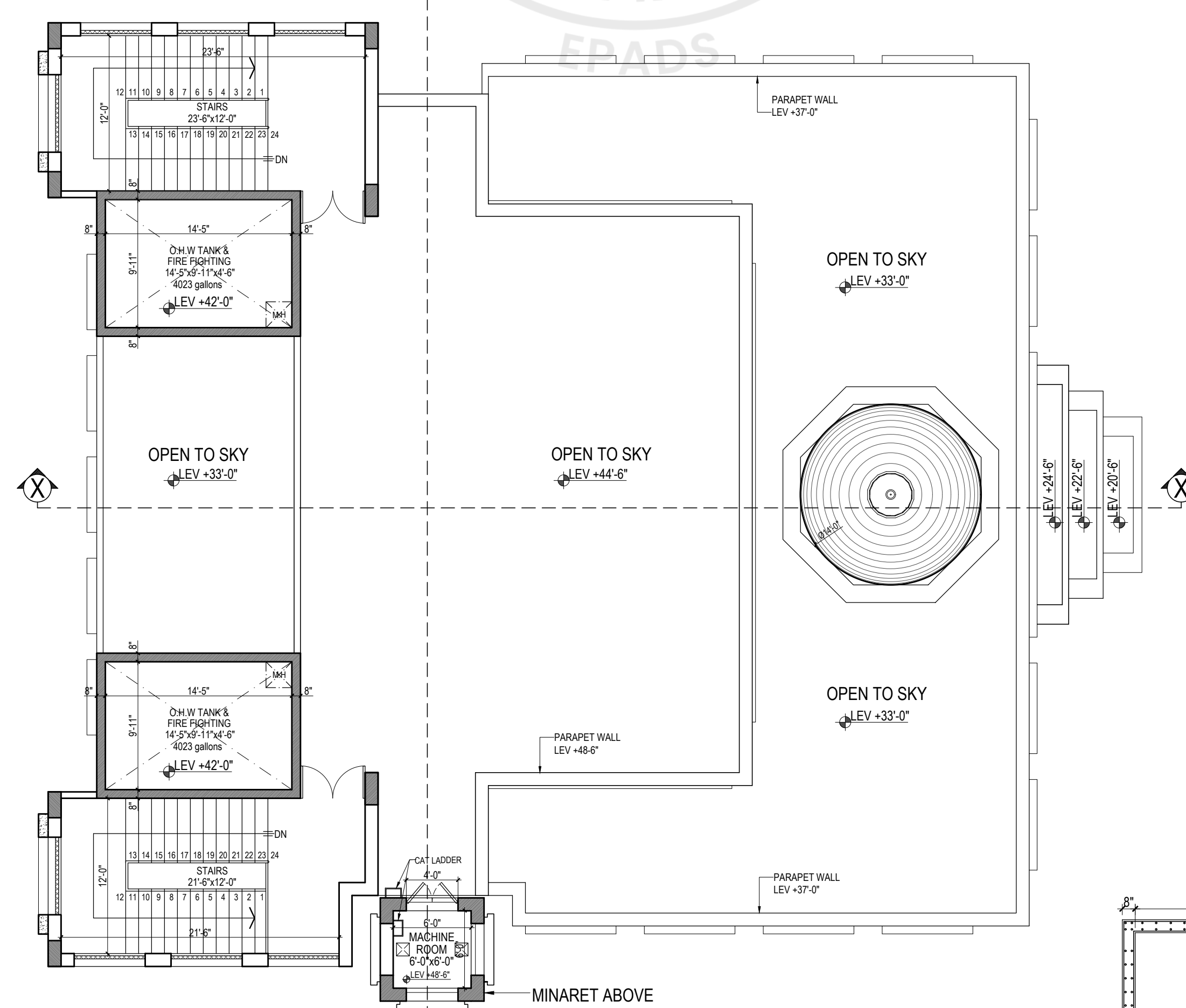
SIDE ELEVATION
SCALE: 1/8"=1'-0"



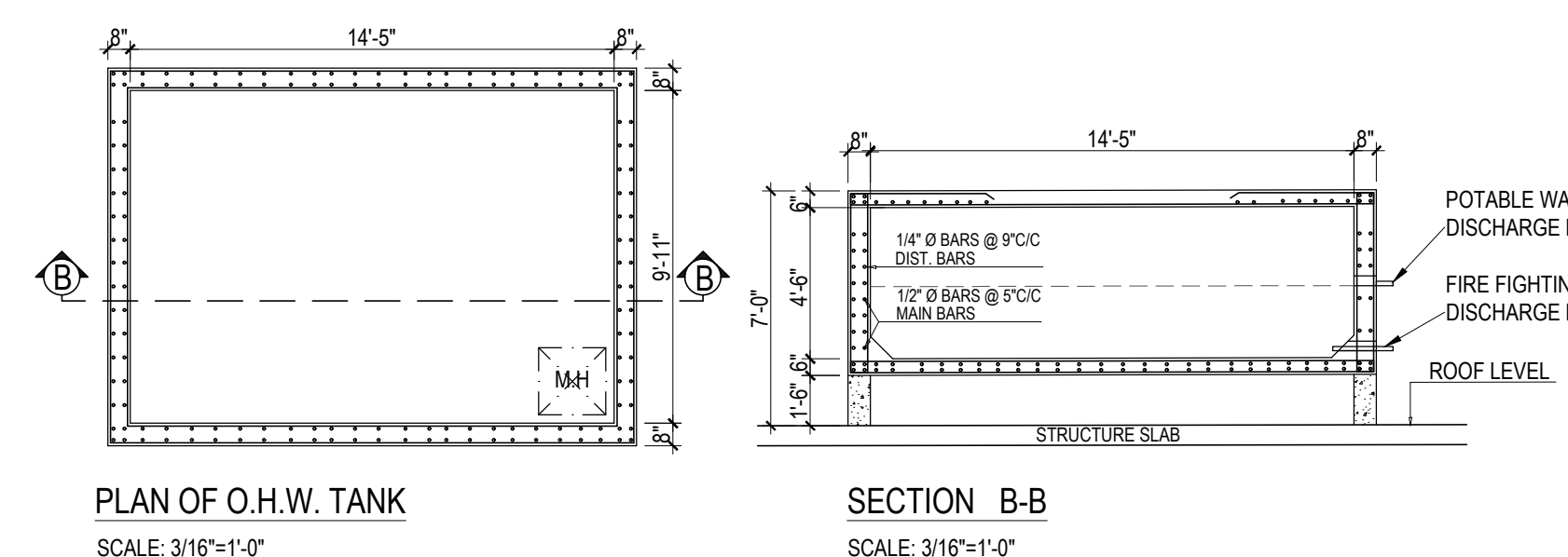
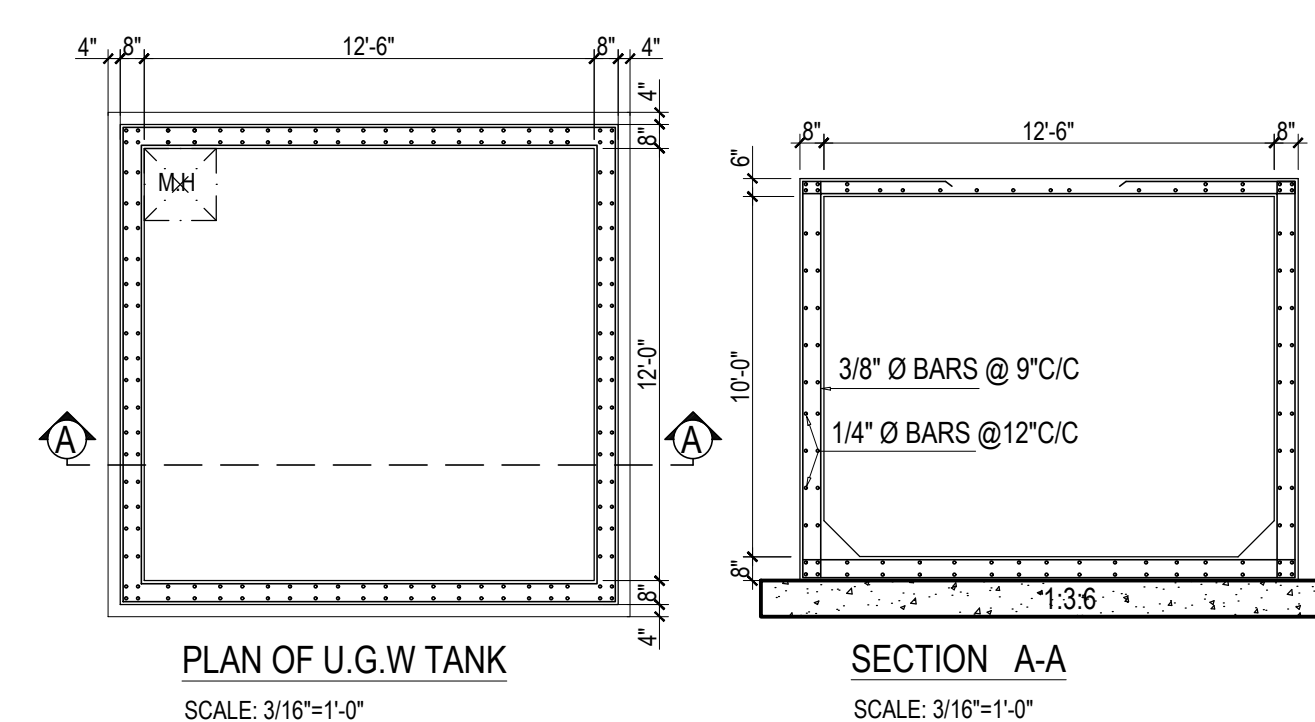
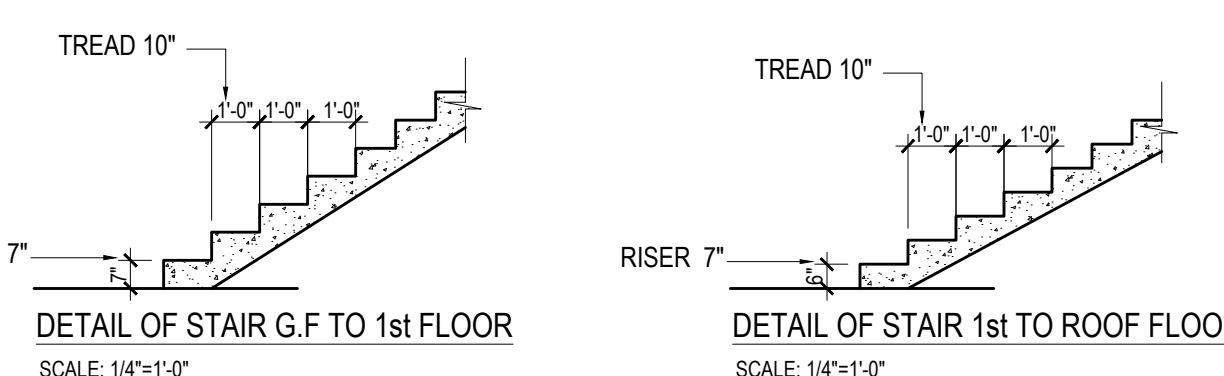
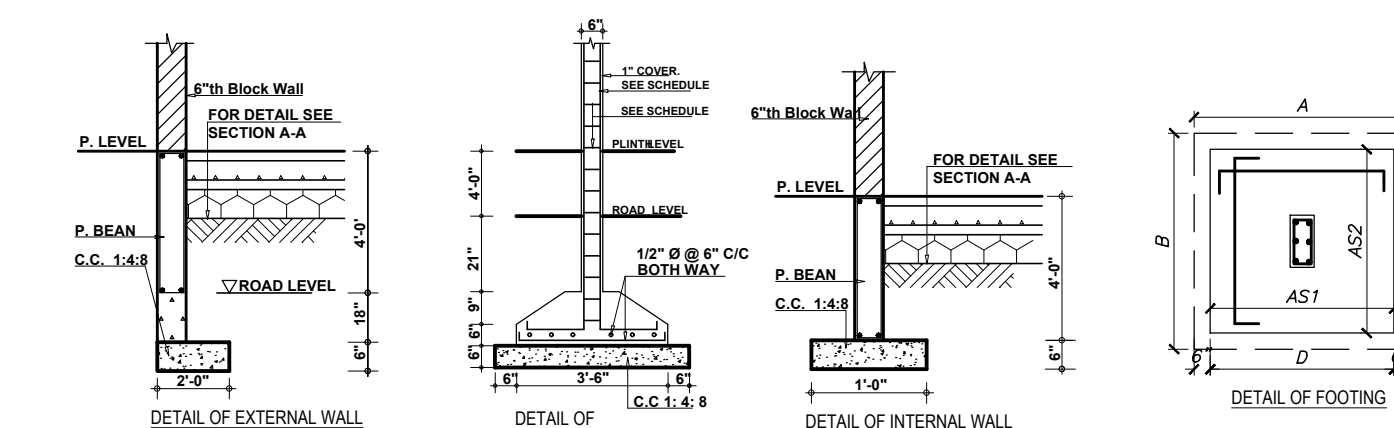
SECTION X-X
SCALE: 1/8"=1'-0"

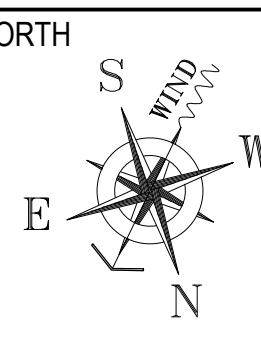


SECOND FLOOR PLAN
160 PERSONS
SCALE: 1/8"=1'-0"



ROOF FLOOR PLAN
160 PERSONS
SCALE: 1/8"=1'-0"



OWNER:			
ARCHITECT:		STRUCTURE ENGINEER:	
PROJECT MOSQUE STATE BANK OF PAKISTAN HEAD OFFICE KARACHI			
TITLE SUBMISSION DRAWING			
JOB NO. PRO / 324 / 25	DRG. NO. SB - 02 / 03	NORTH 	
CHECKED	Abdul Waheed		
CAD BY			
SCALE 1/8"=1'-0"			
DATE 29-10-2025			
 ARCHITECTURE & PLANNING CONSULTANTS 16-C, BCDHARR Commercial Lane 1, PH-VI, D-11/1 Karachi - 75500307, 75500308 email: parcinternational@gmail.com			

GENERAL NOTE:

- PLEASE ENSURE THAT ALL LAYOUTS AND LEVELS ARE CONSISTENT WITH THE ARCHITECTURAL DRAWINGS.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS IN THE FIELD AND BE RESPONSIBLE FOR ACCURATE COORDINATION, ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD BEFORE PROCEEDING.
- ANY DAMAGES TO EXISTING CONDITIONS DURING NEW CONSTRUCTION WILL BE PATCHED AND REPAIRED AT NO EXTRA COST TO THE OWNER.
- PROVIDE TEMPORARY SUPPORT WHEREVER REQUIRED DUE TO CONSTRUCTION SEQUENCING FOR THE SUPPORT OF THE STRUCTURE. SUCH SUPPORT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL REMAIN IN PLACE AS LONG AS REQUIRED TO MAINTAIN SAFETY.
- CAREFUL PLANNING OF THE CONSTRUCTION SEQUENCE IS ESSENTIAL TO MINIMIZE ANY ADVERSE EFFECTS ON THE EXISTING STRUCTURE. TEMPORARY SUPPORTS MAY BE REQUIRED DURING THE CONSTRUCTION PHASE TO ENSURE STABILITY.
- ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH LOCAL SAFETY REGULATIONS AND STANDARDS. PROPER SCAFFOLDING, FALL PROTECTION, AND SAFETY BARRIERS MUST BE IN PLACE DURING CONSTRUCTION.
- CONTRACTOR WILL SUBMIT CONCRETE MIX DESIGN, MATERIAL SPECIFICATIONS AND OTHER SUBMITTALS FOR REVIEWS AND APPROVAL.
- PROPER DRAINAGE PROVISIONS MUST BE INCORPORATED AROUND THE FOUNDATION TO PREVENT WATER ACCUMULATION THAT MAY AFFECT THE STRUCTURAL STABILITY. THE DRAINAGE SYSTEM MUST BE INSTALLED AS PER THE DESIGN AND LOCAL STANDARDS.

DESIGN AND CODES

- THE DESIGN IS BASED ON THE DIMENSIONS PROVIDED BY THE ARCHITECT FOR THE NEW STRUCTURE, AND THESE DIMENSIONS HAVE BEEN USED FOR THE STRUCTURAL DESIGN.
- THE MASJID STRUCTURE HAS BEEN DESIGNED FOR GROUND + 2 FLOORS ONLY.
- THE MINARET STRUCTURE HAS BEEN DESIGNED FOR A HEIGHT OF 89'-0", AS SPECIFIED IN THE ARCHITECTURAL DRAWINGS.
- ALL RCC WORK IS DESIGNED IN ACCORDANCE WITH THE ACI 318-19 CODE.
- STORAGE OF SAND, DEBRIS, OR ANY MATERIALS EXCEEDING THE DESIGNATED LIVE LOAD LIMITS IS STRICTLY PROHIBITED ON EACH FLOOR. THE ALLOWABLE LIVE LOADS BASED ON USAGE ARE AS FOLLOWS:
FIRST FLOOR (PRAYER AREA): 100 PSF
SECOND FLOOR (PRAYER AREA): 100 PSF
SECOND FLOOR (INACCESSIBLE AREA): 40 PSF
ACCESSIBLE ROOF (FOR PRAYER): 100 PSF
- WEIGHT OF 3" FINISHES ON EACH FLOOR HAS BEEN ACCOUNTED INTO THE DESIGN.
- THE MINARET STRUCTURE HAS BEEN DESIGNED CONSIDERING A BASIC WIND SPEED OF 80 MPH IN ACCORDANCE WITH BCOP-2007.
- THE MASJID AND MINARET STRUCTURES HAVE BEEN DESIGNED FOR SEISMIC ZONE 2B APPLICABLE TO KARACHI.
- THE SOIL PROFILE TYPE SD HAS BEEN ADOPTED IN THE ANALYSIS BASED ON THE SOIL INVESTIGATION REPORT PROVIDED BY THE CLIENT.
- THE FOUNDATION HAS BEEN DESIGNED USING AN SOIL ALLOWABLE BEARING CAPACITY OF 0.9 TSF AT A DEPTH OF 2.5 METERS BELOW THE E.G.L., AS PER SOIL REPORT PROVIDED BY THE ARCHITECT.
- SULPHATE-RESISTANT CEMENT SHOULD BE USED UP TO THE PLINTH LEVEL.
- WATERPROOFING SHALL BE APPLIED TO ALL FOUNDATION WALLS BELOW GROUND LEVEL AS SPECIFIED IN THE DRAWING.
- ENSURE THAT THE WATERPROOFING MEMBRANE IS CONTINUOUS AND FREE OF ANY HOLES OR DAMAGE.

MATERIALS & DETAILING

- CONCRETE SHOULD BE DESIGN MIX HAVING CYLINDRICAL STRENGTH AT 28 DAYS.
 - COLUMNS $f_c' = 4000$ psi
 - WALL $f_c' = 4000$ psi
 - U.G.W.TANK $f_c' = 4000$ psi
 - O.H.W.TANK $f_c' = 4000$ psi
 - FOUNDATIONS $f_c' = 3000$ psi
 - BEAM AND SLAB $f_c' = 3000$ psi
- ALL STEEL IS TOR /DEFORMED STEEL HAVING MIN.YIELD STRENGTH OF 60 ksi AND ULTIMATE STRENGTH OF 90 ksi CONFORMING TO ASTM A615.
- CUTTING, PLACING, OVER LAPPING SHALL BE AS PER A.C.I.CODE.
- WATER USED FOR CONCRETING AND CURING SHOULD BE FREE FROM DUST, DIRT, AND SHOULD BE POTABLE.
- ALL R.C.C.WORK TO BE PROPERLY VIBRATED THROUGH ELECTROMECHANICAL VIBRATORS.
- CURING PERIOD FOR ALL ELEMENTS OF STRUCTURES SHALL BE 07 DAYS.
- PROVIDE CLEAR COVER AS UNDER ,IF NOT SPECIFIED.
 - FOUNDATION 3" TO MAIN BOTTOM REINFORCEMENT.
 - FOUNDATION 2" TO MAIN TOP REINFORCEMENT.
 - COLUMNS,WALLS 1" TOP, BOTTOM & FROM SIDE
 - SLAB 3/4" TOP & BOTTOM (MAIN REINFORCEMENT).
 - BEAMS 1 1/2" TO MAIN REINFORCEMENT TOP & BOTTOM AND 1" FROM SIDE.
- PROPER WATERPROOFING MEASURES MUST BE IMPLEMENTED, PARTICULARLY AT THE JUNCTIONS BETWEEN THE RCC GROUND FLOOR AND THE RETAINING WALL, TO PREVENT WATER INGRESS EFFECTIVELY.
- ALL SURFACES OF R.C.C. AND BLOCK WORK IN CONTACT WITH SOIL MUST BE TREATED WITH A WATERPROOF SEAL COATING, MADE OF APPROVED MATERIAL, AS DIRECTED BY THE ENGINEER-IN-CHARGE.

