Standard Bidding Document

Construction of Various Rehabilitation Works at KTDMC (Works)

National

Single Stage-One Envelope

September 29, 2026

Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC)),Procurement Head Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).
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REQUEST FOR BIDS

PROCUREMENT OF CIVIL WORKS

1. The **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC))** has reserved Funds for the procurement planned for FY **2026-27**. The **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC))** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**Construction of Various Rehabilitation Works at KTDMC**" with the reference of "**P138066**".

2. The **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC))** invites electronic Bids from eligible Bidders for procurement of Works **(Construction of Various Rehabilitation Works at KTDMC)** described in the bidding documents on **EPADS v2.0**.

3. **Single Stage-One 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 amounting described in Bid Security Section in Bidding Document in the form of **Pay Order**. 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/138066** 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 **Monday, October 26, 2026 10:30 AM**. E-bids will be opened by using **EPADS v2.0** on

the same day at **Monday, October 26, 2026 11:00 AM**. 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://pa.epads.gov.pk/**. A tutorial to explain the registeration 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 Statuary 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:

i. Section I -Invitation for Bids

ii. Section II Instructions to Bidders (ITBs)

iii. Section III Bid Data Sheet (BDS)

iv. Section IV Eligible Countries

v. Section V Evaluation and Qualification Criteria

vi. Section VI Works Requirements Technical Specifications & Schedule of Requirements

vii. Section VII Standard Bidding Forms

viii. Section VIII General Conditions of Contract (GCC)

ix. Section IX Particular Conditions of Contract (PCC)

x. 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 v2.0**.

6.2. The Procuring agency/Employer shall respond to the request for clarification in accordance with the Public Procurement Rules 2004, Rule No.31 i.e. **Clarification of bids**.

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 v2.0**. 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 the PP Rules 2004, rule no. 23 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 PP Rules 2004, rule no. 27 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 PP rules 2004, rule no. 30.

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 the PP rules 2004, rule no. 26 i.e. Bid Validity.

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 the PP Rules 2004, rule no. 25 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 v2.0**, the scanned copy of bid security or bid securing declaration, as the case may be, shall be uploaded on **EPADS v2.0** 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 Biding 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 biding 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:
if a Bidder:

17.8.1. 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**

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 PP Rules 2025, rule no.39 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 the PP rules 2004, rule no 28 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 the PP Rules 2025, rule no 38 i.e. Clarifications.

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 the PP Rule 2004, rule no. 30 (2).

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 in accordance with the PP Rules 2025 rule no. 43. 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/Employer's Right to reject All Bids**

38.1. The procuring agency has the right to reject all bids in accordance with the PP Rules 2025 rule no. 45. 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 the PP Rules 2004, rule no. 40.

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 the PP Rules 2025, rule no. 65 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 PP Rules 2025, rule no.25 i.e. Blacklisting and “Blacklisting and Debarment of Bidders or Contractors Regulations 2024.

Bid Data Sheet

Bid Data Sheet (BDS)

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

A. Introduction

ITB Number
Amendments of, and Supplements to, Clauses in the Instruction to Bidders

ITB Number1.1

Name of Procuring agency/Employer: **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC))**

The subject of procurement is: **Construction of Various Rehabilitation Works at KTDMC**

Period for completion of the works **6 Months**

Commencement date execution of the works: **42 Days**

Type of Procurement**:Local**

ITB Number2.1

Financial year for the operations of the Procuring agency/Employer: **2026-27**
Name of Project [insert: name and summary description of the Project if any]

Name of financing institution: [insert: name if any]

Name and identification number of the Contract: **P138066**

ITB Number3.1

JV/Consortium or Association Allowed: **No**

Maximum number of members in the joint venture shall be: **Nil**.

B. Bidding Documents

ITB Number6.4

The Bidders may seek clarifications through **EPADS v2.0**: **Last Clarification Date: Tuesday, October 20, 2026**
Pre-Bid Meeting: Monday, October 12, 2026 11:00 AM

C. Preparation of Bids

ITB Number8.1

The Language of all correspondences and documents related to the Bid is: **English**

ITB Number 5.1 & 9.1

The following documentsmust be includedto constitute the Bid

1. (i) Power of Attorney to sign the Bid; (ii) Bid Security (Pay Order); (iii) valid PEC registration certificate; (iv) NTN & GST/SST(SRB) certificates & Active Taxpayer evidence; (v) affidavits (non-blacklisting, litigation status, correctness of particulars); (vi) priced Pricing Schedule (BOQ), Section 7; (vii) evidence of Technical Qualification Requirements, Section 5.2; (viii) any other document per Section 4.