EXCAVATION:

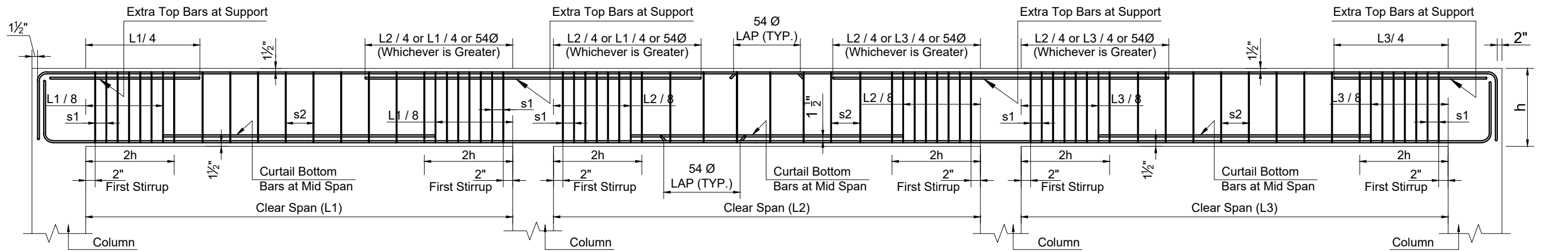
- EXCAVATION SHOULD BE CARRIED OUT TO THE REQUIRED DEPTH AND WIDTH AS PER STRUCTURAL DRAWINGS OR AS DIRECTED BY THE ENGINEER-IN-CHARGE, ENSURING PROPER CLEARANCE FOR FOUNDATION ELEMENTS AND OTHER UTILITIES.
- PROVIDE ADEQUATE SHORING OR BRACING TO PREVENT SOIL COLLAPSE DURING EXCAVATION, ESPECIALLY IN DEEP EXCAVATIONS OR WHERE SOIL CONDITIONS ARE UNSTABLE.
- ENSURE THE SAFETY OF WORKERS AND THE SURROUNDING AREA BY USING SUITABLE PROTECTIVE MEASURES FOR TRENCH SIDES AND SLOPES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE EXCAVATED AREA AND ENSURING THAT IT REMAINS IN A SAFE AND DRY CONDITION AT ALL TIMES.
- IN CASE OF WATER ACCUMULATION OR HIGH WATER TABLE, TAKE NECESSARY MEASURES LIKE DEWATERING OR INSTALLING WATERPROOF BARRIERS TO PREVENT WATER FROM ENTERING THE EXCAVATION SITE, PARTICULARLY FOR FOUNDATION WORK.
- ALL EXCAVATED MATERIAL SHALL BE DISPOSED OF ACCORDING TO ENVIRONMENTAL REGULATIONS AND SITE-SPECIFIC REQUIREMENTS.
- SEPARATE AND STOCKPILE ANY USABLE SOIL OR MATERIAL FOR BACKFILLING IF APPROVED BY THE ENGINEER.
- ENSURE THAT THE EXCAVATION DOES NOT NEGATIVELY IMPACT EXISTING STRUCTURES OR UTILITIES.
- ANY EXCAVATION CLOSE TO EXISTING FOUNDATIONS MUST BE CLOSELY MONITORED TO AVOID UNDERMINING OR DESTABILIZING NEARBY STRUCTURES.
- ENSURE PROPER SAFETY MEASURES, INCLUDING BARRIERS AND WARNING SIGNS, ARE IN PLACE AROUND THE EXCAVATION SITE TO PROTECT WORKERS AND THE PUBLIC.
- FOLLOW THE OSHA OR LOCAL SAFETY REGULATIONS FOR EXCAVATION WORK TO PREVENT ACCIDENTS.
- AFTER COMPLETING THE FOUNDATION WORK, BACKFILL THE EXCAVATION WITH CLEAN, COMPACTED MATERIAL AS PER THE APPROVED DRAWING OR AS DIRECTED BY THE ENGINEER.
- ENSURE BACKFILLING IS DONE IN LAYERS TO MAINTAIN PROPER COMPACTION AND AVOID SETTLING.
- ENSURE THAT THE EXCAVATION SITE ALLOWS FOR THE SAFE MOVEMENT AND OPERATION OF MACHINERY SUCH AS EXCAVATORS, DUMP TRUCKS, OR CRANES, WITHOUT DISRUPTING THE SURROUNDING ENVIRONMENT.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF ADJACENT EXISTING STRUCTURES, PROVIDING ADEQUATE SHORING AND BRACING DURING EXCAVATION AND CONSTRUCTION AS REQUIRED. ALL MEASURES MUST BE IMPLEMENTED TO THE SATISFACTION OF THE ENGINEER-IN-CHARGE.

COMPACTION

- ALL BACKFILL MATERIALS AROUND FOUNDATIONS, RETAINING WALLS, OR OTHER STRUCTURAL ELEMENTS MUST BE COMPACTED TO THE REQUIRED DENSITY AS PER THE SOIL COMPACTION STANDARDS.
- USE MECHANICAL COMPACTION METHODS, SUCH AS VIBRATORY ROLLERS OR PLATE COMPACTORS, TO ACHIEVE THE SPECIFIED COMPACTION LEVEL.
- BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 92% OF THE MODIFIED PROCTOR DENSITY IN LAYERS NOT EXCEEDING [150MM], AND SHOULD BE FREE FROM LARGE STONES, DEBRIS, OR ANY MATERIAL THAT MAY COMPROMISE THE STABILITY OF THE FOUNDATION.
- EACH LAYER MUST BE THOROUGHLY COMPACTED BEFORE PLACING THE NEXT LAYER TO PREVENT VOIDS OR WEAK SPOTS.
- ENSURE THAT THE BACKFILL MATERIAL IS WITHIN THE SPECIFIED MOISTURE CONTENT RANGE DURING COMPACTION. TOO WET OR TOO DRY CONDITIONS MAY LEAD TO INADEQUATE COMPACTION AND RESULT IN SETTLEMENT ISSUES.
- IF THE MOISTURE CONTENT IS OUTSIDE THE REQUIRED RANGE, ADJUST BY ADDING WATER OR ALLOWING THE MATERIAL TO DRY BEFORE COMPACTING.
- COMPACTION TESTING SHALL BE CONDUCTED AT REGULAR INTERVALS BY A QUALIFIED TESTING AGENCY TO CONFIRM THAT THE SPECIFIED COMPACTION LEVELS HAVE BEEN ACHIEVED.

TYPICAL SLAB REINFORCING DETAILING

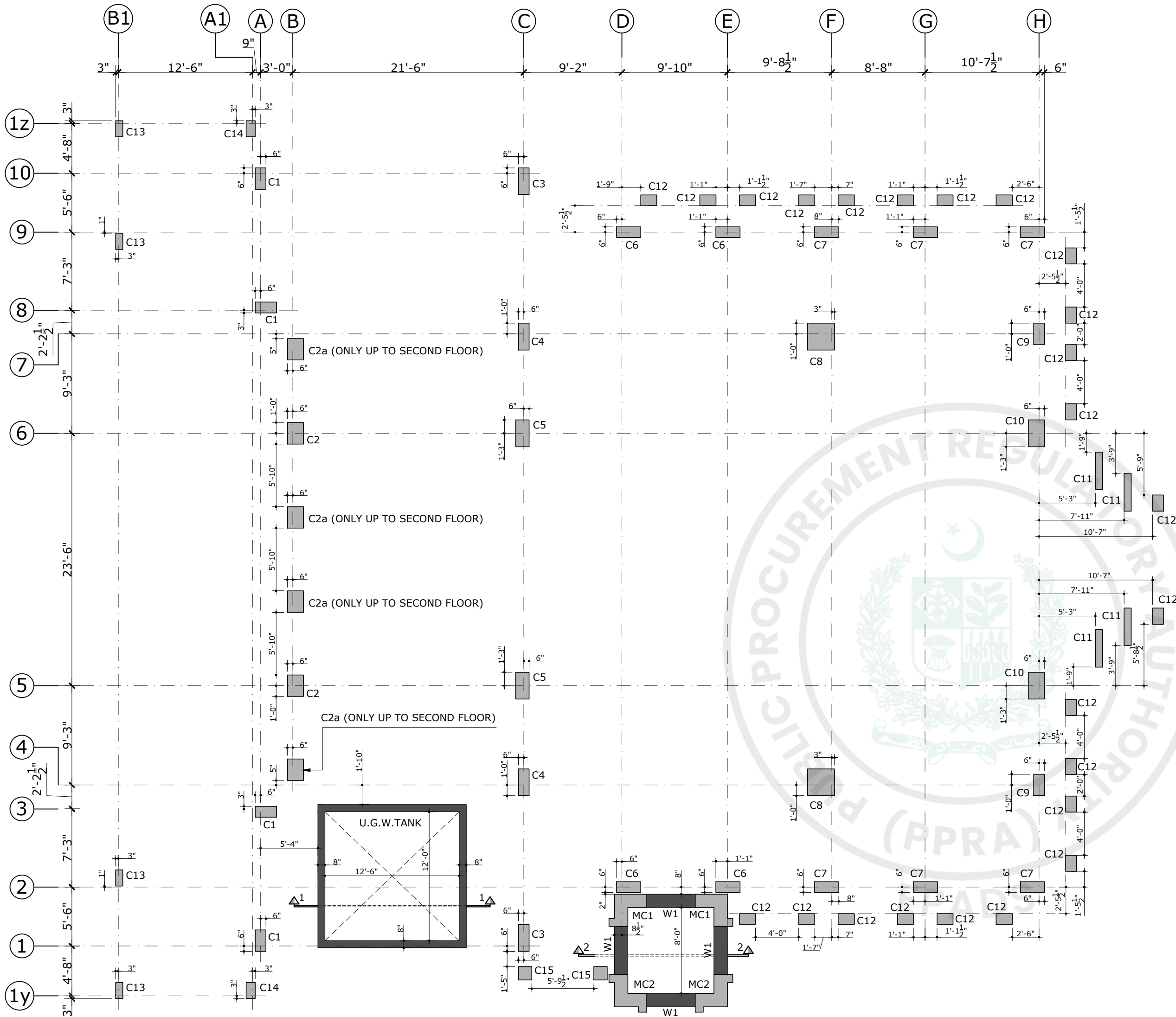
The bottom reinforcement lap should be placed at the beam support when the bar reaches its maximum available length for the next span (if applicable). Similarly, the top reinforcement lap should be positioned at the midpoint between two beam supports when the bar extends its maximum length for the next span (if applicable).



TYPICAL BEAM REINFORCEMENT DETAILING

s1=min(d/4,8db,12")
s2=min(d/2,12")
where db = minimum dia of longitudinal reinforcement

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com		COLUMN LAYOUT PLAN & COLUMN SCHEDULE (SHEET 1)				M.K	MUDASSIR	ST-01
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.							SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



COLUMN LAYOUT PLAN
SCALE:- (1/8"=1'-0")

TOP ROOF / STAIR TOWER / O.H.W. TANK				
TO	● 10-5/8"Ø	● 8-5/8"Ø	● 12-3/4"Ø	
S.LEV.(+)44'-3" ROOF	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@4"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	
TO				
TO	● 10-5/8"Ø	● 10-5/8"Ø	● 12-3/4"Ø	● 12-5/8"Ø
S.LEV.(+)32'-9" SECOND FLOOR	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c
TO				
TO	● 10-5/8"Ø	● 16-5/8"Ø	● 12-3/4"Ø	● 12-5/8"Ø
S.LEV.(+)20'-3" FIRST FLOOR	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c
TO				
TO	● 10-5/8"Ø	● 16-5/8"Ø	● 14-3/4"Ø	● 12-5/8"Ø
S.LEV. (+)3'-9" GROUND FLOOR	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c	s1 = 3/8"Ø@5"c/c s2 = 3/8"Ø@8"c/c
TO				
TO	● 10-5/8"Ø	● 16-5/8"Ø	● 14-3/4"Ø	● 12-5/8"Ø
FOUNDATION	STIRRUPS = 3/8"Ø@5"c/c	STIRRUPS = 3/8"Ø@5"c/c	STIRRUPS = 3/8"Ø@5"c/c	STIRRUPS = 3/8"Ø@5"c/c
MARK	C1	C2/C2a	C3	C4
FLOOR				

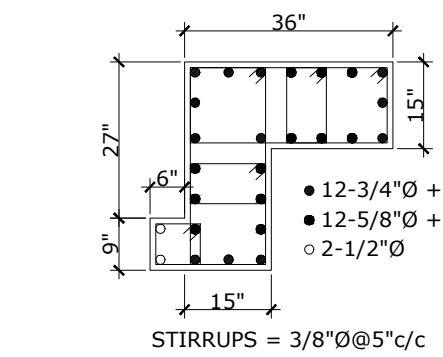
NOTE: CONCRETE CYLINDRICAL STRENGTH
fc' = 4000 psi (FOR ALL COLUMN & WALLS)

- NOTES:
- REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 - ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 - ALL LEVELS MENTIONED ARE STRUCTURAL LEVELS.
 - REFER TO DRAWING NO. ST-02 FOR COLUMN SCHEDULE OF 'C5' TO 'C15'.
 - REFER TO DRAWING NO. ST-02 FOR 'W1' DETAIL.
 - REFER TO DRAWING NO. ST-05 FOR SECTION 1-1 & SECTION 2-2.

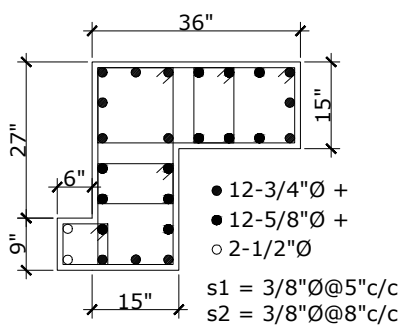
CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	parc international		COLUMN LAYOUT PLAN & COLUMN SCHEDULE (SHEET 1)				M.K	MUDASSIR	ST-01
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	

S.LEV.(+)44'-3" ROOF											
TO											
S.LEV.(+)32'-9" SECOND FLOOR											
TO											
S.LEV.(+)20'-3" FIRST FLOOR											
TO											
GROUND FLOOR											
TO											
FOUNDATION											
MARK FLOOR	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15

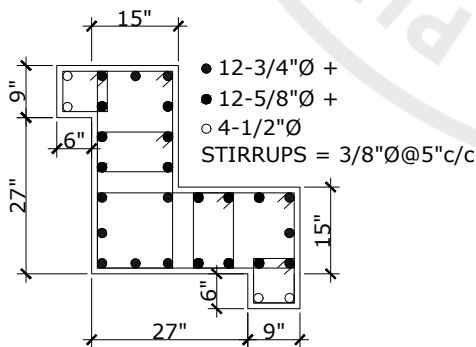
NOTE: CONCRETE CYLINDRICAL STRENGTH $f_c' = 4000$ psi (FOR ALL COLUMN & WALLS)



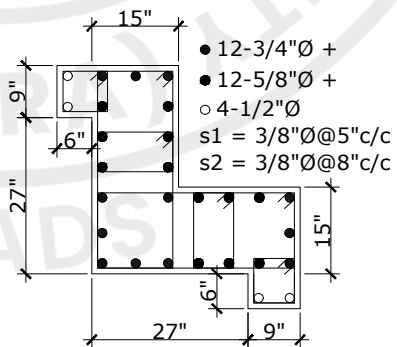
MINARET COLUMN 'MC1'
(FROM FOUNDATION TO S.L. +1'-9")



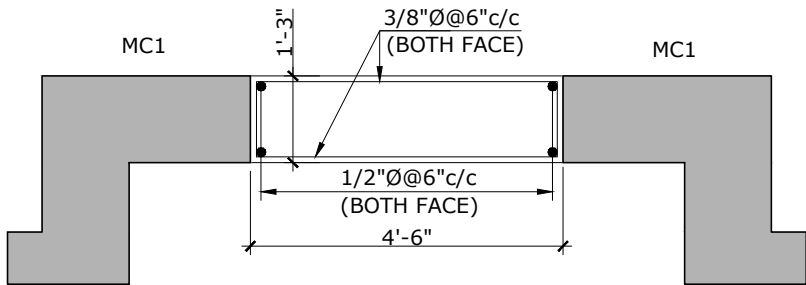
MINARET COLUMN 'MC1'
(FROM S.L. +1'-9" TO 58'-3")



MINARET COLUMN 'MC2'
(FROM FOUNDATION TO S.L. +1'-9")

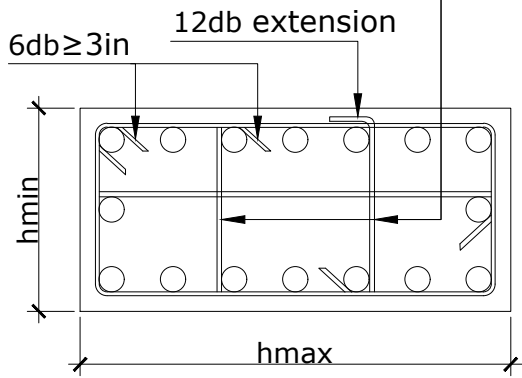


MINARET COLUMN 'MC2'
(FROM S.L. +1'-9" TO 58'-3")

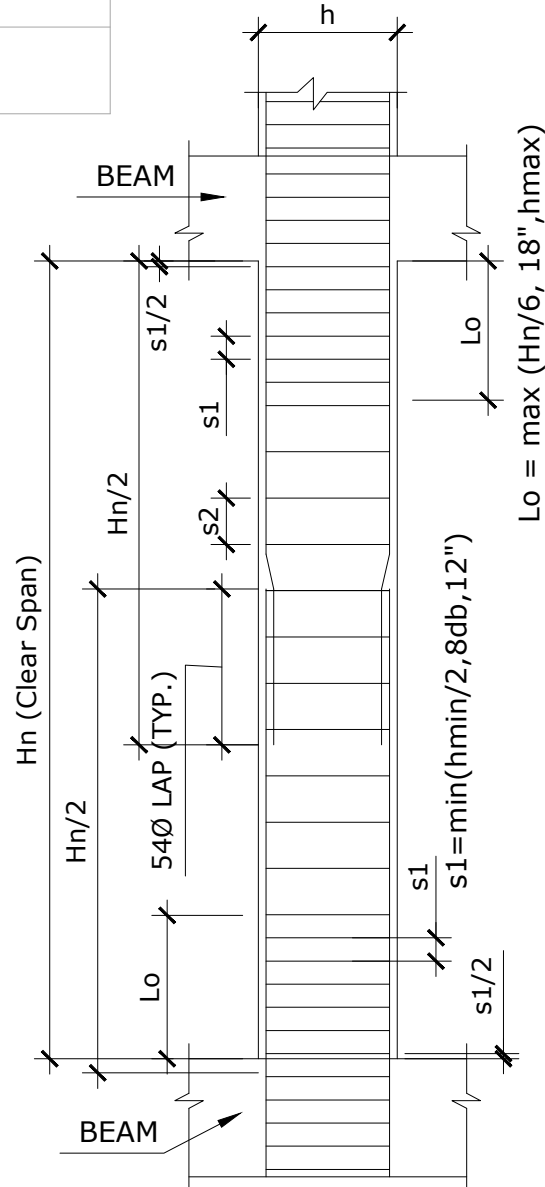


TYPICAL PLAN OF WALL 'W1'
FOUNDATION TO PLINTH S.L. +1'-9"
SCALE: 3/8"=1'-0"

Consecutive crossies engaging the same longitudinal bar have their 90° hooks on opposite sides of column

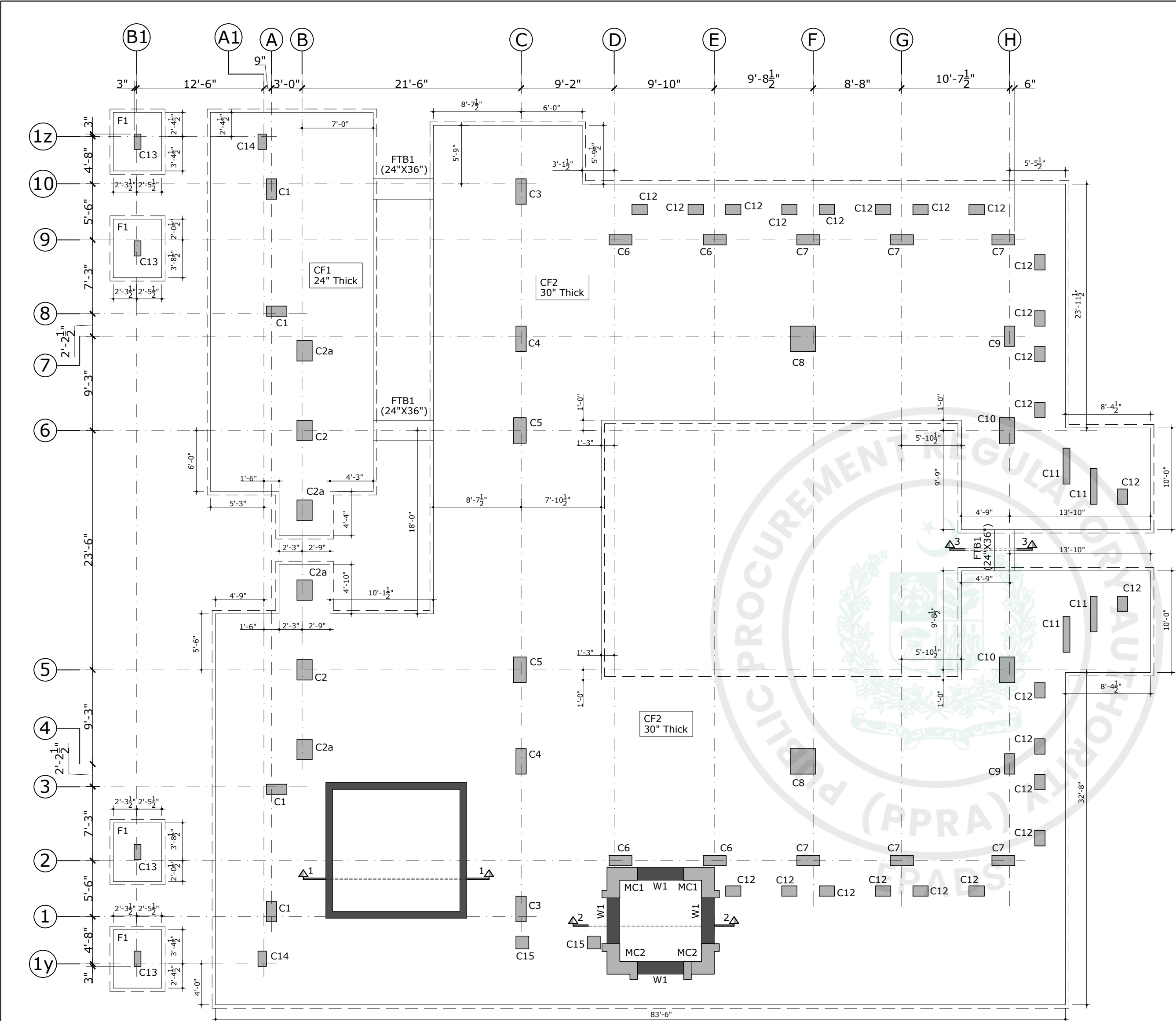


COLUMN SECTION

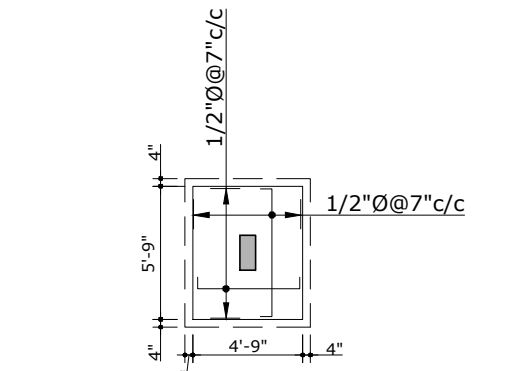


TYPICAL COLUMN
DETAILING
(SCALE:- 1/4"=1'-0")

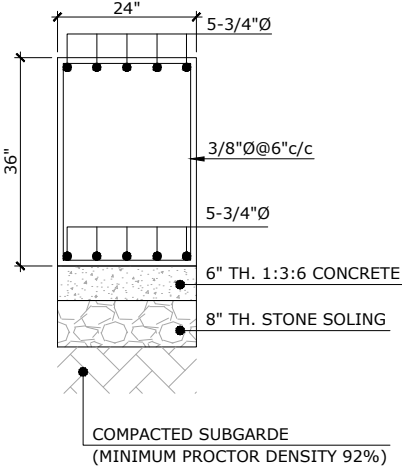
CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:			COLUMN SCHEDULE (SHEET 2)				M.K	MUDASSIR	ST-02
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



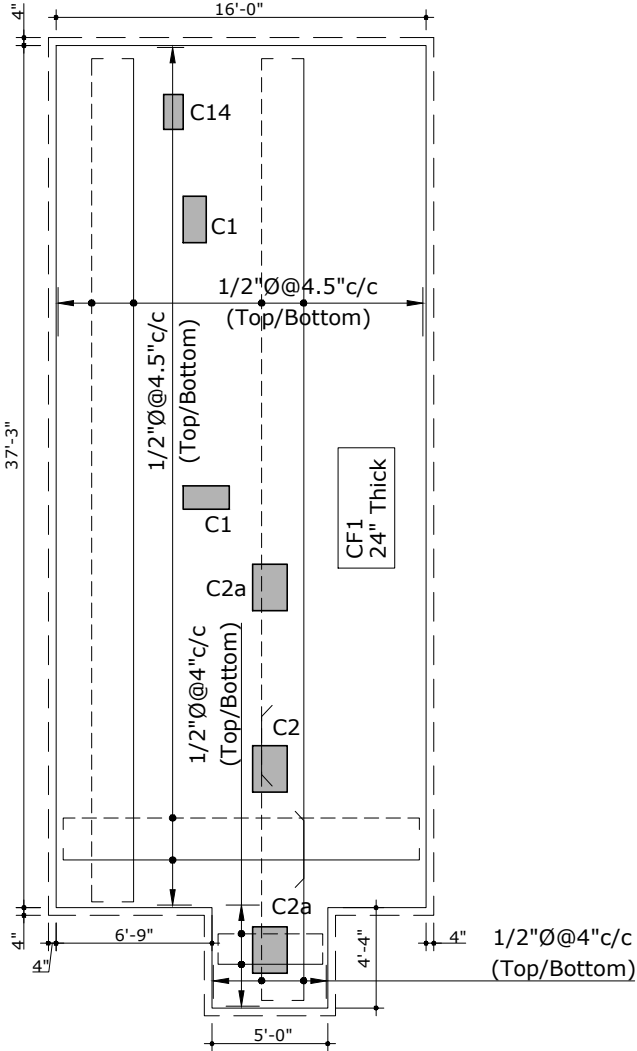
FOUNDATION LAYOUT PLAN
SCALE:- (1/8"=1'-0")



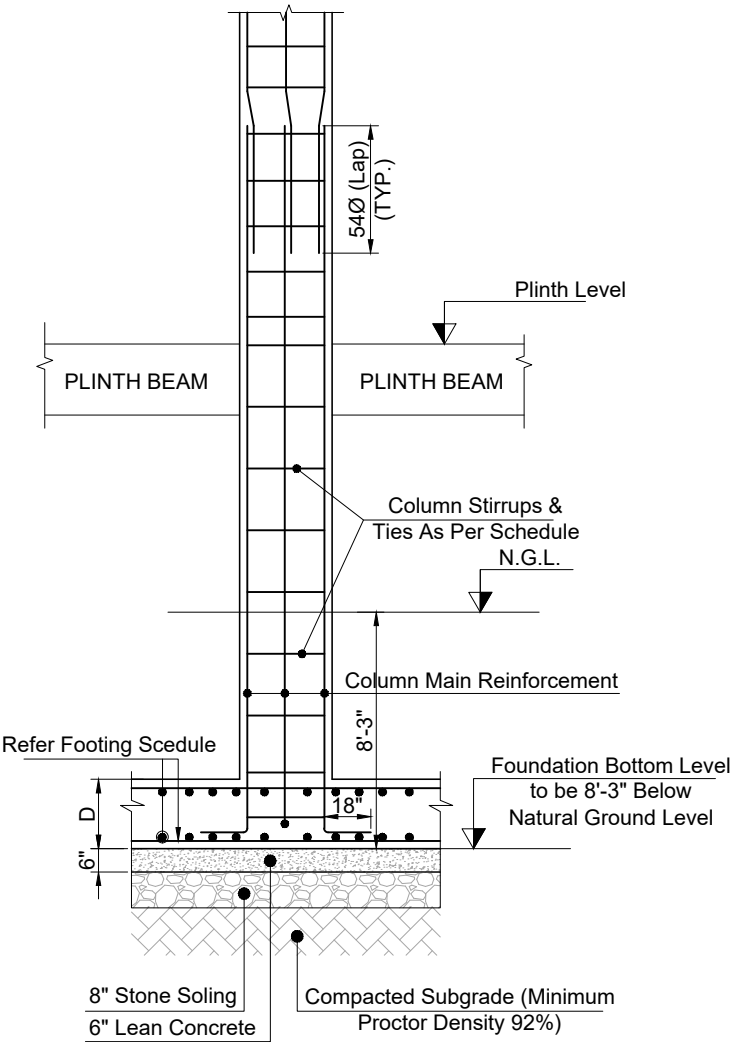
REINFORCEMENT DETAIL
OF 'F1 (15" THICK)'
SCALE:- (1/8"=1'-0")



SECTION 3-3
(FTB1 24"x36")
SCALE: 1/2"=1'-0"



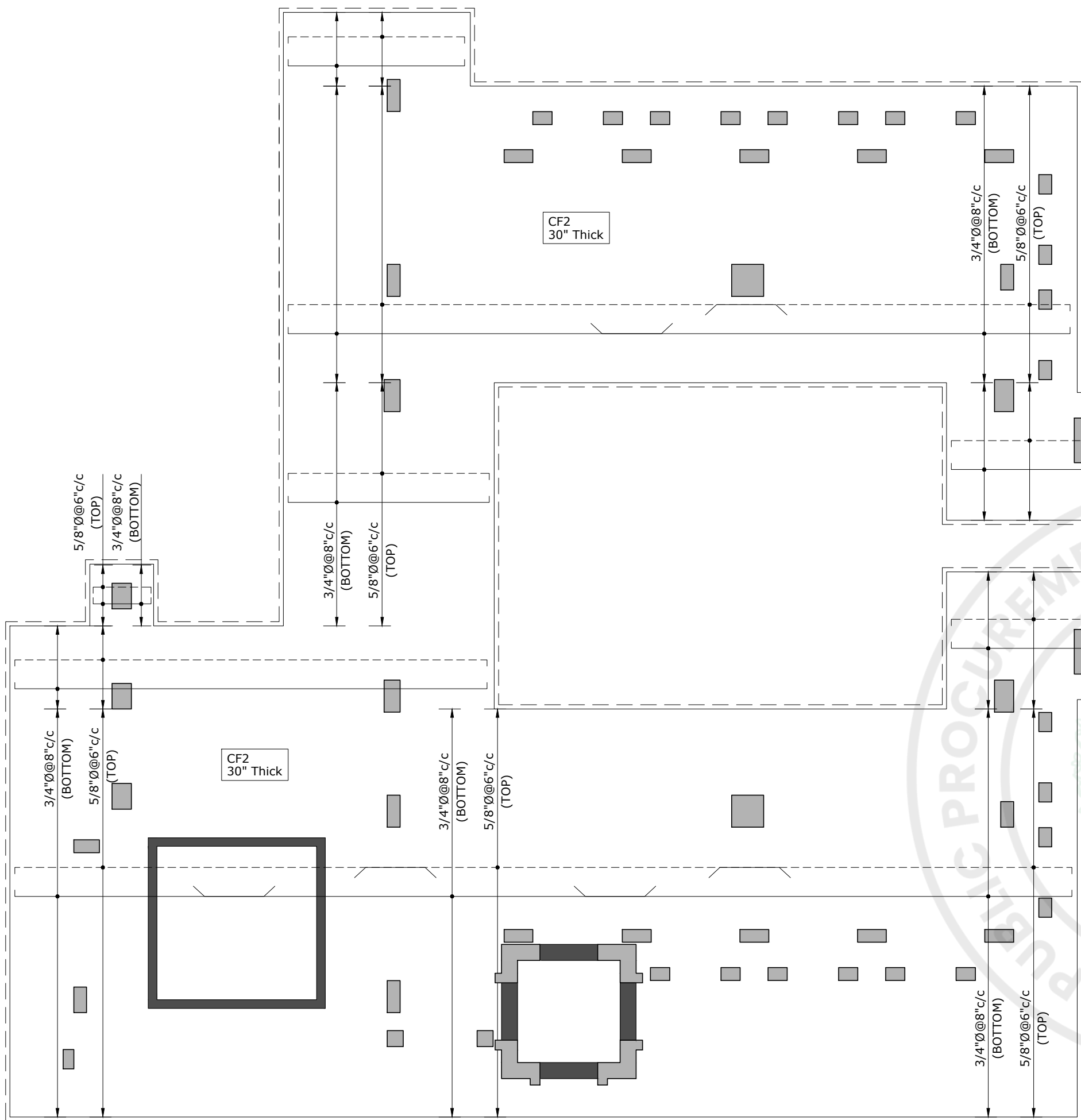
REINFORCEMENT DETAIL
OF 'CF1 (24" THICK)'
SCALE:- (1/8"=1'-0")



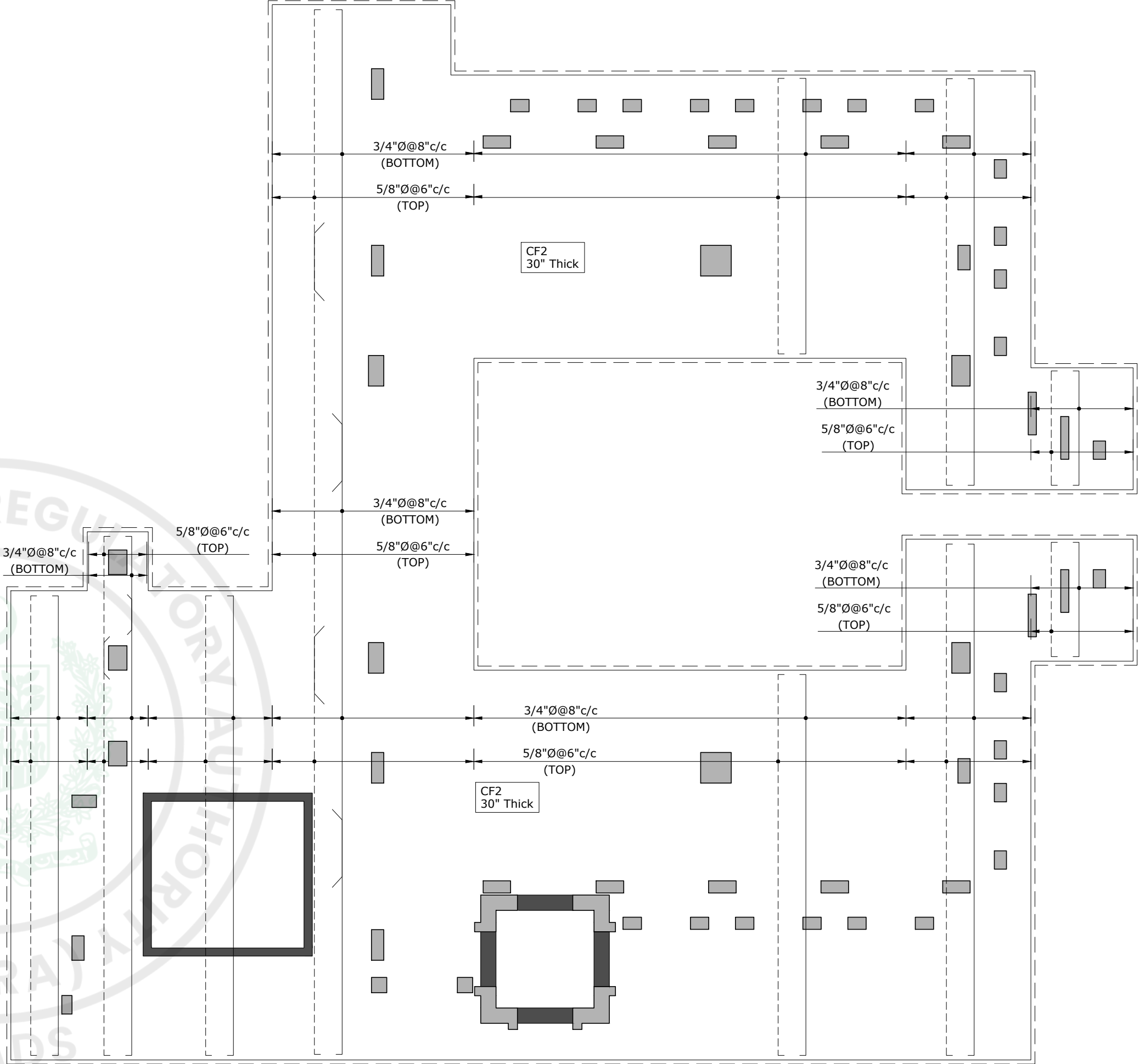
TYPICAL SECTION
OF FOUNDATION

- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL LEVELS MENTIONED ARE STRUCTURAL LEVELS.
 4. REFER TO DRAWING NO. ST-04 & ST-04A FOR REINFORCEMENT DETAIL OF 'CF2'.
 5. REFER TO DRAWING NO. ST-05 FOR SECTION 1-1 & SECTION 2-2.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	parc international		FOUNDATION LAYOUT PLAN AND REINFORCEMENT DETAIL OF 'F1' & 'CF1'				M.K	MUDASSIR	ST-03
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parccinternational@gmail.com						SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



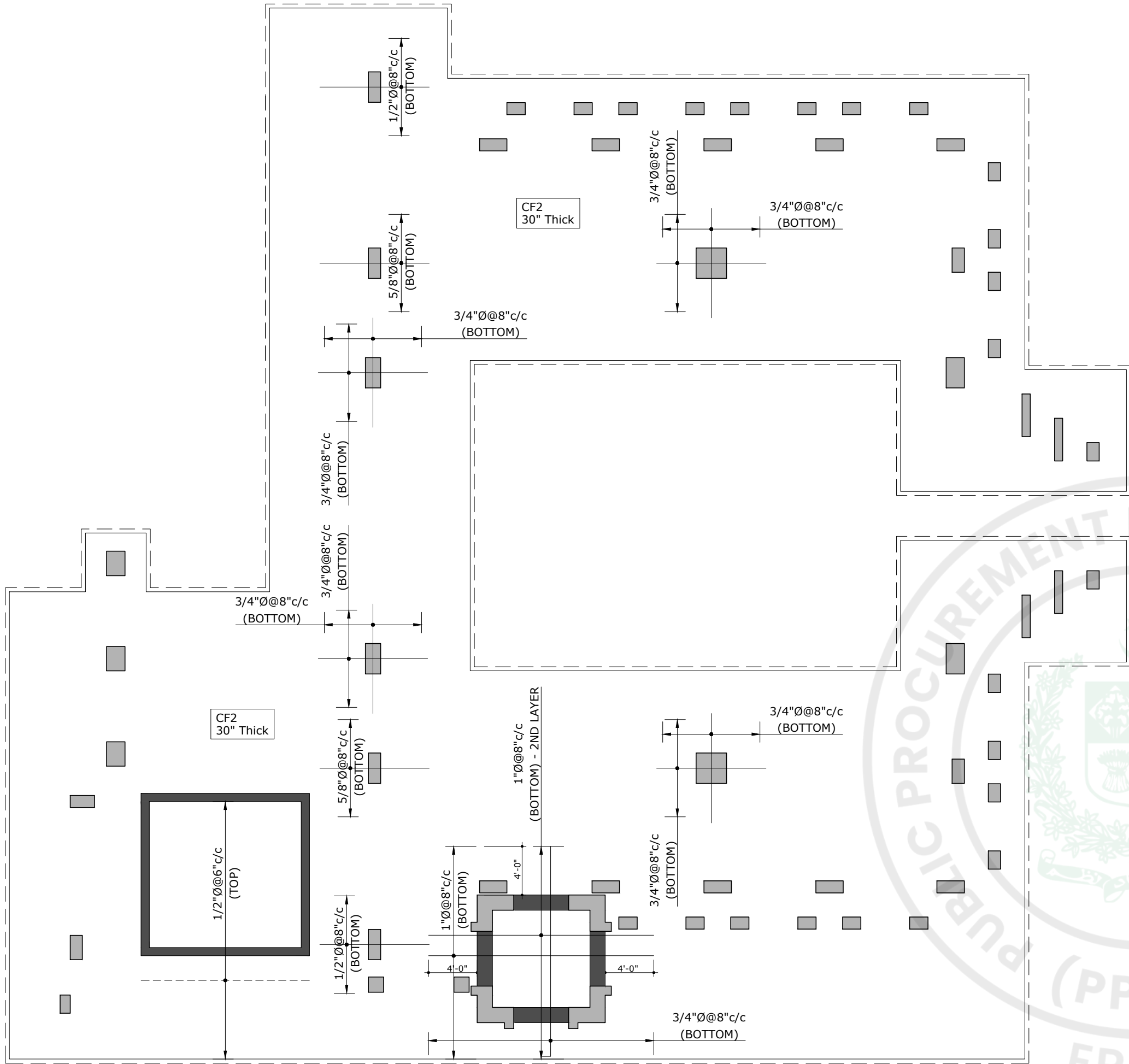
X-DIRECTION REINFORCEMENT
DETAIL OF 'CF2 (30" THICK)'
SCALE:- (1/8"=1'-0")



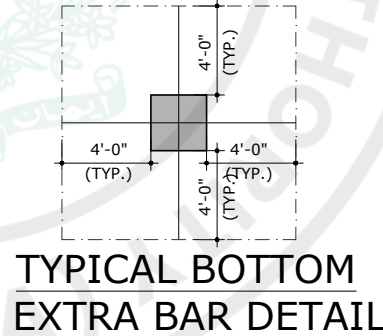
Y-DIRECTION REINFORCEMENT
DETAIL OF 'CF2 (30" THICK)'
SCALE:- (1/8"=1'-0")

- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL LEVELS MENTIONED ARE STRUCTURAL LEVELS.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international		BOTTOM & TOP REINFORCEMENT DETAIL OF 'CF2'				M.K	MUDASSIR	ST-04
MOSQUE	ARCHITECTURE & PLANNING CONSULTANTS						SCALE	DATE	PROJECT #
STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						AS SHOWN	31-MAR-2026	
							DESIGNED BY	REV. #	
							ENGR. UZAIR	0	