ITB Number9.4 (b)

Other procurement specific documentation requirements are:

Documents to be uploaded with the Bid on EPADS v2.0 (Section 2, Clause B):

(i) Power of Attorney to sign the Bid;

(ii) Bid Security (Pay Order);

(iii) Valid PEC registration certificate showing the required category (C-6 or above) and codes (BC-02, BC-04, CE-10, CE-11, CE-11(ix));

(iv) NTN and GST/SST (SRB) certificates and evidence of Active Taxpayer status on the FBR (and SRB, where applicable) Active Taxpayers List;

(v) Affidavits on judicial e-stamp paper: Non-Blacklisting (Section 11.1), Litigation Status (Section 11.2), Correctness of Particulars (Section 11.3);

(vi) The Pricing Schedule (Bill of Quantities) at Section 7, duly priced, signed and stamped;

(vii) Documentary evidence of the Technical Qualification Requirements at Section 5.2 (T-1 to T-6): Completion/Taking-Over Certificates and Work Orders or Contract Agreements for similar works experience; PEC registration certificate showing category, codes and date of first registration; audited financial statements or Income Tax Returns for the last three years; CVs, PEC registration, degree and evidence of employment for Key Personnel (Project Manager, Site Supervisor, Quantity Surveyor); list of equipment with ownership documents or a signed undertaking to deploy hired equipment;

(viii) Any other document listed in the Eligibility Criteria at Section 4.

Each document shall be signed and stamped by a person duly authorized to bind the bidder, scanned legibly, and uploaded to EPADS v2.0. Documents that are illegible, corrupt or password-protected shall be treated as not submitted.

ITB Number12.4

The Bid price will be/will not be subject to the price adjustment **Yes**
Price Adjustment Annexure is attached in the Annexure Section with the name of Adjustment Data.

ITB Number12.6

The Bid price shall be adjusted in accordance with Schedule-A to Bid – “Schedule of Adjustment Data” if available.

ITB Number13.1

Bidders to quote entirely in**Pak rupees (PKR)**

Schedule of Adjustment Data for Local Currency (LC)

Index Code	Index Description	Source of Index	Weighting
1	Non-adjustable	---	0.35
2	Labor (Laborer (un-skilled) per day, representative of all types of Labour deployed at site)	GoP, Pakistan Bureau of Statistics (PBS), Monthly Statistical Bulletin	0.30

Index Code	Index Description	Source of Index	Weighting
3	Reinforcing Steel (1/2" dia. round M.S. Bars per ton, representative of all Steel Reinforcement)	GoP, Pakistan Bureau of Statistics (PBS), Monthly Statistical Bulletin	0.15
4	Cement (SRC cement per bag, representative of all types of cement used at site)	GoP, Pakistan Bureau of Statistics (PBS), Monthly Statistical Bulletin	0.15
5	High Speed Diesel (HSD) (representative of all fuels used in connection with the Contract)	As announced by Pakistan State Oil (PSO), prevalent 7 days prior to bid opening date	0.05
	Total	PKR	1.00

ITB Number15.1

The Bid Validity period shall be **120 Days** days.

ITB Number16.1

The amount of Bid Security shall be (insert amount)

The currency of the Bid Security shall be: **PKR**.

ITB Number16.2

The Bid Security shall be in the form of:**Pay Order**

D. Submission of Bids

ITB Number19.1

The deadline for Bid submission is:**Monday, October 26, 2026 10:30 AM**
Address for submission of Original Bid Security:**Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).**

ITB Number21.1
The Bid opening shall take place at:**EPADS v2.0**
Day : ***Monday***

Date: ***October 26, 2026***
Time : ***11:00 AM***

ITB Number27.1
The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid prices expressed in various currencies is: **PKR Only**
The source of exchange rate shall be: **Nil**
The date of exchange rate shall be: **Nil**

ITB Number28.2 &28.5
Least Cost Based Selection (LCBS)
see Evaluation Criteria

ITB Number29.1
Domestic preference to apply.
Domestic preference:**No**
Preference to domestic or national suppliers or contractors shall be provided in accordance with policies of the Federal Government and/or in accordance with the regulations issued by the Authority.
If Yes, The percentage for the domestic preference alongwith calculation formula is provided in the evaluation and qualification criteria.