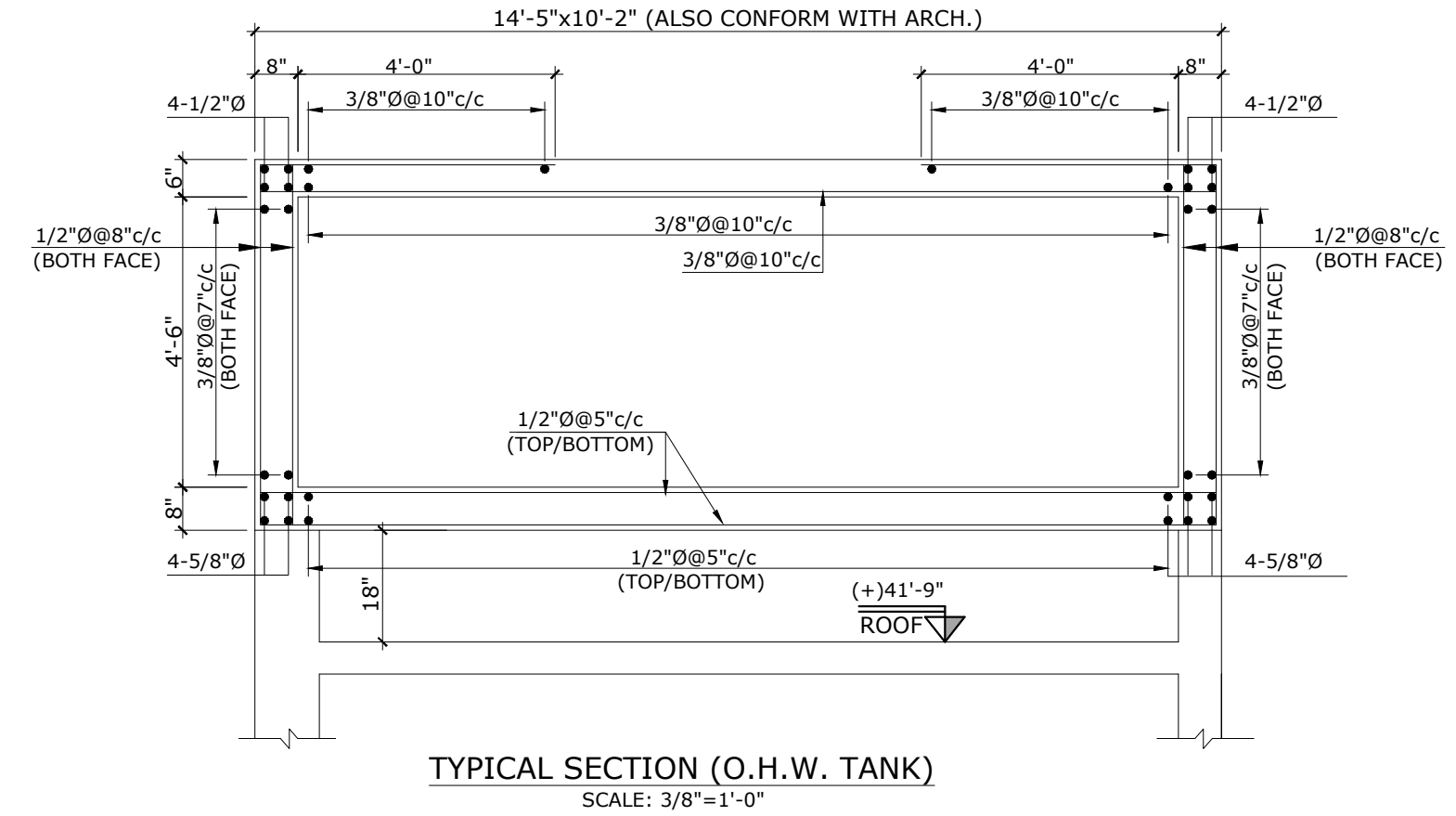
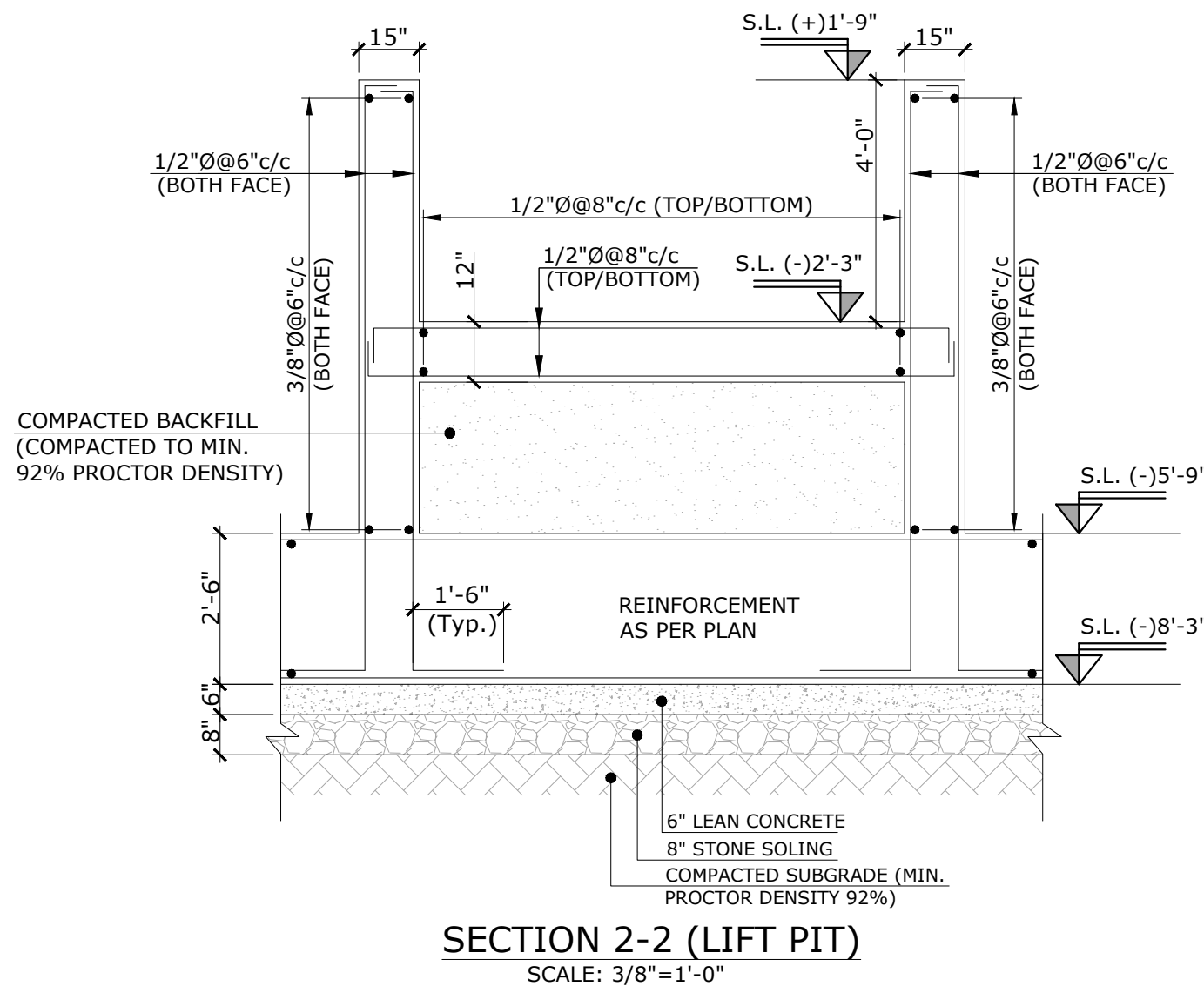
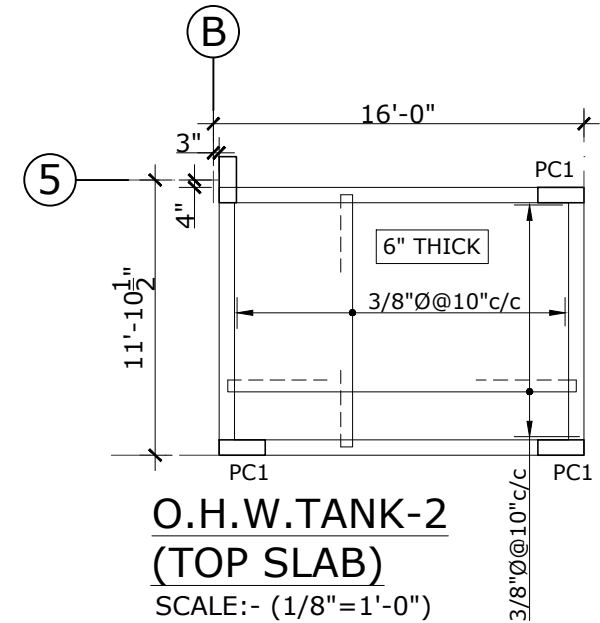
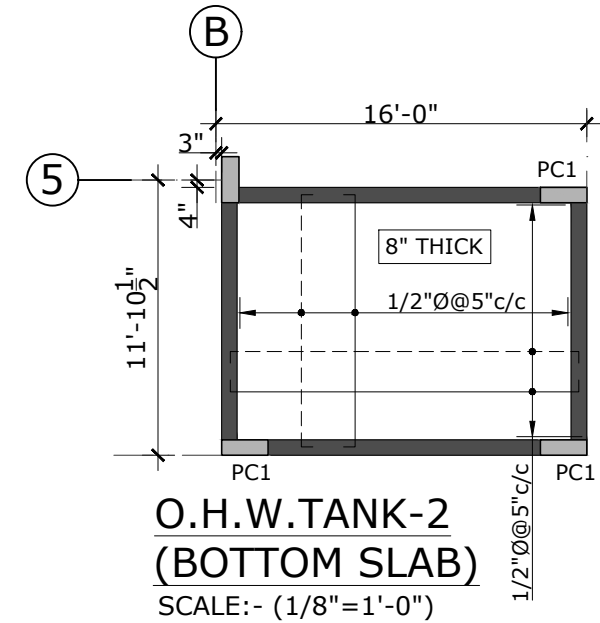
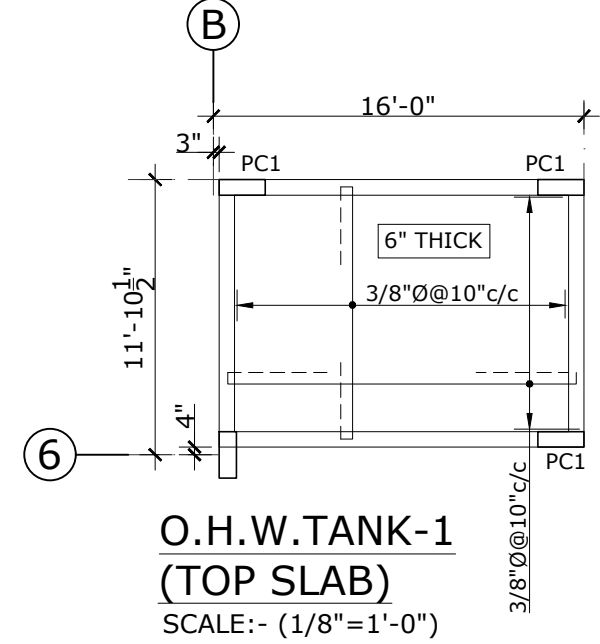
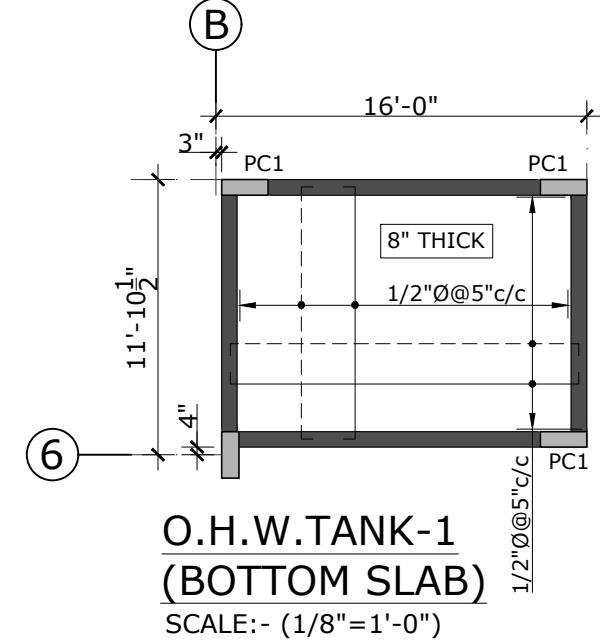
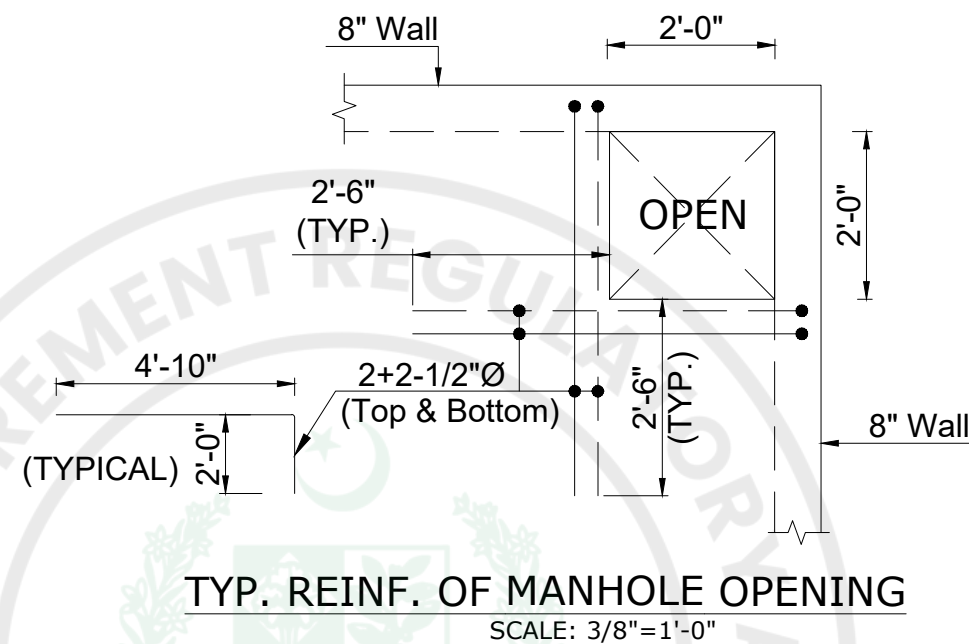
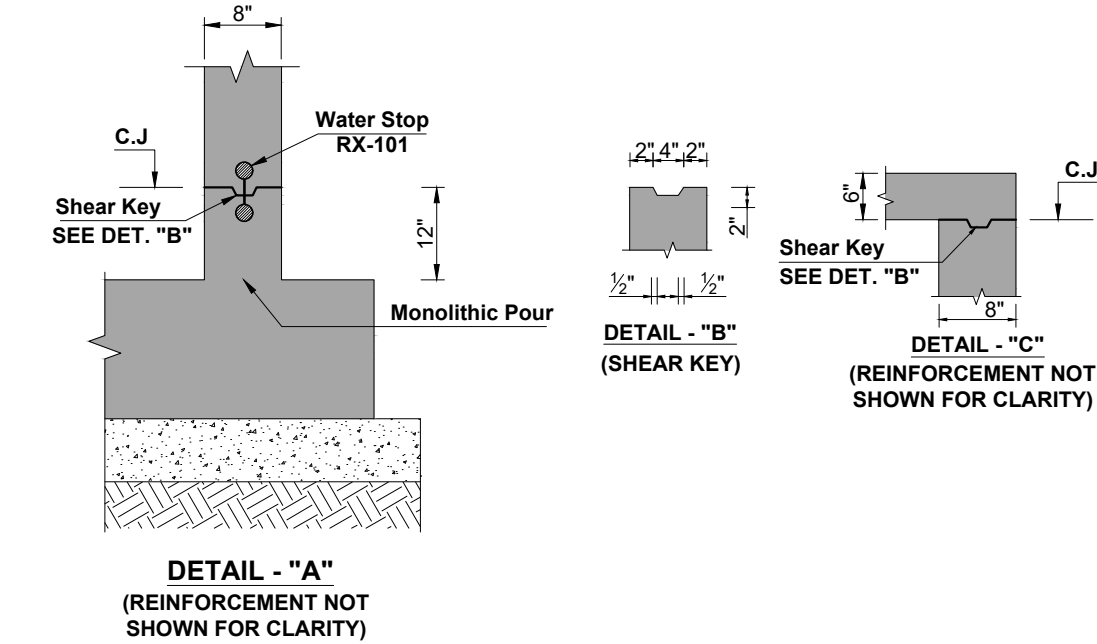
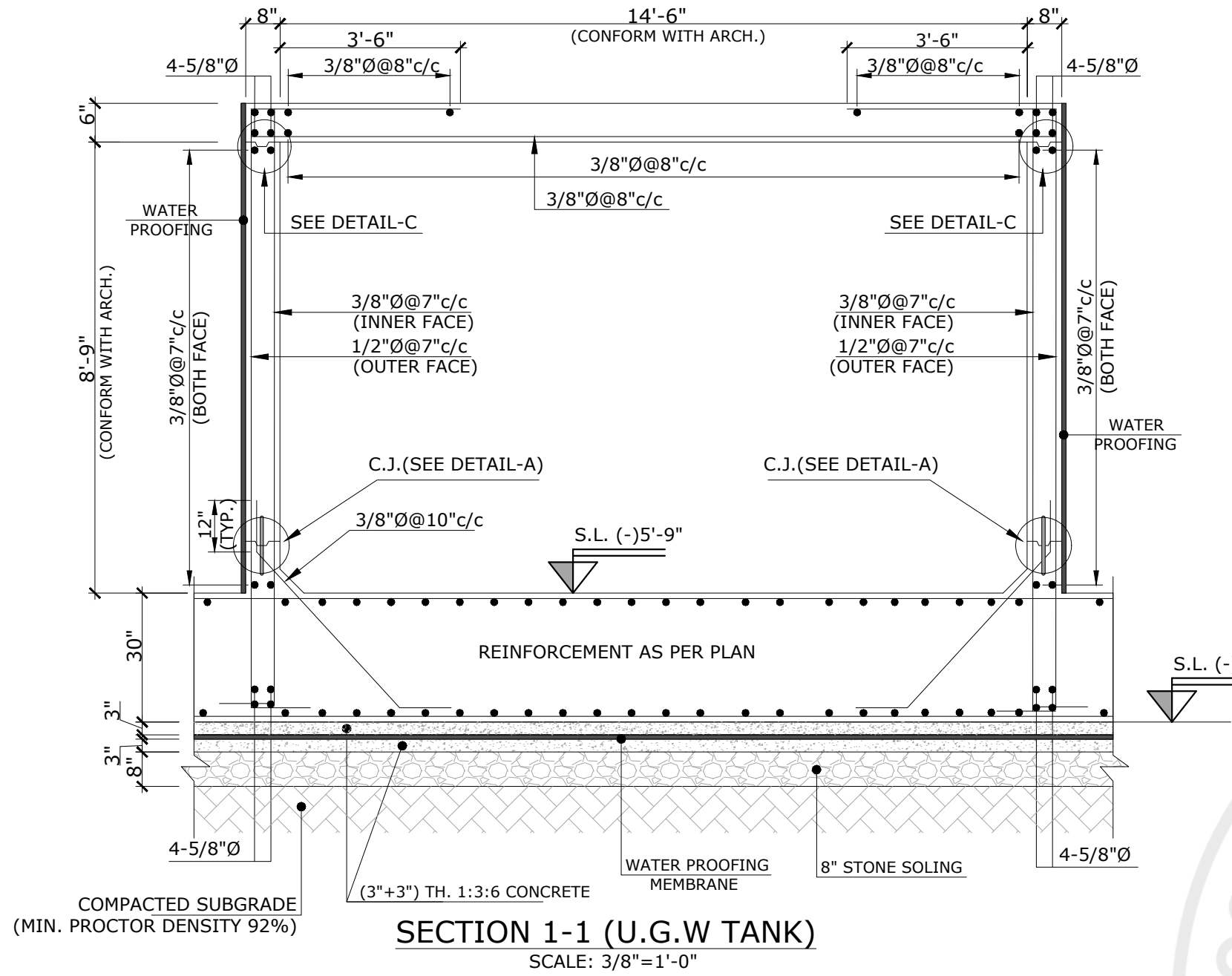


EXTRA REINFORCEMENT DETAIL OF
'CF2 (30" THICK)'
SCALE:- (1/8"=1'-0")



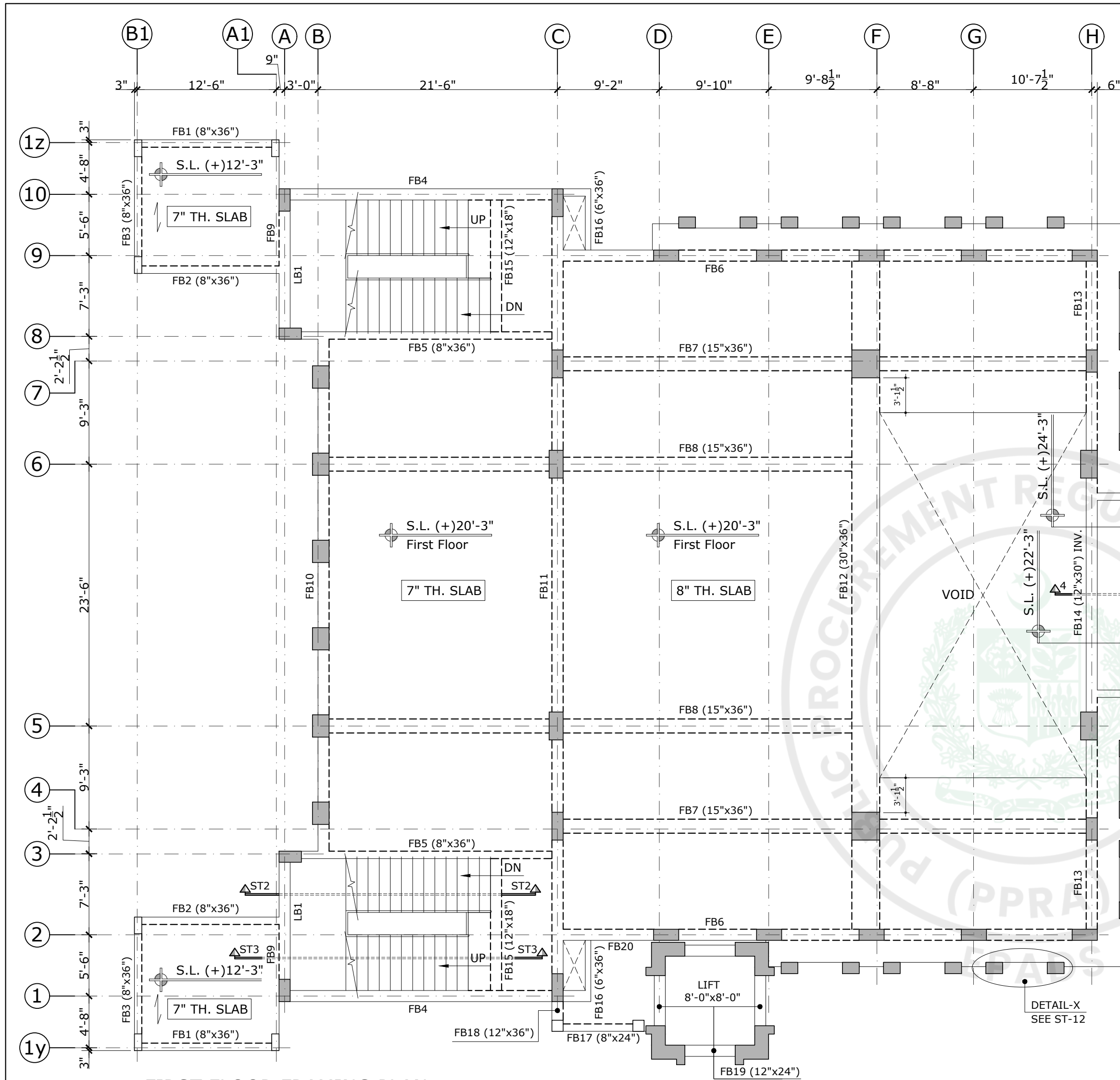
- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL LEVELS MENTIONED ARE STRUCTURAL LEVELS.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international		EXTRA REINFORCEMENT DETAIL OF 'CF2'				M.K	MUDASSIR	ST-04A
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



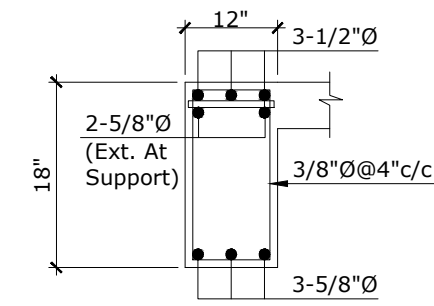
- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL LEVELS MENTIONED ARE STRUCTURAL LEVELS.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	parc international		SECTION 1-1 (U.G.W.TANK), SECTION 2-2 (LIFT PIT) & O.H.W.TANK DETAIL				M.K	MUDASSIR	ST-05
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	

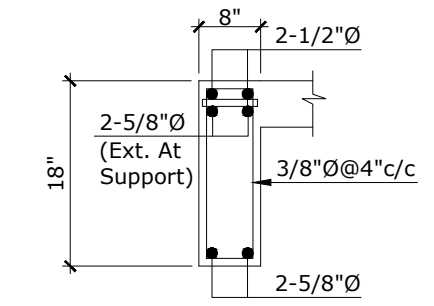


FIRST FLOOR FRAMING PLAN
SCALE:- (1/8"=1'-0")

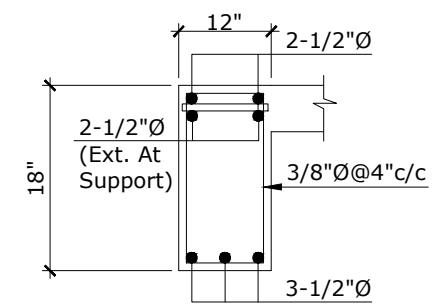
- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL SLAB ARE 6" THICK UNLESS NOTED OTHERWISE.
 4. ALL BEAMS ARE 12"x36" UNLESS NOTED OTHERWISE.
 5. REFER TO DRAWING NO. ST-08 FOR FIRST FLOOR BEAM ELEVATIONS.
 6. REFER TO DRAWING NO. ST-09 FOR FIRST FLOOR REINFORCEMENT PLAN.
 7. REFER TO DRAWING NO. ST-12 FOR DETAIL 'X'.
 8. REFER TO DRAWING NO. ST-15 FOR SECTION ST2 & ST3.



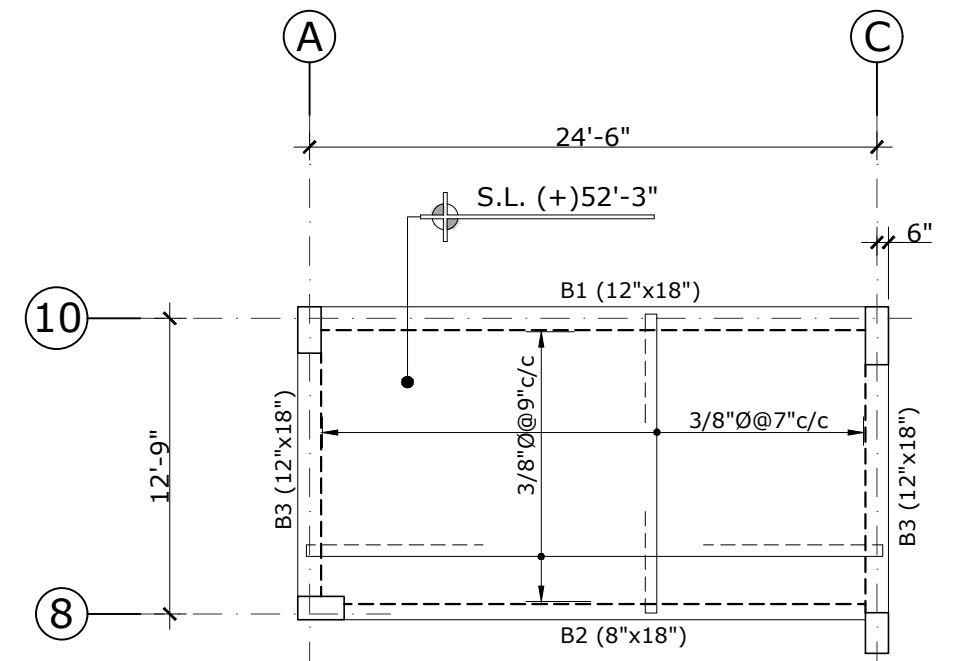
B1
SCALE: 1/2"=1'-0"



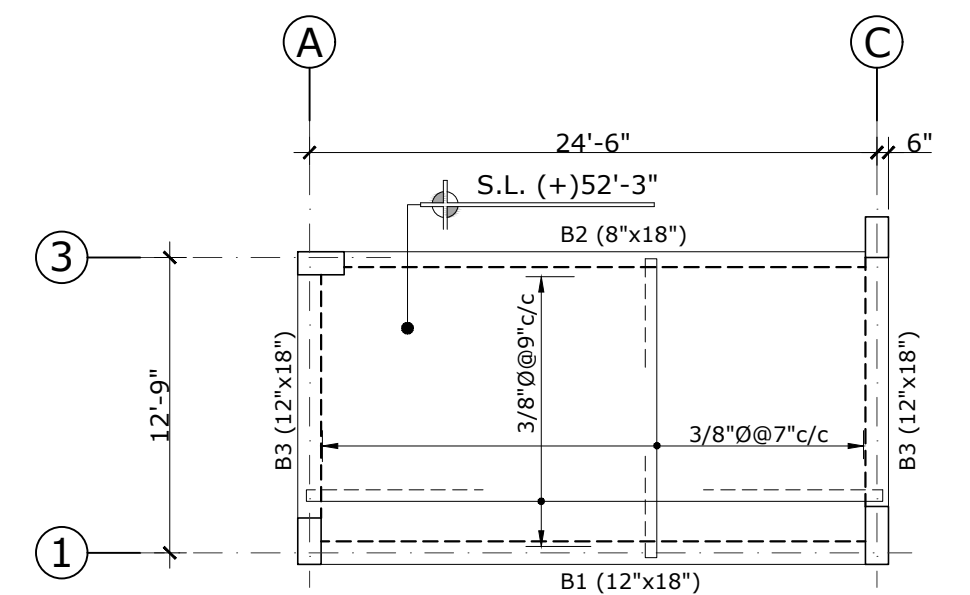
B2
SCALE: 1/2"=1'-0"



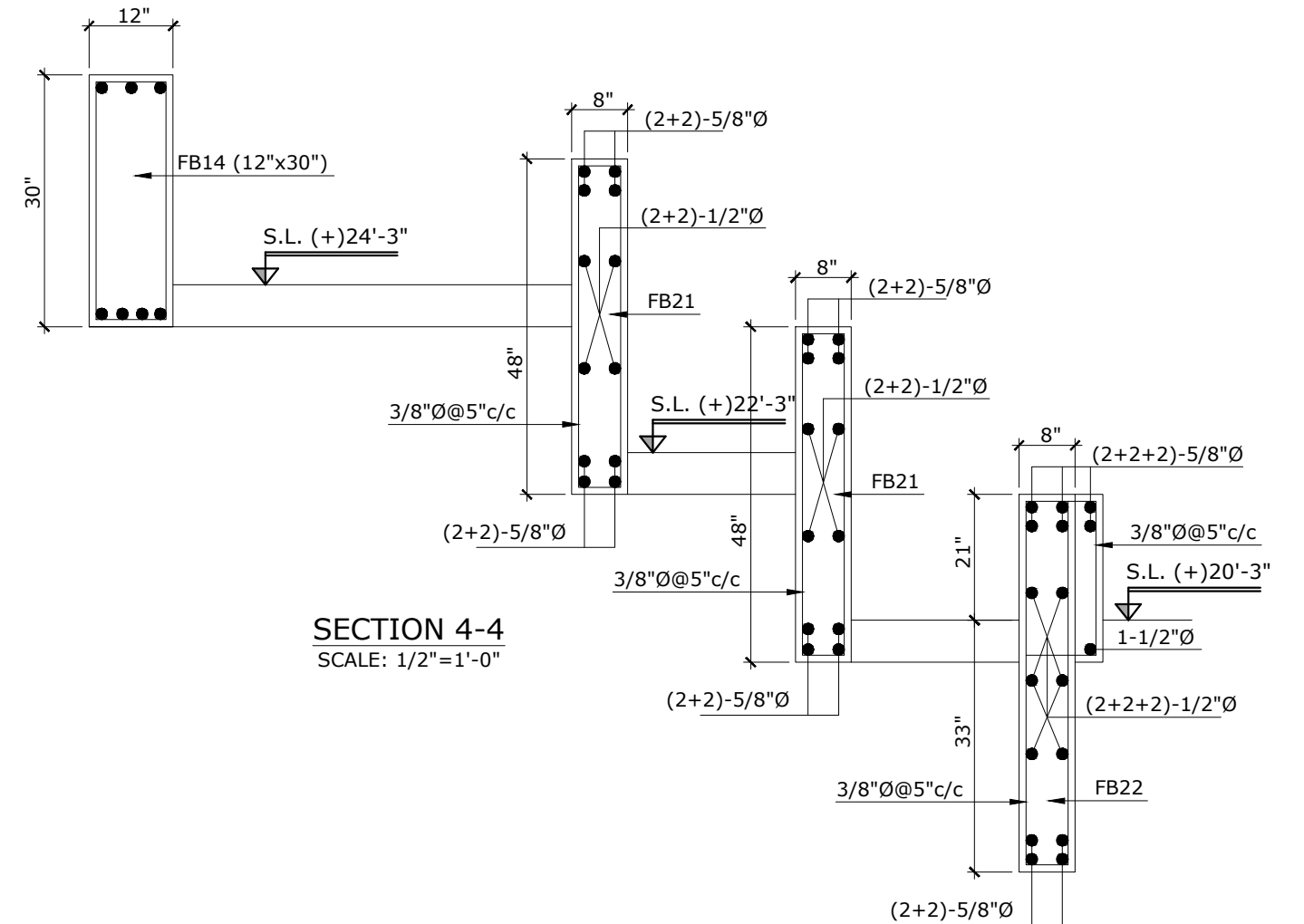
B3
SCALE: 1/2"=1'-0"



STAIR TOWER-1 FRAMING PLAN
SCALE:- (1/8"=1'-0")

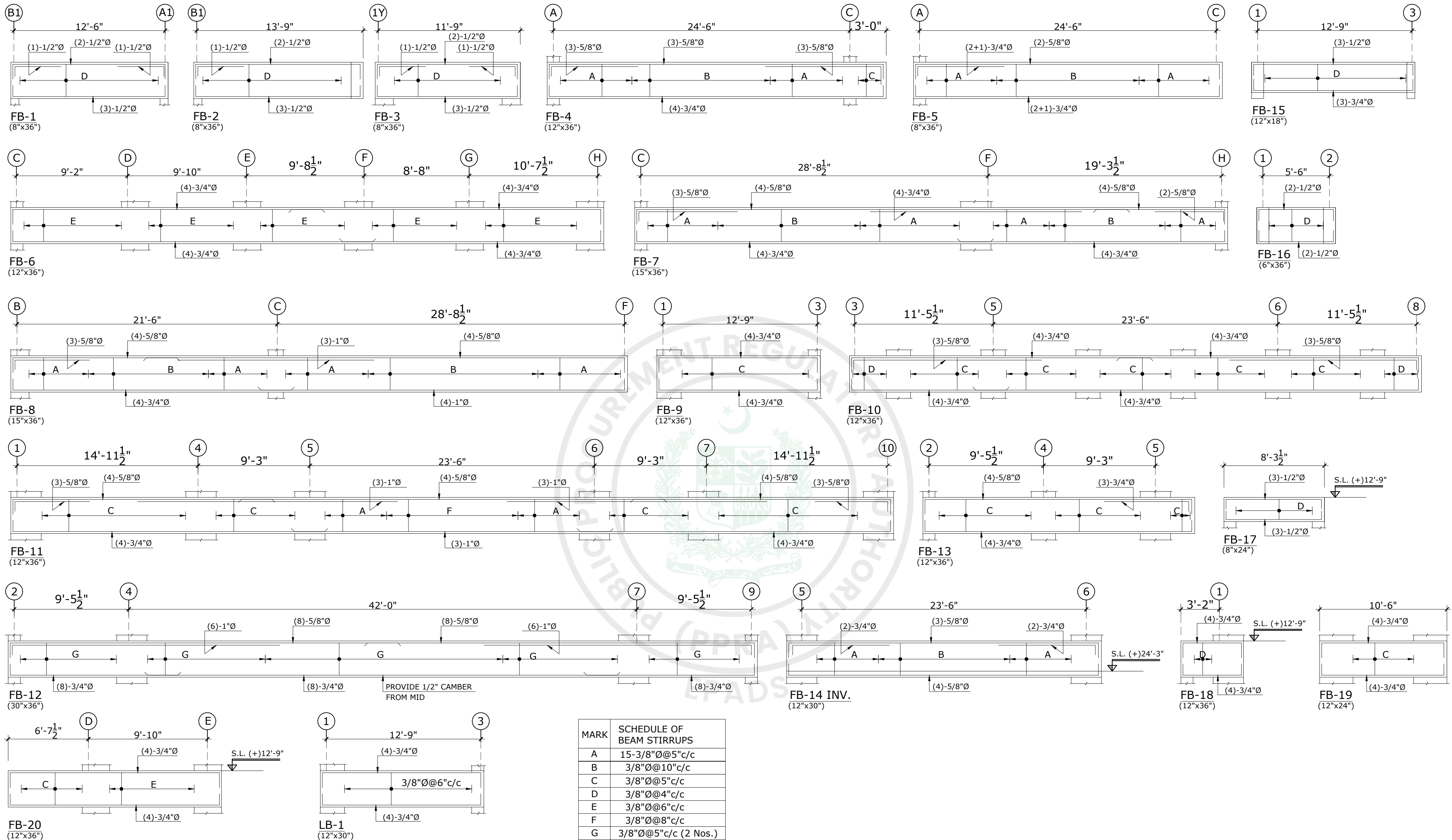


STAIR TOWER-2 FRAMING PLAN
SCALE:- (1/8"=1'-0")



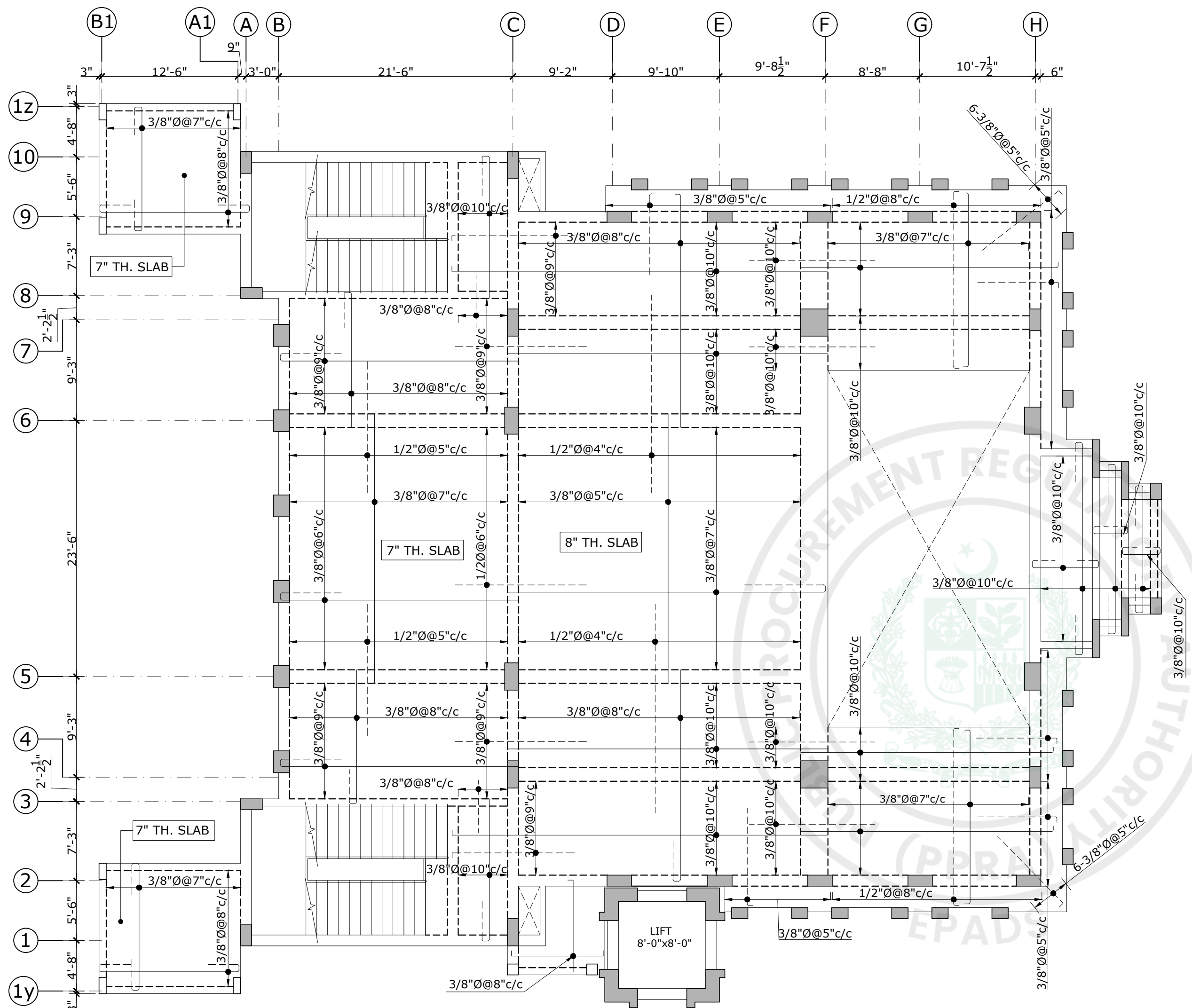
SECTION 4-4
SCALE: 1/2"=1'-0"

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	parc international		FIRST FLOOR FRAMING PLAN, STAIR TOWER FRAMING PLAN & STAIR TOWER REINFORCEMENT DETAIL				M.K	MUDASSIR	ST-07
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.