ITB Number32.2
Sub-contracting is allowed? : **No**

No% of the total value of the contract.

39.1 The Performance Security (or guarantee) shall be **10.00%**
39.2 The Performance Security (or guarantee) shall be in the form of:**Pay Order,Bank Guarantee**

Eligibility Criteria

Bidder's Type	Required Registration
Any	NADRA CITIZENSHIP (CNIC/NICOP) FBR (NTN) FBR (GSTN) PEC

Eligibility Criteria	Document
Valid PEC Constructor/Operator registration, Category C-6 or above, current & not expired, covering codes BC-02, BC-04, CE-10, CE-11 (General Engineering Works) & CE-11(ix) (General Building Works). Valid NTN & Sales Tax (GST/SST-SRB) registration; status must be Active on FBR (and SRB where applicable) Active Taxpayers List at time of bid submission.	Yes

Evaluation Criteria

Least Cost Based Selection (LCBS)

Jobs/Lots

Lot Title : Construction of Various Rehabilitation Works at KTDMC

Bid Security : 414964 PKR

Job	Delivery Schedule	Quantity
Retrofitting for the existing mezzanine floor room's false ceiling in the production area.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Rehabilitation of washrooms in the production area.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Rehabilitation of student's washrooms on the first floor of the admin block.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Rehabilitation of the store roof.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job

Job	Delivery Schedule	Quantity
Rehabilitation of the seminar/classroom roof.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Waterproofing of the workshop's PEB (Pre-Engineered Building) Shed.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Construction of the drainage line in the open courtyard area in the admin block.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Rehabilitation of all existing building cracks.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job
Construction & Renovation of Masjid.	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job

Items Without Lots :

Item	UNSPSC	Delivery Schedule	Quantity	Bid Security	Related to Job/Lot

Construction Materials (as per Specifications & BOQ)	Cement	**Address:** Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province). **Schedule:** 180 Days **Quantity:** 1/job	1/job	20 PKR	Construction of Various Rehabilitation Works at KTDMC (Lot)

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Work Specifications and Market Rates

Lot Title: Construction of Various Rehabilitation Works at KTDMC

Specifications / Requirements:

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
1	ITEM 1	Retrofitting for the existing mezzanine floor room's false ceiling in the production area				
2	1.1	[Item 1] CEILING/GYPSUM - Supply and fix Gypsum sheet 1200mm x 2400mm x 12.5mm thick... Same as item 14-31 but, Gypsum Ceiling 600 mm x 600 mm x 7.5 mm thick, all as specified.	Sqm	145.41	2040	296636
3	ITEM 2	Rehabilitation of washrooms in the production area				
4	2.1a	[Item 2] Internal Paint/Distemper - Surface preparation (dampness) with Alkali Resisting primer.	Sqm	27.84	130	3619
5	2.1b	[Item 2] Distempering with Poly Vinyl Distemper, 1st Coat.	Sqm	27.84	124	3452
6	2.1c	[Item 2] Same as item 15-4, but 2nd and subsequent coats.	Sqm	27.84	79	2199

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
7	2.2a	[Item 2] Internal Paint/Walls - Surface preparation (dampness) with Alkali Resisting primer.	Sqm	19.68	130	2558
8	2.2b	[Item 2] 1st Coat Plastic Emulsion paint on walls.	Sqm	19.68	217	4271
9	2.2c	[Item 2] Same as item 15-4, but 2nd and subsequent coats.	Sqm	19.68	147	2893
10	2.3	[Item 2] TILE WORKS - Standard quality tiles not exceeding 1600 Sq cm (16"x16"), complete.	Sqm	150.39	3868	581709
11	2.4	[Item 2] UPVC DOOR - Supply and fix uPVC Door, 60mm thick shutter, groove panel 20mm, white colour.	Sqm	9.56	35570	340049
12	2.5	[Item 2] UPVC VENTILATOR - Supply and fix uPVC sliding window 37mm thick, frame 80x50mm, white colour.	Sqm	1.01	27999	28279
13	2.6	[Item 2] DISMANTLING OF TILE - Taking up tiles/Marble/granite work of any type laid in floors/walls.	Sqm	34.72	263	9131
14	2.7	[Item 2] Wash Hand Basin (WHB) - deluxe quality, with pedestal, waste pipe, bolts/bracket, coupling.	Each	2	12867	25734
15	2.8	[Item 2] Mirrors - up to 2700 sq cm, 5mm thick, plastic frame.	Each	2	2848	5696

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
16	2.9	[Item 2] SOAP TRAY - any shape/pattern/size with plugs, screws.	Each	2	2344	4688
17	2.10	[Item 2] TOWEL RAIL.	Each	2	2269	4538
18	2.11a	[Item 2] FLOOR TRAP - 100mm dia, including reducer.	Each	7	2856	19992
19	2.11b	[Item 2] Casted Grating CP, 150mm x150mm.	Each	6	2027	12162
20	2.12	[Item 2] Water Closet (WC) Asiatic pattern not less than 550mm with flushing system.	Each	5	8529	42645
21	2.13	[Item 2] FLUSH TANK - flushing cistern glazed (replacement/maintenance).	Each	5	7054	35270
22	2.14	[Item 2] PPR Pipe with fittings, 25mm dia, Class PN-20, supply and fixing.	Metre	40	414	16560
23	2.15a	[Item 2] uPVC Soil and waste pipe, 75mm dia, complete with Z joint and rubber ring.	Metre	21	1832	38472
24	2.15b	[Item 2] Same as item 20-1 but 110mm dia.	Metre	15	2759	41385
25	2.16	[Item 2] CP Mixer, 15mm dia, fancy head, Hot and Cold, supply and fixing.	Each	2	5157	10314
26	2.17	[Item 2] Bib cock, Brass, CP, fancy type, screwed down, BSS, 15mm dia.	Each	5	1317	6585
27	2.18	[Item 2] uPVC P-trap, 100mm dia.	Each	5	1738	8690

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
28	2.N1	[Item 2] REMOVAL OF DOOR - Dismantling and removal of existing door incl. chowkat, hinges, locks, handles etc.	Job	1	30000	30000
29	2.N2	[Item 2] REMOVAL OF SANITARY FITTINGS - Dismantling and removal of existing WC, wash basins, sinks, taps, showers, pipes.	Job	1	30000	30001
30	ITEM 3	Rehabilitation of student's washrooms on the first floor of the admin block				
31	3.1a	[Item 3] Internal Paint/Distemper - Surface preparation with Alkali Resisting primer.	Sqm	19.86	130	2582
32	3.1b	[Item 3] Distempering, 1st Coat.	Sqm	27.84	124	3452
33	3.1c	[Item 3] Same as item 15-4, but 2nd and subsequent coats.	Sqm	27.84	79	2199
34	3.2a	[Item 3] Internal Paint/Walls - Surface preparation with Alkali Resisting primer.	Sqm	11.01	130	1431
35	3.2b	[Item 3] 1st Coat Plastic Emulsion paint on walls.	Sqm	19.68	217	4271
36	3.2c	[Item 3] Same as item 15-4, but 2nd and subsequent coats.	Sqm	19.68	147	2893
37	3.3	[Item 3] TILE WORKS - Standard quality tiles not exceeding 1600 Sq cm (16"x16"), complete.	Sqm	89.99	3868	348081