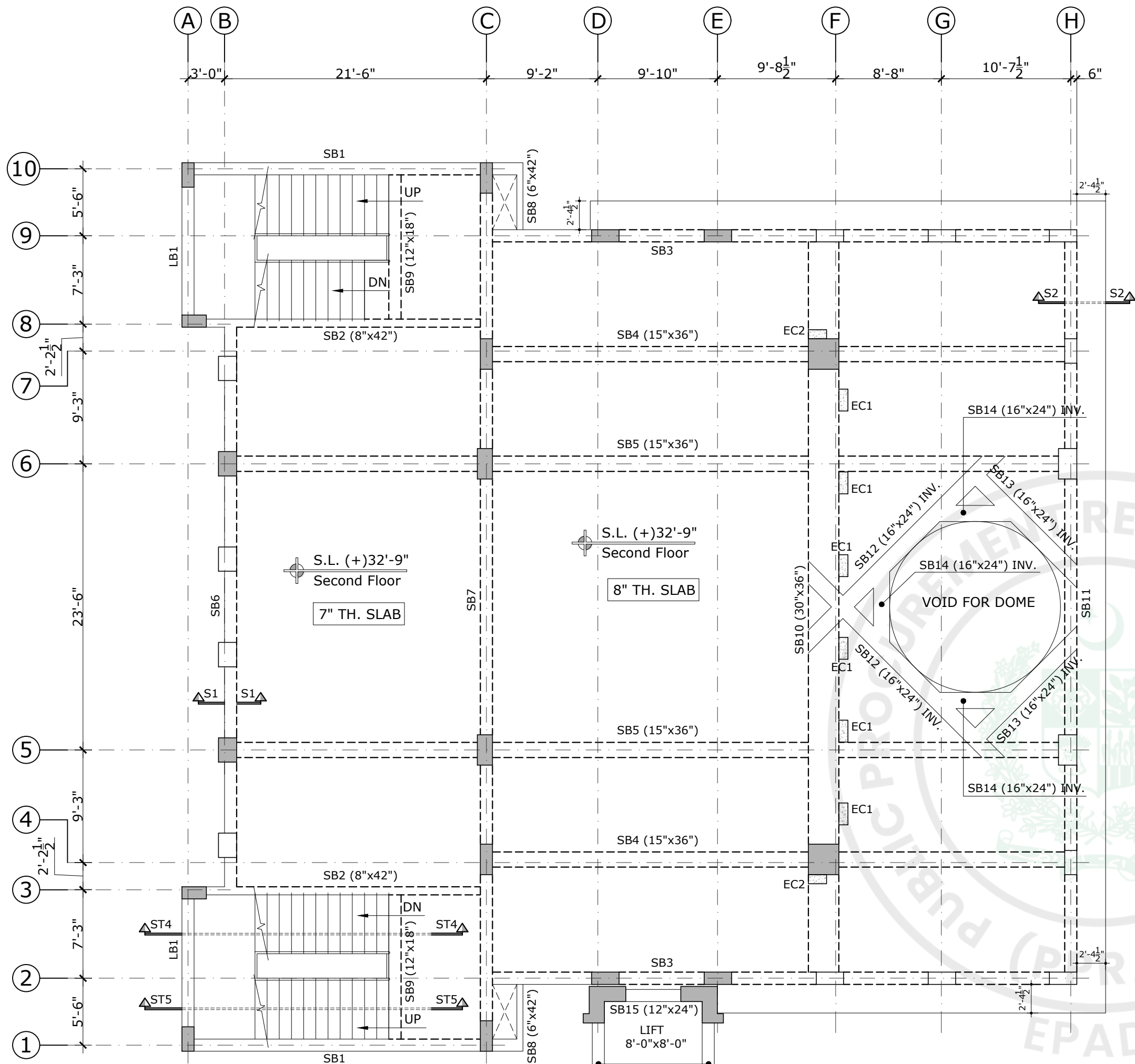
CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international		FIRST FLOOR BEAM ELEVATIONS				M.K	MUDASSIR	ST-08
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



FIRST FLOOR REINFORCEMENT PLAN
SCALE:- (1/8"=1'-0")

- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL SLAB ARE 6" THICK UNLESS NOTED OTHERWISE.
 4. PROVIDE 3/8"Ø@10"c/c DISTRIBUTION BAR NOT SHOWN IN DRAWING.

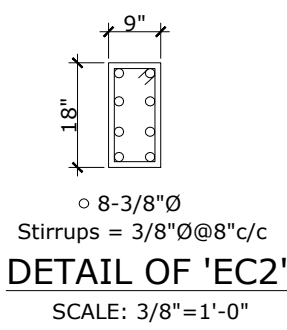
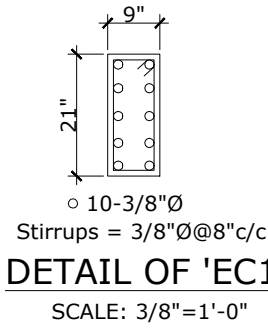
CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com		FIRST FLOOR REINFORCEMENT PLAN				M.K	MUDASSIR	ST-09
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.							SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



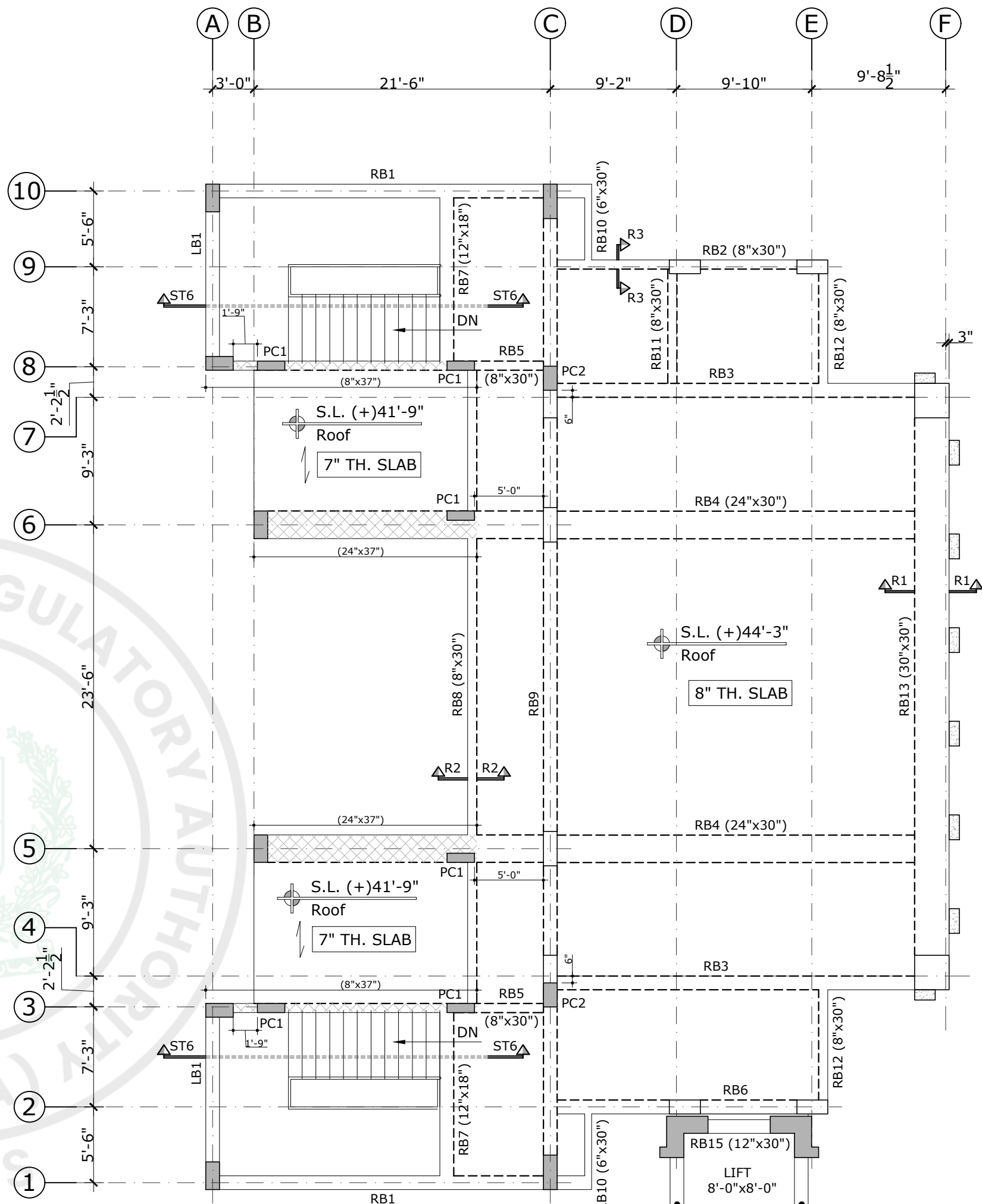
SECOND FLOOR FRAMING PLAN

SCALE:- (1/8"=1'-0")

NOTE: ALL BEAMS ARE 12"x42" UNLESS NOTED OTHERWISE.



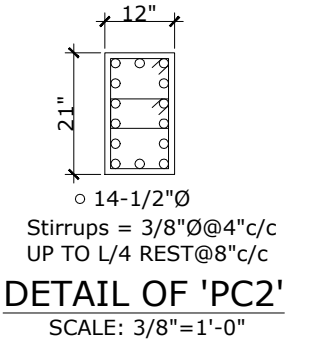
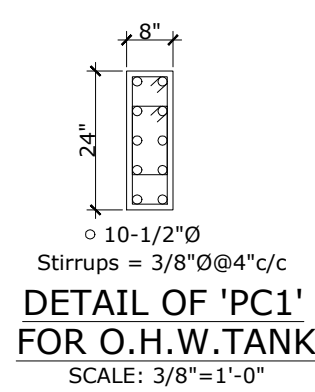
- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL SLAB ARE 6" THICK UNLESS NOTED OTHERWISE.
 4. REFER TO DRAWING NO. ST-11 FOR SECOND FLOOR BEAM ELEVATIONS.
 5. REFER TO DRAWING NO. ST-12 FOR ROOF BEAM ELEVATIONS.
 6. REFER TO DRAWING NO. ST-13 FOR SECOND FLOOR & ROOF REINFORCEMENT PLAN.
 7. REFER TO DRAWING NO. ST-11 FOR SECTIONS S1-S1 & S2-S2.
 8. REFER TO DRAWING NO. ST-12 FOR SECTIONS R1-R1, R2-R2 & R3-R3.
 9. REFER TO DRAWING NO. ST-05 FOR O.H.W.TANK DETAIL.
 - 10.REFER TO DRAWING NO. ST-14 FOR DOME STRUCTURAL DETAIL.
 - 11.REFER TO DRAWING NO. ST-15 FOR SECTION ST4, ST5 & ST6.



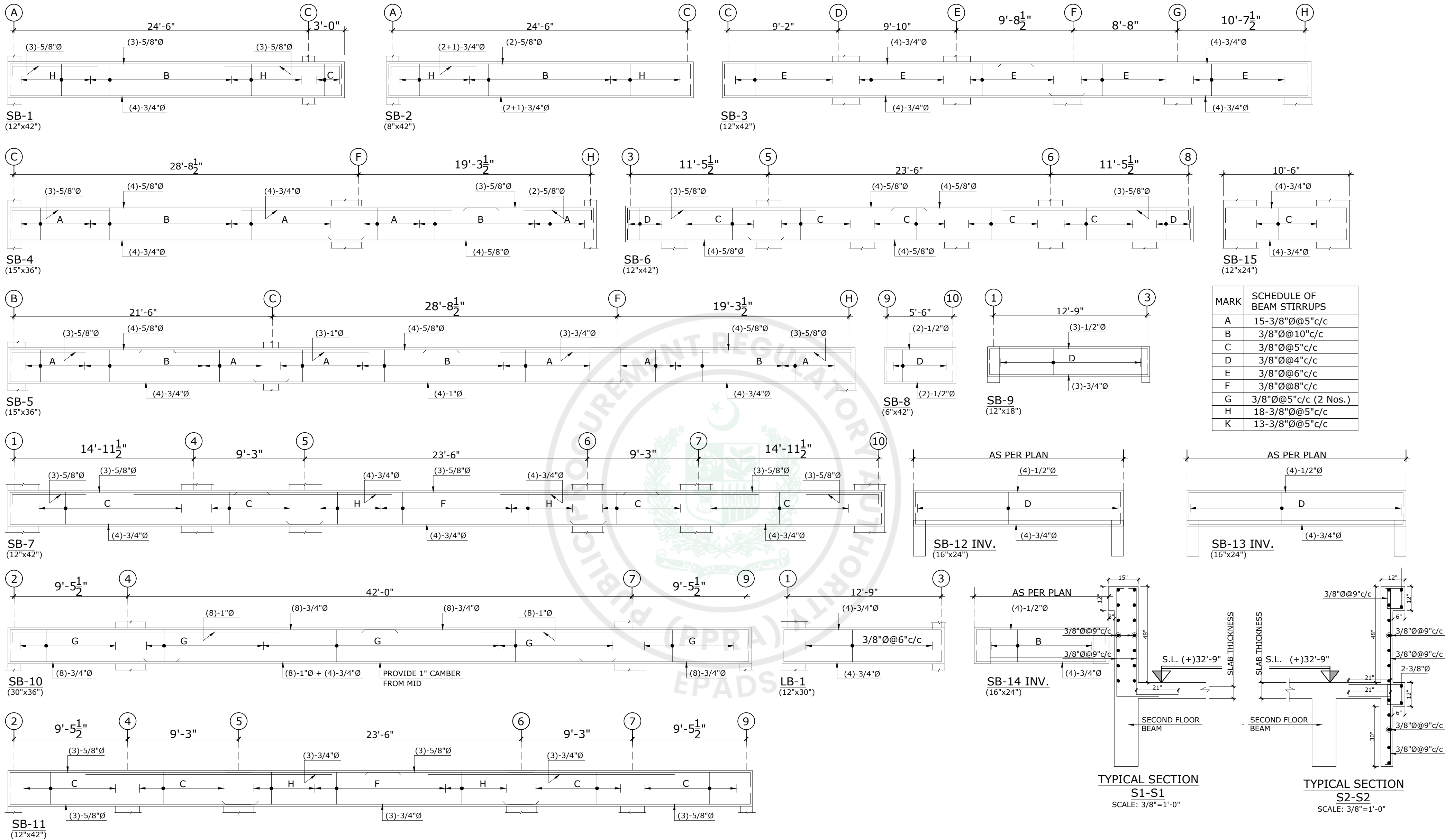
ROOF FRAMING PLAN

SCALE:- (1/8"=1'-0")

NOTE: ALL BEAMS ARE 12"x30" UNLESS NOTED OTHERWISE.



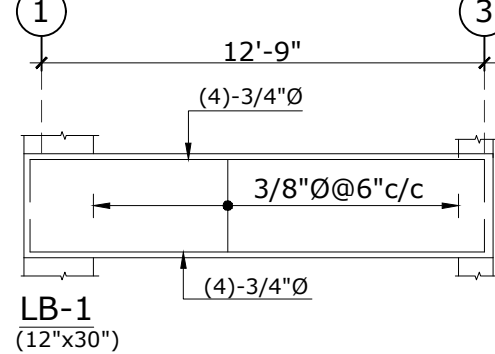
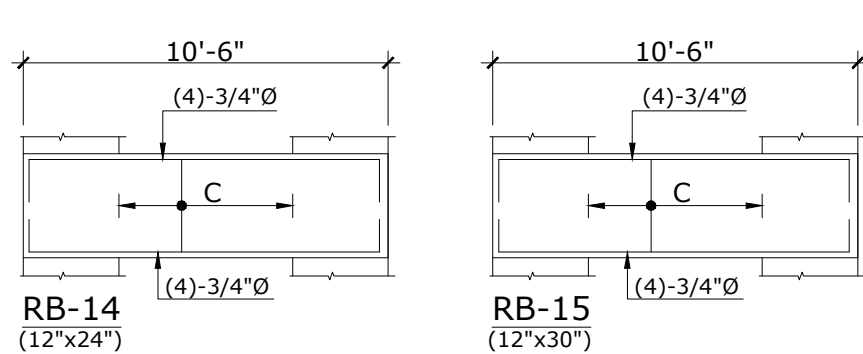
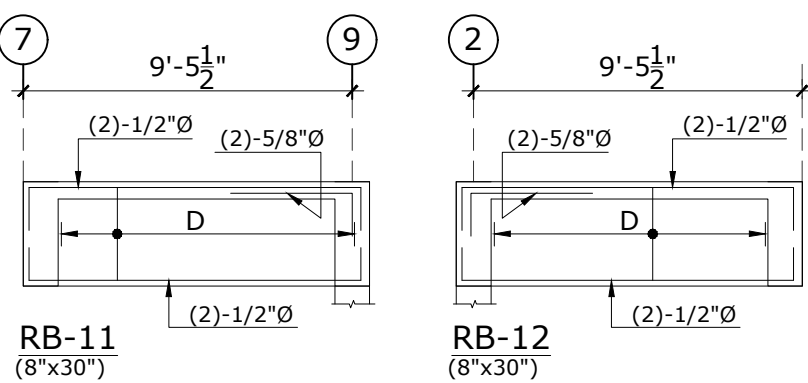
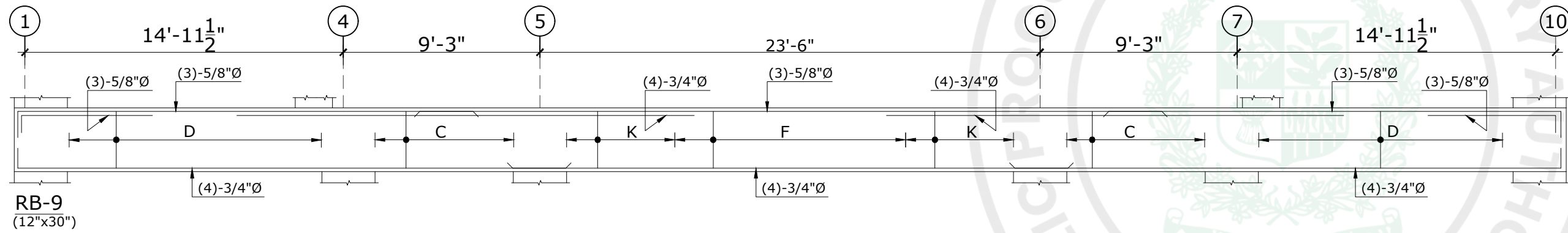
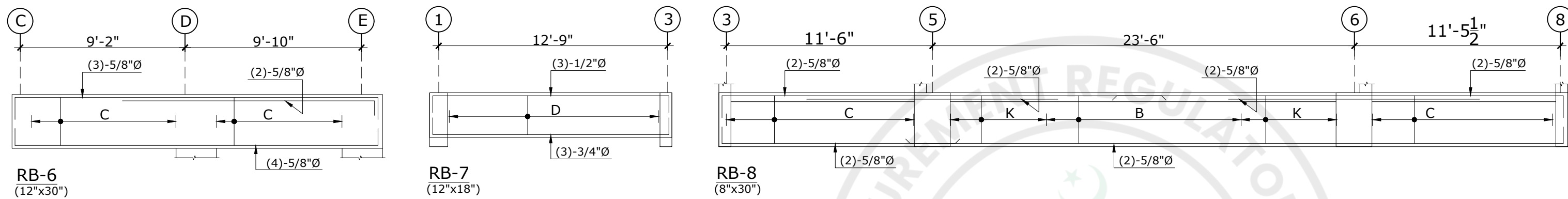
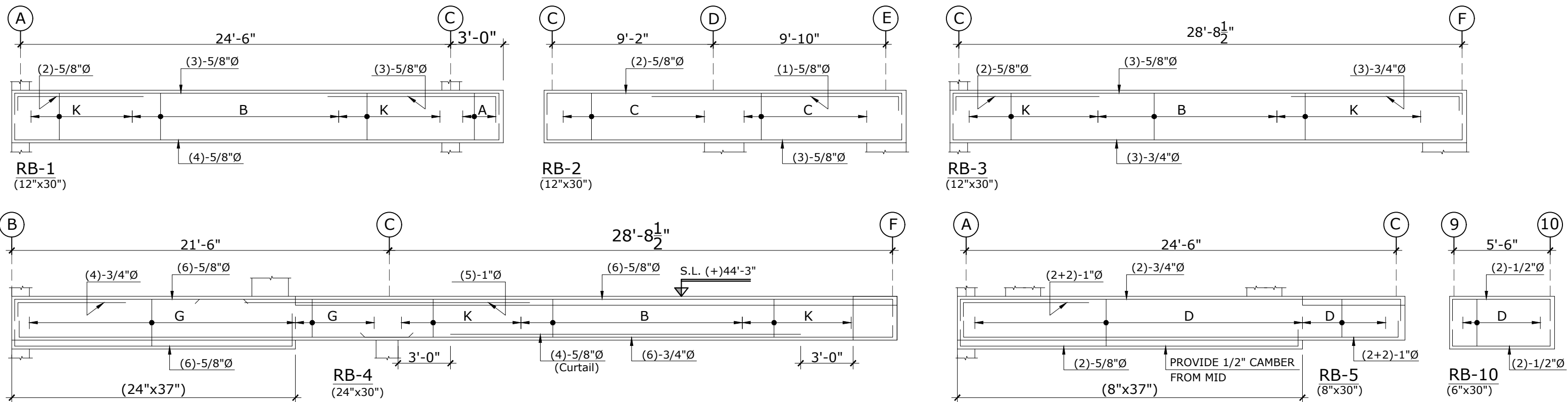
CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international		SECOND FLOOR & ROOF FRAMING PLAN				M.K	MUDASSIR	ST-10
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