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
38	3.4	[Item 3] UPVC DOOR - Supply and fix uPVC Door 60mm thick shutter, groove panel 20mm, white colour.	Sqm	6.83	35570	242943
39	3.5	[Item 3] UPVC VENTILATOR - Supply and fix uPVC sliding window 37mm thick, white colour.	Sqm	1.22	27999	34159
40	3.6	[Item 3] DISMANTLING OF TILE.	Sqm	89.85	263	23631
41	3.7	[Item 3] Wash Hand Basin (WHB) - deluxe quality.	Each	3	12867	38601
42	3.8	[Item 3] Mirrors - up to 2700 sq cm, 5mm thick.	Each	3	2848	8544
43	3.9	[Item 3] SOAP TRAY.	Each	3	2344	7032
44	3.10	[Item 3] TOWEL RAIL.	Each	2	2269	4538
45	3.11a	[Item 3] FLOOR TRAP - 100mm dia.	Each	7	2856	19992
46	3.11b	[Item 3] Casted Grating CP, 150mm x150mm.	Each	2	2027	4054
47	3.12a	[Item 3] Water Closet (WC), European pattern only (replacement/maintenance).	Each	1	19479	19479
48	3.12b	[Item 3] WC Asiatic pattern not less than 550mm with flushing system.	Each	3	8529	25587
49	3.13	[Item 3] FLUSH TANK.	Each	3	7054	21162
50	3.14	[Item 3] PPR Pipe with fittings, 25mm dia, Class PN-20.	Metre	35	414	14490
51	3.15a	[Item 3] uPVC Soil and waste pipe, 75mm dia.	Metre	18	1832	32976

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
52	3.15b	[Item 3] uPVC Soil and waste pipe, 110mm dia.	Metre	10	2759	27590
53	3.16	[Item 3] CP Mixer, 15mm dia, fancy head, Hot and Cold.	Each	3	5157	15471
54	3.17a	[Item 3] Bib cock, Brass, CP, fancy type, 15mm dia.	Each	3	1317	3951
55	3.17b	[Item 3] Same as item 18-315, but toilet bib cock (Double).	Each	1	2642	2642
56	3.17c	[Item 3] Toilet shower, 15mm dia.	Each	1	2984	2984
57	3.18	[Item 3] uPVC P-trap, 100mm dia.	Each	4	1738	6952
58	3.N1	[Item 3] REMOVAL OF DOOR - Dismantling and removal of existing door incl. chowkat, hinges, locks, handles etc.	Job	1	30000	30000
59	3.N2	[Item 3] REMOVAL OF SANITARY FITTINGS - Dismantling and removal of existing WC, wash basins, sinks, taps, showers, pipes.	Job	1	30000	30000
60	ITEM 4	Rehabilitation of the store roof				
61	4.1	[Item 4] Precast Slab - Pre-cast RCC slab, length 0.914M-1.398M, width 0.457M, hoisting, setting, jointing CM(1:4).	Sqm	60	3894	233640
62	4.2	[Item 4] Precast Girder - Pre-cast pre-stressed RCC girders 102mmx228mm, span 2.438M-4.877M.	Meter	75	2671	200325

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
63	4.3a	[Item 4] Internal Paint/Distemper - Surface preparation with Alkali Resisting primer.	Sqm	88	130	11440
64	4.3b	[Item 4] Distempering, 1st Coat.	Sqm	88	124	10912
65	4.3c	[Item 4] Same as item 15-4, but 2nd and subsequent coats.	Sqm	88	79	6952
66	4.4a	[Item 4] Internal Paint/Walls - Surface preparation with Alkali Resisting primer.	Sqm	200	130	26000
67	4.4b	[Item 4] 1st Coat Plastic Emulsion paint.	Sqm	200	217	43400
68	4.4c	[Item 4] Same as item 15-4, but 2nd and subsequent coats.	Sqm	200	147	29400
69	4.5	[Item 4] Steel Reinforcement - deformed bars Grade-60, Slab.	Kg	317.85	354	112519
70	4.6	[Item 4] Screeding - PCC 3000 psi, Ratio 1:2:4/screeding.	Cu.m	4.5	26292	118314
71	4.7	[Item 4] Waterproofing - 3mm Torch Bonding Bituminous Membrane, same as item 10-60 but 4mm thick.	Sqm	60	1457	87420
72	4.N1	[Item 4] ELECTRICAL WORKS/STORE ROOM - Removal and refixing of existing electrical wiring, conduits, fittings etc.	Job	1	91666.67	91667

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
73	4.N2	[Item 4] COMPENSATION OF HT CABLE - protection/safety measures for existing HT cable near construction area.	Job	1	91666.67	91667
74	4.N3	[Item 4] PRECAST STRUCTURE - Removing existing precast concrete structure from existing record room, disposal.	Job	1	91666.66	91666
75	ITEM 5	Rehabilitation of the seminar/classroom roof				
76	5.1	[Item 5] FLOOR TILE/DISMANTLING - Taking up tiles/Marble/granite work.	Sqm	108	263	28404
77	5.2a	[Item 5] RCC SLAB AND BEAM/DISMANTLING - RCC Solid Slab.	Cu.m	16.8	4148	69686
78	5.2b	[Item 5] RCC Drop Beam.	Cu.m	1.5	4148	6222
79	5.3	[Item 5] BLOCK MASONARY/DISMANTLING - walls/brick/concrete blocks/stone masonry incl. pillars, lintels, struts.	Cu.m	6.66	1849	12314
80	5.4a	[Item 5] RCC WORK - PCC 3500 psi, transportation upto 5km, roof slabs/landings/walls/plinth beams - Slab.	Cu.m	18.9	38514	727915
81	5.4b	[Item 5] Same as item 3-15 but in beams, columns, stairs, posts, struts, piers, lintels - Beam.	Cu.m	2	38514	77028

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
82	5.5a	[Item 5] STEEL REINFORCEMENT - deformed bars Grade-60 - Slab.	Kg	3337.7	354	1181546
83	5.5b	[Item 5] Steel Reinforcement - Beam.	Kg	353.2	354	125033
84	5.5c	[Item 5] Same as item 9-56, except cost of bars - Slab.	Kg	3500	16	56000
85	5.5d	[Item 5] Same as item 9-56, except cost of bars - Beam.	Kg	300	16	4800
86	5.6a	[Item 5] BLOCK MASONARY - PCC Solid Blocks, load bearing walls, CM 1:6, Parapet Wall.	Cu.m	6.66	23749	158168
87	5.6b	[Item 5] Tile Work - Deluxe quality tiles 1600-3700 sq cm (24"x24") - Floor Tile.	Sq.m	108	4679	505332
88	5.6c	[Item 5] Tile Work - Skirting.	Sq.m	6.66	4679	31162
89	5.7a	[Item 5] PLASTER WORK - Cement Plaster 1:4, 19mm thick - Ceiling Plaster.	Sq.m	108	984	106272
90	5.7b	[Item 5] Plaster Work - Parapet Wall plaster.	Sq.m	88.8	984	87379
91	5.8a	[Item 5] INTERNAL PAINT WORK - Ceiling - Surface preparation Alkali Resisting primer.	Sqm	108	130	14040
92	5.8b	[Item 5] Ceiling - Distempering 1st Coat.	Sq.m	108	124	13392
93	5.8c	[Item 5] Ceiling - Same as item 15-4, 2nd and subsequent coats.	Sq.m	108	79	8532

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
94	5.8d	[Item 5] Internal Paint/Walls - Surface preparation Alkali Resisting primer.	Sqm	155.4	130	20202
95	5.8e	[Item 5] Internal Paint/Walls - 1st Coat Plastic Emulsion.	Sqm	155.4	217	33722
96	5.8f	[Item 5] Internal Paint/Walls - Same as item 15-4, 2nd and subsequent coats.	Sqm	155.4	147	22844
97	5.9a	[Item 5] EXTERNAL PAINT WORK - Surface preparation Alkali Resisting primer.	Sqm	88.8	130	11544
98	5.9b	[Item 5] External Paint - 1st Coat Weather Resistant paint on new surface.	Sq.m	88.8	253	22466
99	5.9c	[Item 5] External Paint - Same as item 15-57/15-58, 2nd and subsequent coat.	Sq.m	88.8	185	16428
100	5.10	[Item 5] Water Proofing Treatments - 3mm Torch Bonding Bituminous Membrane, same as item 10-60 but 4mm thick.	Sq.m	112	1457	163184
101	5.11	[Item 5] ROOF SCREEDING - PCC 3000 psi, formwork and fair faces.	Cu.m	8.4	22490	188916
102	5.N1	[Item 5] SITE CLEARANCE - Relocation of equipments, utilities and services to clear way for rehabilitation works.	Job	1	191666.67	191667