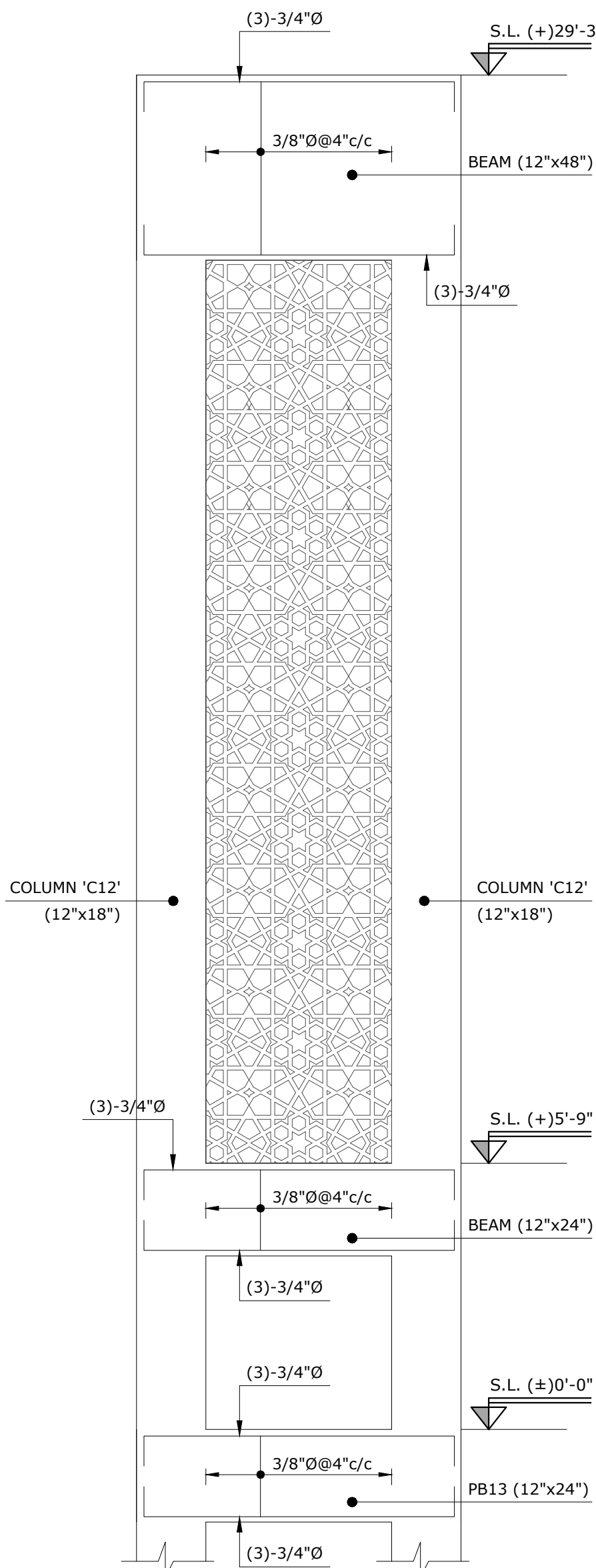
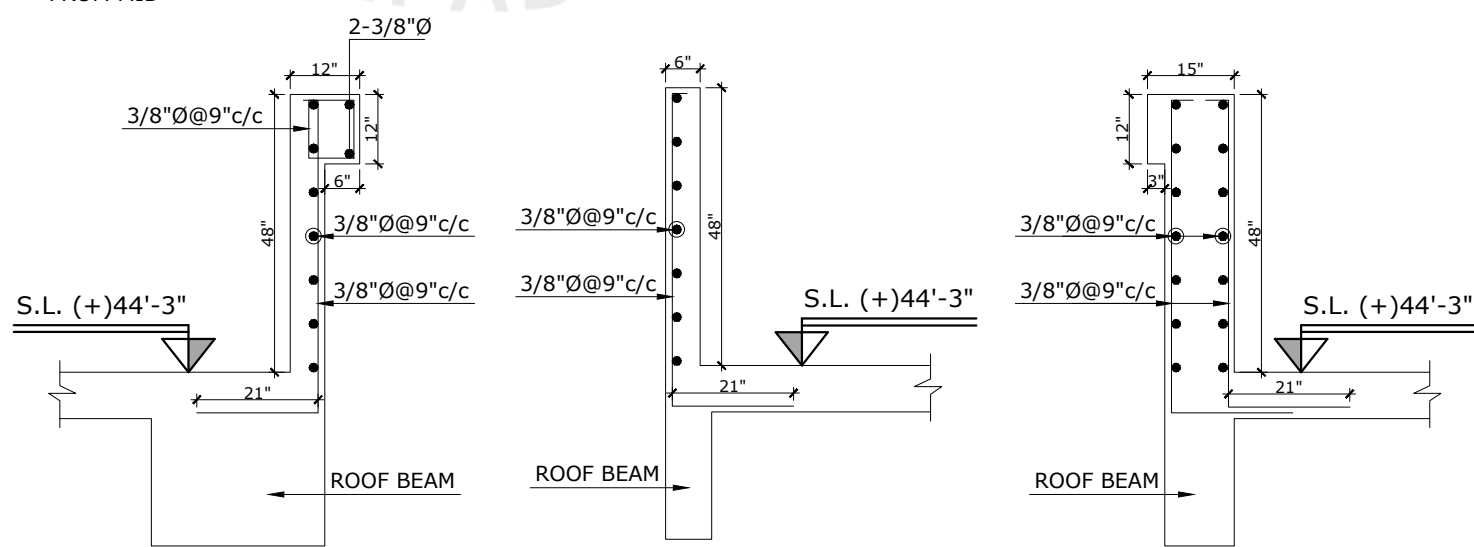
MARK	SCHEDULE OF BEAM STIRRUPS
A	15-3/8"Ø@5"c/c
B	3/8"Ø@10"c/c
C	3/8"Ø@5"c/c
D	3/8"Ø@4"c/c
E	3/8"Ø@6"c/c
F	3/8"Ø@8"c/c
G	3/8"Ø@5"c/c (2 Nos.)
H	18-3/8"Ø@5"c/c
K	13-3/8"Ø@5"c/c

- NOTES:
- REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 - ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international		SECOND FLOOR BEAM ELEVATIONS				M.K	MUDASSIR	ST-11
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com						SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



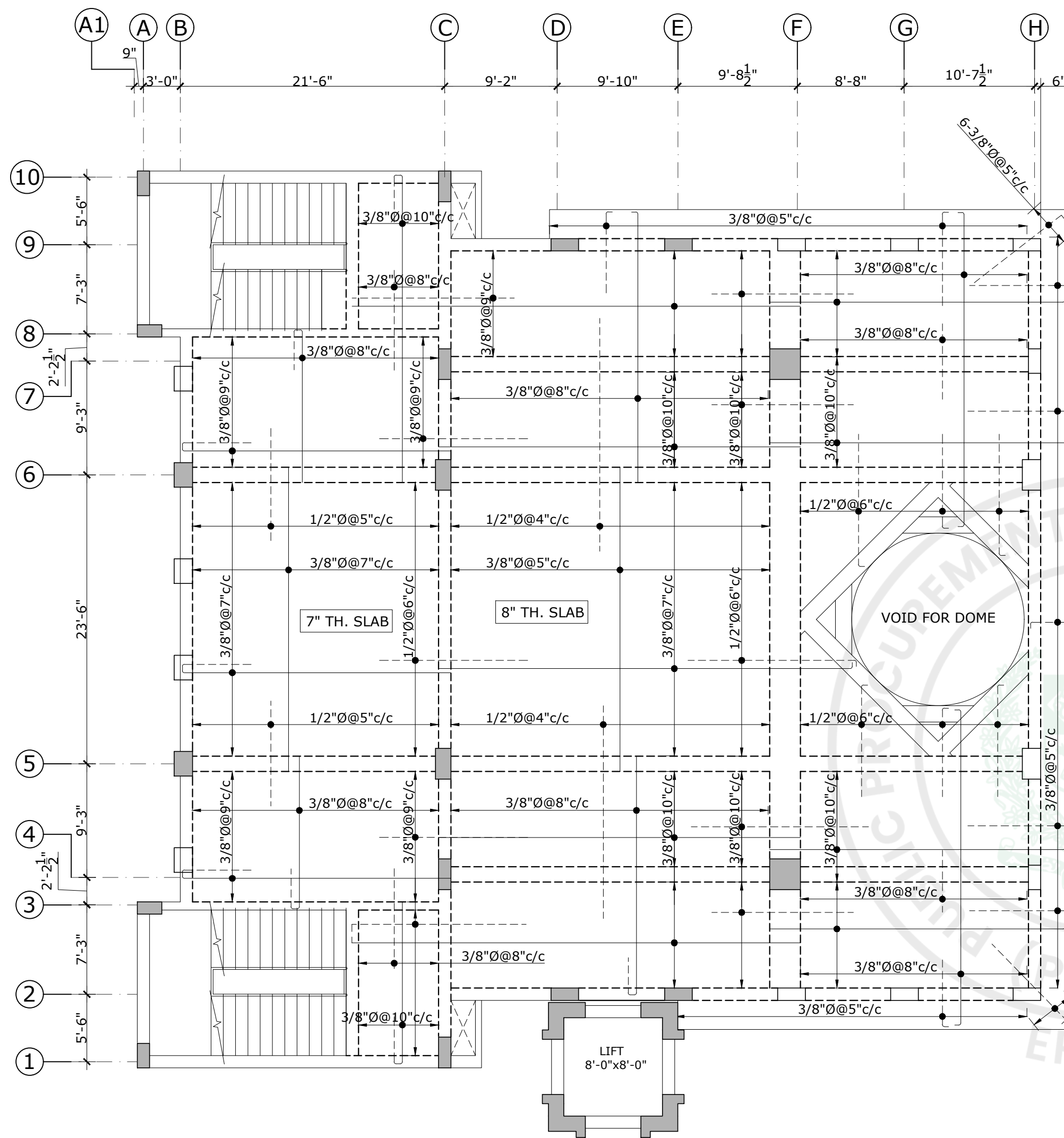
MARK	SCHEDULE OF BEAM STIRRUPS
A	15-3/8"Ø@5"c/c
B	3/8"Ø@10"c/c
C	3/8"Ø@5"c/c
D	3/8"Ø@4"c/c
E	3/8"Ø@6"c/c
F	3/8"Ø@8"c/c
G	3/8"Ø@5"c/c (2 Nos.)
H	18-3/8"Ø@5"c/c
K	13-3/8"Ø@5"c/c



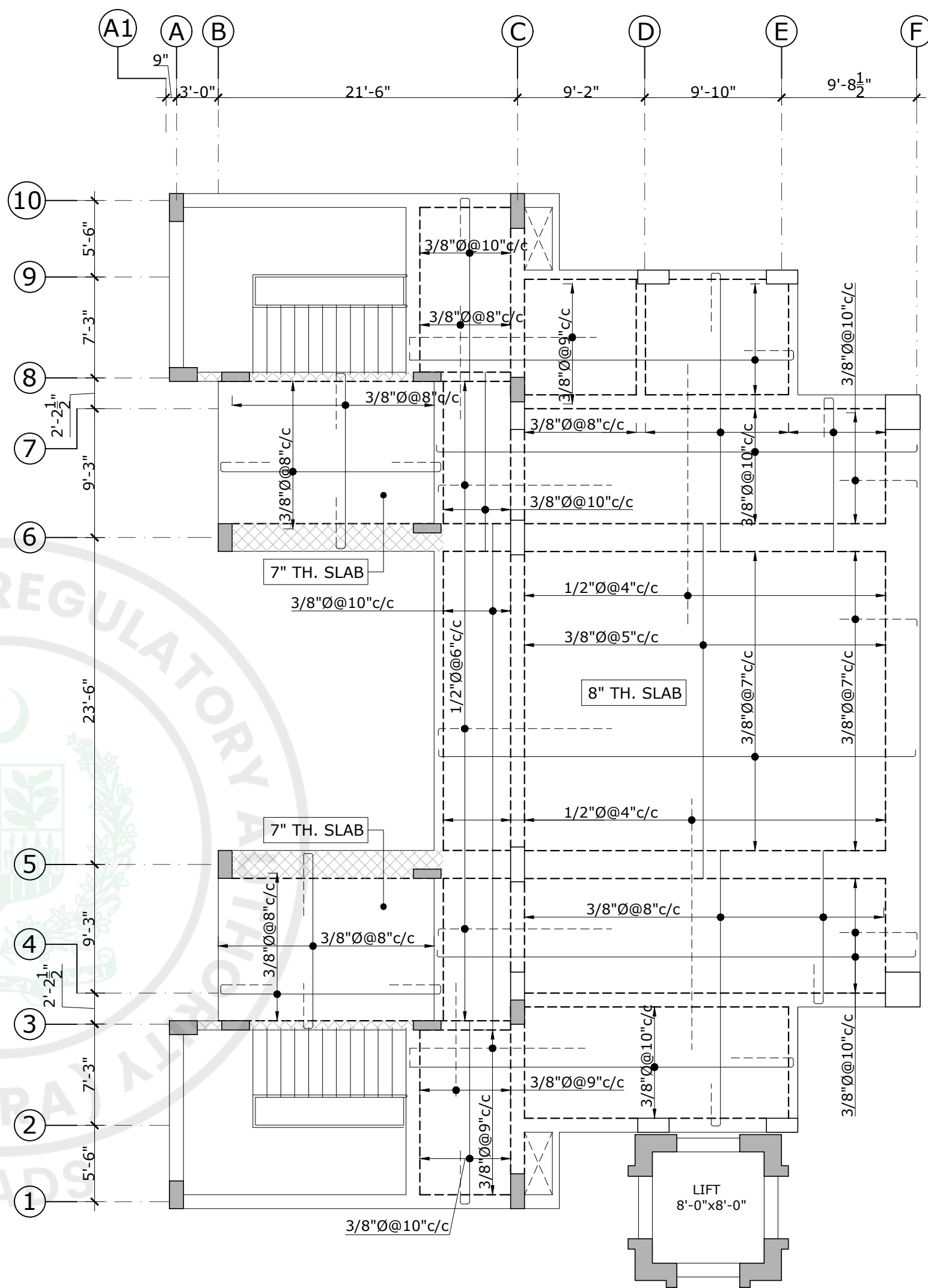
TYPICAL DETAIL 'X'
SCALE: 3/8"=1'-0"

- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	parc international		ROOF BEAM ELEVATIONS				M.K	MUDASSIR	ST-12
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.	ARCHITECTURE & PLANNING CONSULTANTS 16 C. BOKHARI Commercial Lane 1 PH VI D.H.A Karachi. Telephone : 35856307, 35856308 email : parcinternational@gmail.com						AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



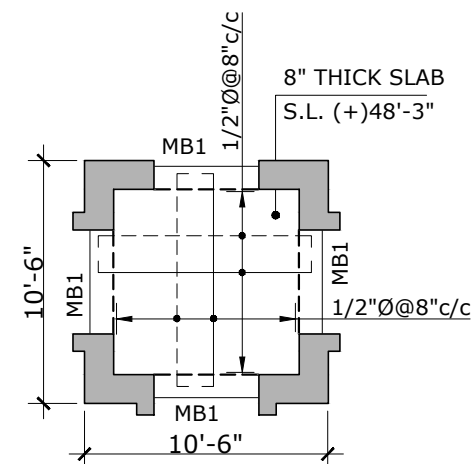
SECOND FLOOR REINFORCEMENT PLAN
SCALE:- (1/8"=1'-0")



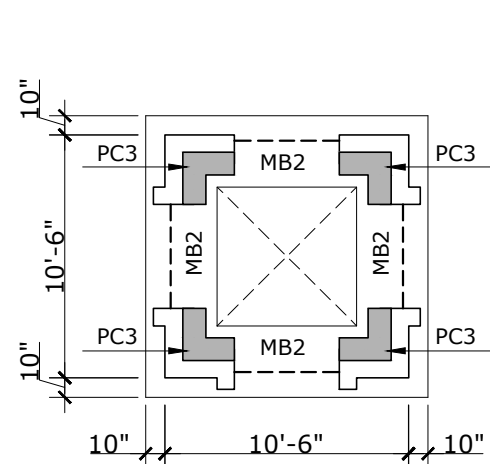
ROOF REINFORCEMENT PLAN
SCALE:- (1/8"=1'-0")

- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
 2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.
 3. ALL SLAB ARE 6" THICK UNLESS NOTED OTHERWISE.
 4. PROVIDE 3/8"Ø@10"c/c DISTRIBUTION BAR NOT SHOWN IN DRAWING.

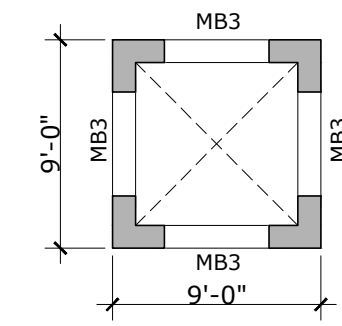
CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international ARCHITECTURE & PLANNING CONSULTANTS 16 C BOKHARI Commercial Lane 1 PH VI D.H.A Karachi . Telephone : 35856307, 35856308 email : parcinternational@gmail.com		SECOND FLOOR & ROOF REINFORCEMENT PLAN				M.K	MUDASSIR	ST-13
MOSQUE STATE BANK OF PUNJAB HEAD OFFICE, KARACHI.							SCALE AS SHOWN	DATE 31-MAR-2026	PROJECT #
							DESIGNED BY ENGR. UZAIR	REV. # 0	



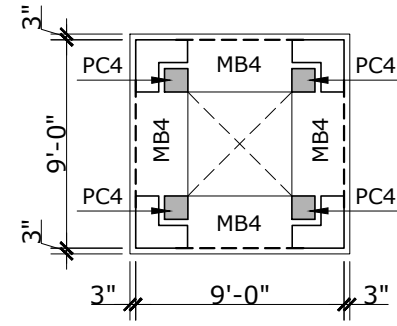
MACHINE ROOM
BOTTOM SLAB
SCALE:- (1/8"=1'-0")



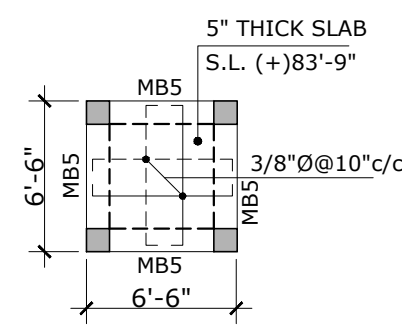
MINARET FRAMING
AT S.L. (+)58'-3"
SCALE:- (1/8"=1'-0")



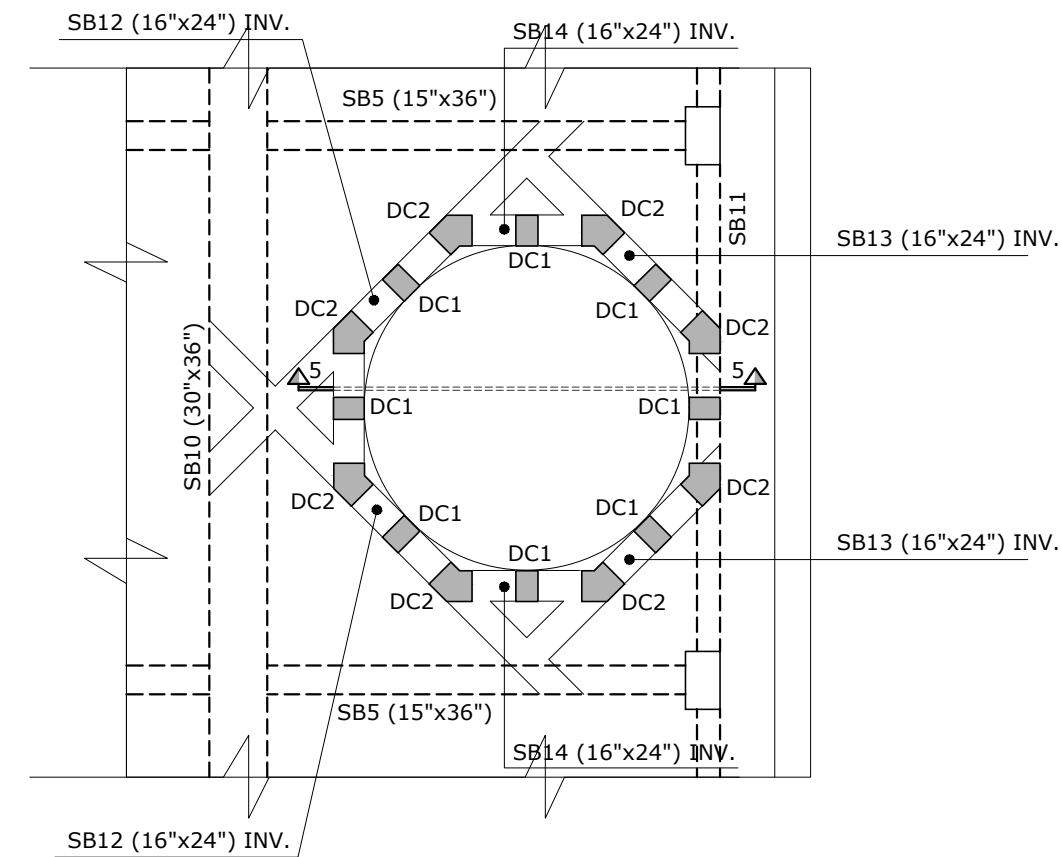
MINARET FRAMING
AT S.L. (+)67'-0"
SCALE:- (1/8"=1'-0")