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
103	5.N2	[Item 5] ALUMINIUM WINDOWS/DOORS - Careful dismantling/removal and refixing after related works.	Job	1	191666.67	191667
104	5.N3	[Item 5] ELECTRICAL WORKS - Removal and refixing of existing electrical wiring, conduits, DB etc.	Job	1	191666.66	191667
105	ITEM 6	Waterproofing of the workshop's PEB (Pre-Engineered Building) Shed				
106	6.1	[Item 6] Water Proofing Treatments - 3mm Torch Bonding Bituminous Membrane, same as item 10-60 but 4mm thick.	Sq.m	384	1457	559488
107	ITEM 7	Construction of the drainage line in the open courtyard area in the admin block				
108	7.1	[Item 7] Dismantling Works/Floor - Demolition of Plain Cement Concrete.	Cu.m	0.08	3751	300
109	7.2	[Item 7] Excavation - Ordinary/Hard Soil up to 1.5M depth, throw earth clear within 50M.	Cu.m	0.42	375	158
110	7.3	[Item 7] Plain Cement Concrete (PCC) - lean concrete, same as 3-1 but PCC 1:4:8.	Cu.m	0.06	17162	1030
111	7.4	[Item 7] Plain Cement Concrete - PCC 3000 psi, Ratio 1:2:4.	Cu.m	4.48	26292	117788
112	7.5	[Item 7] Reinforced Concrete - RCC 3000 psi, roof slabs/landings/walls/plinth beams, form work.	Cu.m	0.33	31581	10422

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
113	7.6	[Item 7] STEEL REINFORCEMENT - deformed bars Grade-60.	kg	46.24	354	16369
114	7.7	[Item 7] SLUDGE PUMP - Submersible sewerage type, AC motor 400V 3phase 50cy, 14 cum/hr, head 30ft/9.14M.	Each	1	564281	564280
115	ITEM 8	Rehabilitation of all existing building cracks				
116	8.1a	[Item 8] Internal Paint/Distemper - Surface preparation Alkali Resisting primer.	Sqm	856.06	130	111288
117	8.1b	[Item 8] Distempering, 1st Coat.	Sqm	856.06	124	106151
118	8.1c	[Item 8] Same as item 15-4, 2nd and subsequent coats.	Sqm	856.06	79	67629
119	8.2a	[Item 8] Internal Paint/Walls - Surface preparation Alkali Resisting primer.	Sqm	6507.56	130	845983
120	8.2b	[Item 8] 1st Coat Plastic Emulsion paint.	Sqm	6507.56	217	1412141
121	8.2c	[Item 8] Same as item 15-4, 2nd and subsequent coats.	Sqm	6507.56	147	956611
122	8.3a	[Item 8] External Paint/Walls - Surface preparation Alkali Resisting primer.	Sqm	1050	130	136500
123	8.3b	[Item 8] 1st Coat Plastic Emulsion paint.	Sqm	1050	253	265650

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
124	8.3c	[Item 8] Same as item 15-57/15-58, 2nd and subsequent coat.	Sqm	1050	185	194250
125	8.N1	[Item 8] NON SHRINKAGE GROUT - filling cracks in existing concrete/masonry with approved non-shrink cementitious grout, cleaning, cutting grooves, washing, injecting, finishing, curing.	Meter	2000	600	1200000
126	ITEM 9	Construction & Renovation of Masjid				
127	9.1	[Item 9] Dismantling Works / Existing Pre-Cast (Masjid) - Walls, Foundations, demolition of walls/brick/concrete blocks/stone masonry.	Cu.m	107.33	1849	198453
128	9.2	[Item 9] Excavation - same as item 1-7 but 1.5M to 3M depth.	Cu.m	17.14	735	12598
129	9.3a	[Item 9] EARTHFILLING - Ordinary/hard soil, foundation/trenches, within 50M, watering and compaction.	Cu.m	34.26	400	13704
130	9.3b	[Item 9] Add to item 01-16, for each additional 1.5M or part thereof, above/below GL.	Cu.m	23.98	75	1798
131	9.4	[Item 9] Anti-termite Treatment - Termite proofing of new buildings, approved chemicals except joinery.	Sq.m	21.2	373	7908
132	9.5	[Item 9] Plain Cement Concrete (PCC) - lean concrete, same as 3-1 but PCC 1:4:8.	Cu.m	7.95	17162	136438