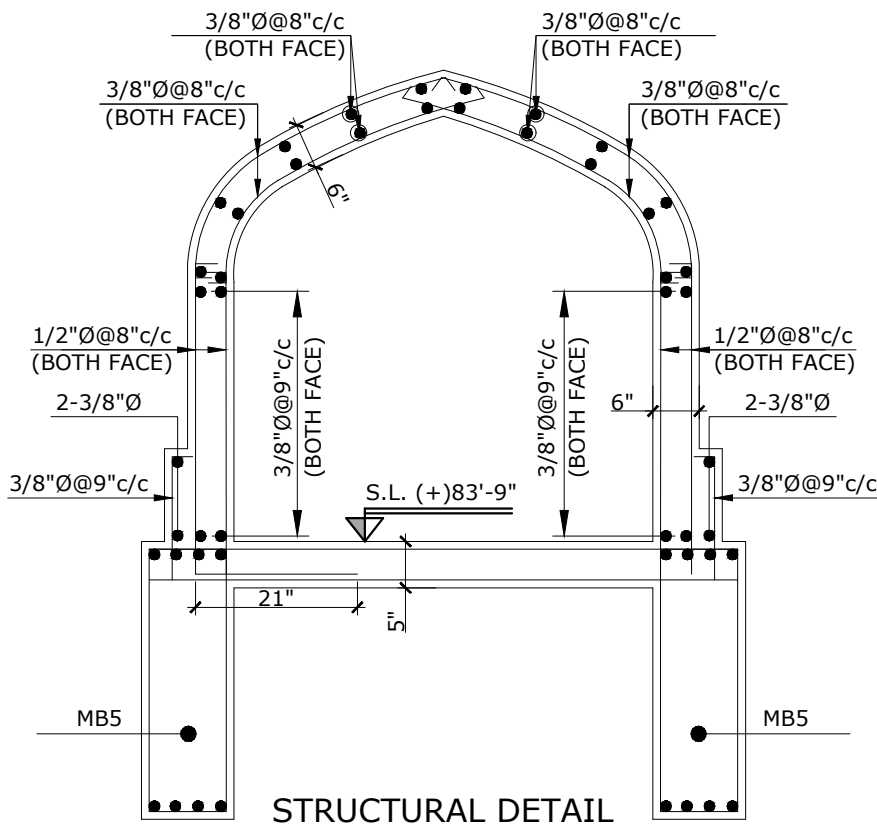
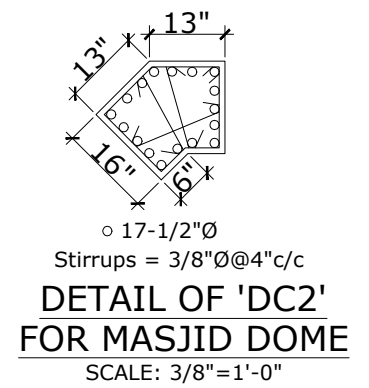
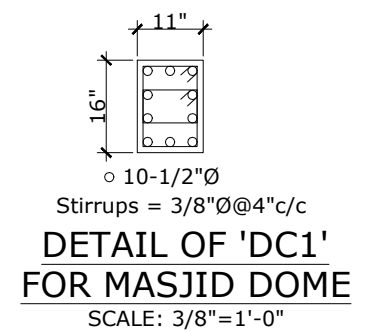
MINARET FRAMING
AT S.L. (+)75'-9"
SCALE:- (1/8"=1'-0")



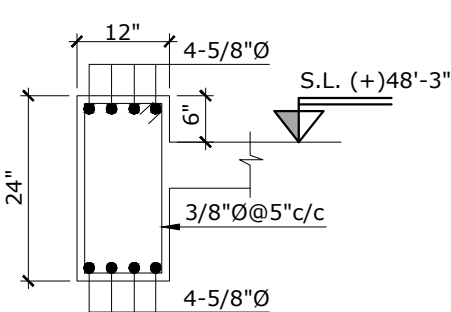
MINARET FRAMING
AT S.L. (+)83'-9"
SCALE:- (1/8"=1'-0")



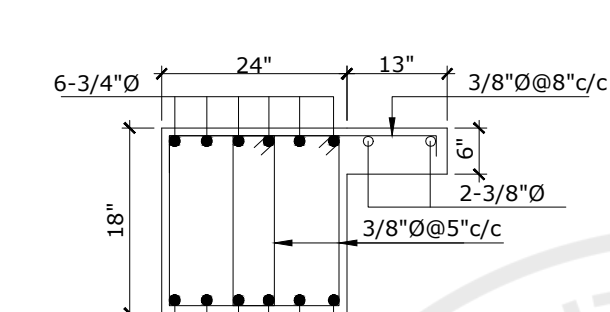
PART PLAN OF DOME STRUCTURE
SCALE:- (1/8"=1'-0")



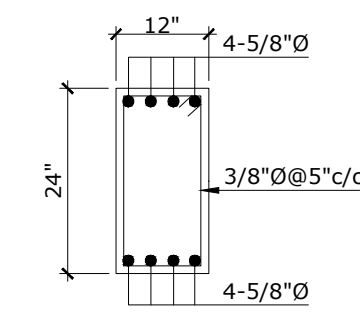
STRUCTURAL DETAIL
OF MINARET TOP DOME
SCALE: 1/2"=1'-0"



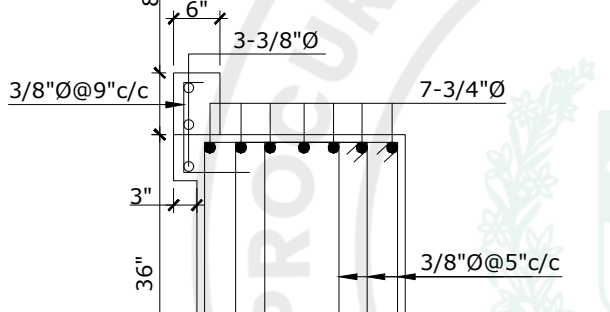
TYPICAL SECTION
OF BEAM 'MB1'
SCALE: 1/2"=1'-0"



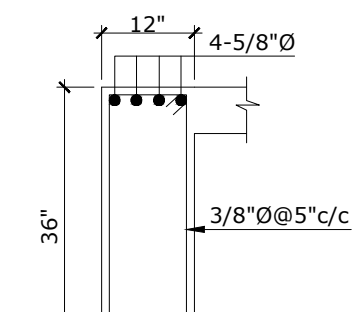
TYPICAL SECTION
OF BEAM 'MB2'
SCALE: 1/2"=1'-0"



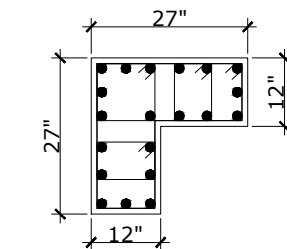
TYPICAL SECTION
OF BEAM 'MB3'
SCALE: 1/2"=1'-0"



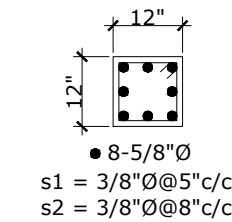
TYPICAL SECTION
OF BEAM 'MB4'
SCALE: 1/2"=1'-0"



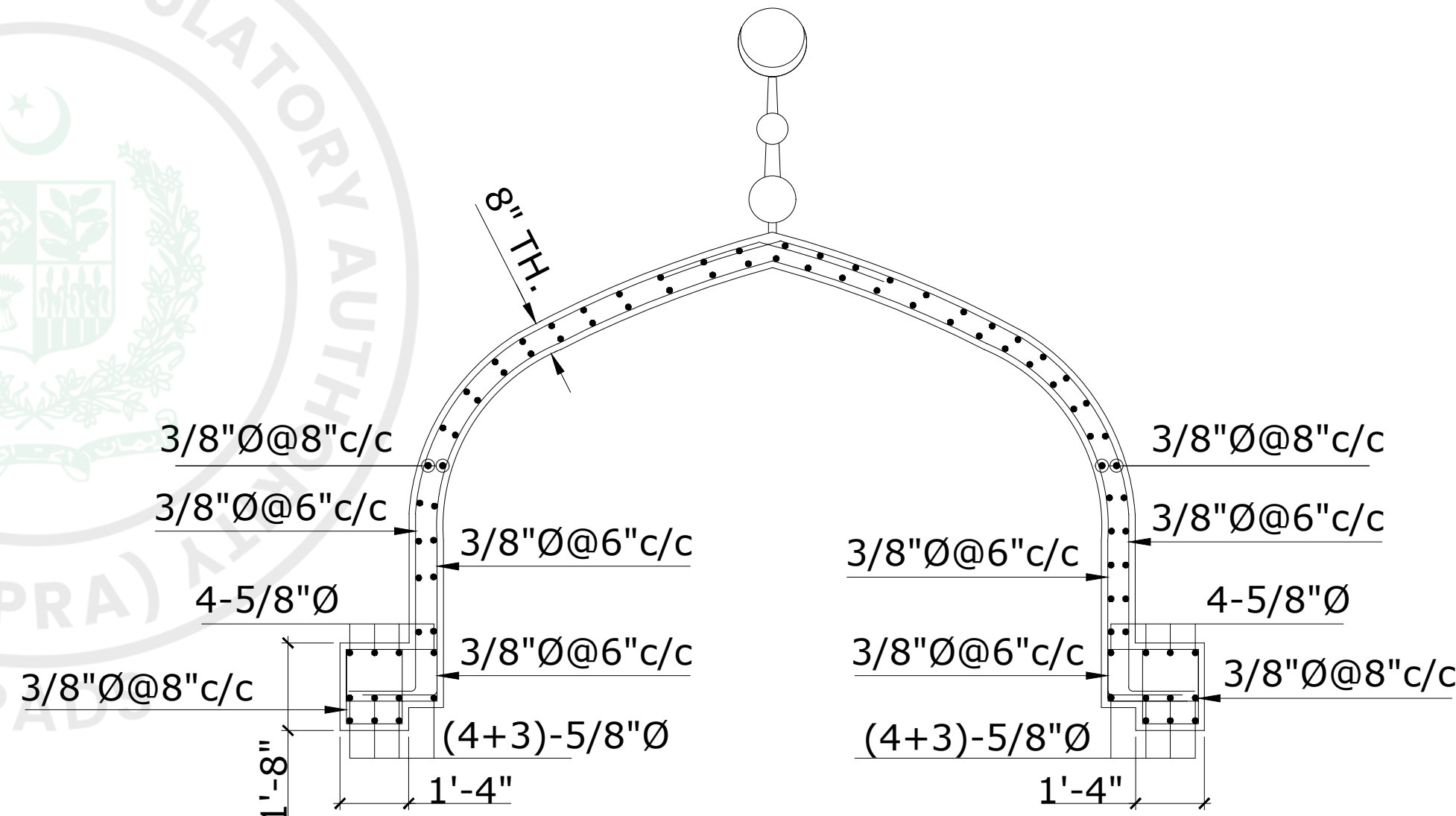
TYPICAL SECTION
OF BEAM 'MB5'
SCALE: 1/2"=1'-0"



DETAIL OF 'PC3'
SCALE: 3/8"=1'-0"



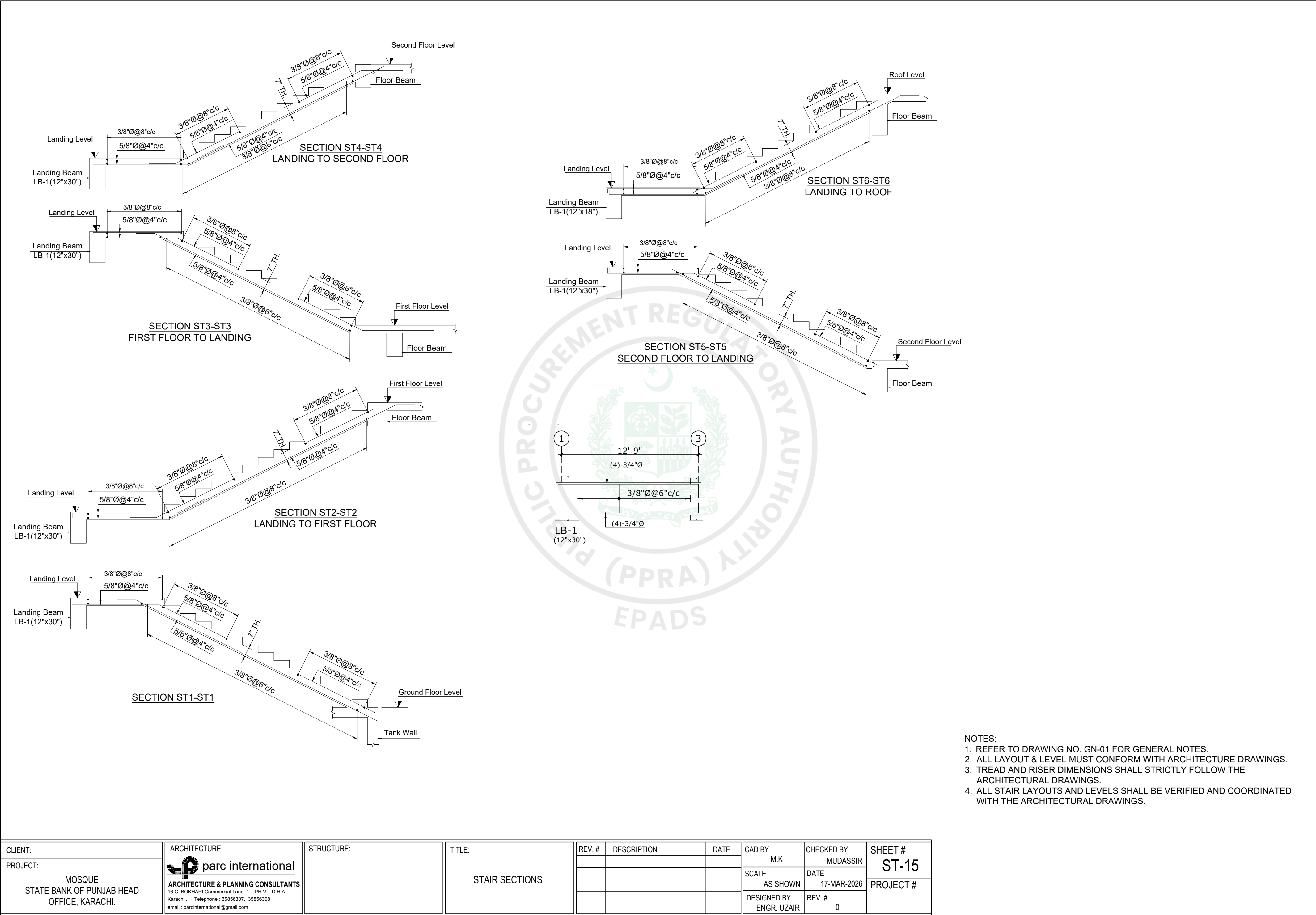
DETAIL OF 'PC4'
SCALE: 3/8"=1'-0"



SECTION 5-5

- NOTES:
1. REFER TO DRAWING NO. GN-01 FOR GENERAL NOTES.
2. ALL LAYOUT & LEVEL MUST CONFORM WITH ARCHITECTURE DRAWINGS.

CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	parc international		MACHINE ROOM				M.K	MUDASSIR	ST-14
MOSQUE	ARCHITECTURE & PLANNING CONSULTANTS		BOTTOM/TOP SLAB				SCALE	DATE	PROJECT #
STATE BANK OF PUNJAB HEAD	16 C. BOKHARI Commercial Lane 1 PH VI D.H.A		PLAN, MINARET DETAIL				AS SHOWN	31-MAR-2026	
OFFICE, KARACHI.	Karachi . Telephone : 35856307, 35856308		& DOME DETAIL				DESIGNED BY	REV. #	
	email : parcinternational@gmail.com						ENGR. UZAIR	0	

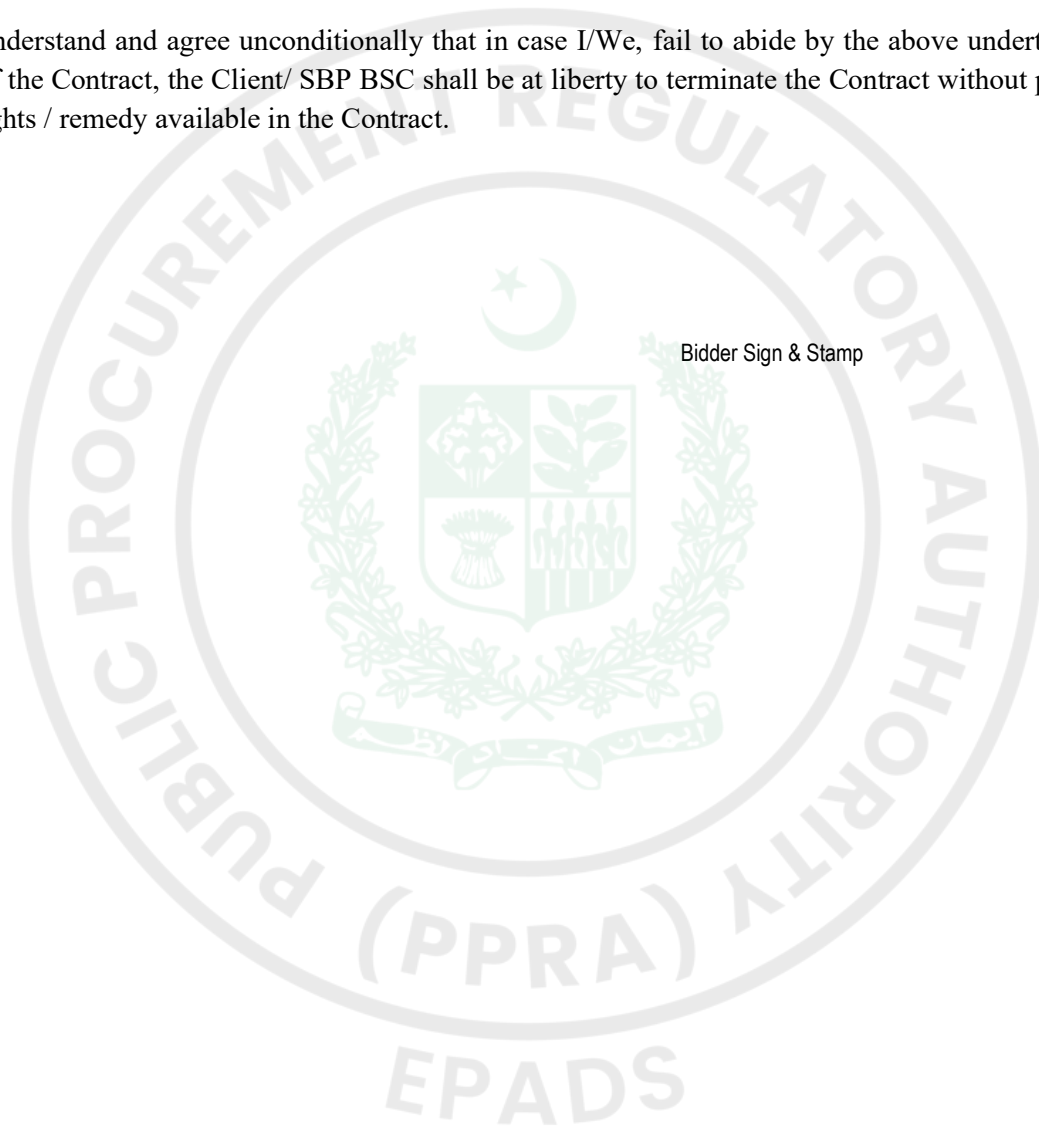


CLIENT:	ARCHITECTURE:	STRUCTURE:	TITLE:	REV. #	DESCRIPTION	DATE	CAD BY	CHECKED BY	SHEET #
PROJECT:	 parc international		STAIR SECTIONS				M.K	MUDASSIR	ST-15
MOSQUE	ARCHITECTURE & PLANNING CONSULTANTS						SCALE	DATE	PROJECT #
STATE BANK OF PUNJAB HEAD	16 C. BOKHARI Commercial Lane 1 PH VI D.H.A						AS SHOWN	17-MAR-2026	
OFFICE, KARACHI.	Karachi . Telephone : 35856307, 35856308						DESIGNED BY	REV. #	
	email : parcinternational@gmail.com						ENGR. UZAIR	0	

UNDERTAKING

Title: _____
Bidder: _____

1. I/We hereby confirm and declare that I/We has/have not been declared in-eligible or debarred, blacklisted/sanctioned by any Federal or Provincial Government Department, National Counter Terrorism Authority (NACTA), Agency, Organization or Autonomous Body anywhere in Pakistan or fraudulent practices, or no failure to perform with SBP.
2. I/We, understand and agree unconditionally that in case I/We, fail to abide by the above undertaking or any of terms of the Contract, the Client/ SBP BSC shall be at liberty to terminate the Contract without prejudice to any other rights / remedy available in the Contract.



S-2 FORM

Supplier Bank Account Details

	STATE BANK OF PAKISTAN BANKING SERVICES CORPORATION Supplier Bank Account (IBAN) Details Form	S-2
1. For Office use:		
*Office/Deptt		*Supplier No.
Supplier	New Update	*Liability A/C
*Supplier Type		*Prepayment A/C
2. Supplier Information		
*Supplier Name		
*Supplier NTN	CNIC No.	
Supplier Address		
Contact No.	Supplier City	
E-mail Address	Mobile	
	Fax No.	
3. Bank Account Information		
*Bank Name		
*IBAN (24 Characters)		*Supplier Stamp & Signature
*Branch Type	Islamic Commercial	
*Title of Account		
(For Office use only)		
Forwarded By	Verified By	Entered By (Supplier Mgt User)
(Procurement Function)		
		Date
Field marked with * are mandatory. Information without complete Bank Account Details (IBAN) & NTN/ CNIC will not be accepted. Any changes in Supplier's particulars should be conveyed immediately to SBP BSC. SBP BSC will not be responsible for credit into wrong account of supplier due to change in bank account details not conveyed to SBP BSC or delay in settlement of supplier's claims.		