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
133	9.6a	[Item 9] Reinforced Concrete - RCC 3500 psi, weigh batch, transport upto 5km - Isolated Footing.	Cu.m	4.54	38514	174854
134	9.6b	[Item 9] Reinforced Concrete - Column Neck.	Cu.m	3.86	38514	148664
135	9.6c	[Item 9] Reinforced Concrete - Plinth Beams.	Cu.m	5.65	38514	217604
136	9.6d	[Item 9] Reinforced Concrete - Superstructure Column. QUANTITY ILLEGIBLE IN SOURCE PDF - solved as a residual against the disclosed Civil Works total; KTDMC/Logix must confirm against their own working file before this figure is relied on.	Cu.m	2.76	38514	106299
137	9.6e	[Item 9] Reinforced Concrete - Roof Beam.	Cu.m	4.7	38514	181016
138	9.6f	[Item 9] Reinforced Concrete - Solid Slab.	Cu.m	8.32	38514	320436
139	9.6g	[Item 9] Reinforced Concrete - Lintels.	Cu.m	0.51	38514	19642
140	9.7	[Item 9] Plain Cement Concrete - PCC 3000 psi, Ratio 1:2:4/Flooring.	Cu.m	4.16	26292	109375
141	9.8	[Item 9] PCC 1:3:6 in walls/partitions/slabs/sills/copings/channels/steps - Ratio 1:3:6/Situ.	Cu.m	1.44	23248	33477
142	9.9a	[Item 9] STEEL REINFORCEMENT - deformed bars Grade-60 - Isolated Footings.	kg	721.48	354	255404
143	9.9b	[Item 9] Steel Reinforcement - Column Necks.	kg	613.42	354	217151

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
144	9.9c	[Item 9] Steel Reinforcement - Plinth Beams.	kg	897.88	354	317850
145	9.9d	[Item 9] Steel Reinforcement - Superstructure Columns.	kg	390.93	354	138389
146	9.9e	[Item 9] Steel Reinforcement - Roof Beam.	kg	746.91	354	264406
147	9.9f	[Item 9] Steel Reinforcement - Solid Slab.	kg	1322.18	354	468052
148	9.9g	[Item 9] Steel Reinforcement - Lintels.	kg	81.05	354	28692
149	9.10	[Item 9] Cement Plaster (Internal) - 1:4, 19mm thick, Basement/GF/FF/2nd floor.	Sq.m	203.94	984	200677
150	9.11	[Item 9] Cement Plaster (External) - 1:4, 19mm thick.	Sq.m	141.12	984	138862
151	9.12	[Item 9] Block Masonry - PCC Solid Blocks, load bearing walls, CM 1:6 up to first floor.	Cu.m	28.14	23549	662669
152	9.13a	[Item 9] Internal Paint/Distemper - Surface preparation Alkali Resisting primer.	Sq.m	55.64	130	7233
153	9.13b	[Item 9] Distempering, 1st Coat.	Sq.m	55.64	124	6899
154	9.13c	[Item 9] Same as item 15-4, 2nd and subsequent coats.	Sq.m	55.64	79	4396
155	9.14a	[Item 9] Internal Paint/Walls - Surface preparation Alkali Resisting primer.	Sq.m	148.3	130	19279
156	9.14b	[Item 9] 1st Coat Plastic Emulsion paint.	Sq.m	148.3	217	32181

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
157	9.14c	[Item 9] Same as item 15-4, 2nd and subsequent coats.	Sq.m	148.3	147	21800
158	9.15a	[Item 9] External Paint/Walls - Surface preparation Alkali Resisting primer.	Sq.m	146.16	130	19001
159	9.15b	[Item 9] 1st Coat Plastic Emulsion paint.	Sq.m	146.16	253	36978
160	9.15c	[Item 9] Same as item 15-57/15-58, 2nd and subsequent coat.	Sq.m	146.16	185	27040
161	9.16	[Item 9] Roof Waterproofing - 3mm Torch Bonding Bituminous Membrane, same as item 10-60 but 4mm thick.	Sq.m	79.56	1457	115919
162	9.17	[Item 9] Roof Screeding - PCC 3000 psi, Ratio 1:2:4/screeding.	Cu.m	5.97	26292	156963
163	9.18	[Item 9] UPVC WINDOW/OPENABLE - 60mm thick shutter, exceeding 2.23sqm, white colour.	Sqm	13.73	22991	315666
164	9.19	[Item 9] UPVC WINDOW/FIXED - 37mm thick, exceeding 2.23sqm, white colour.	Sqm	8	22991	183928
165	9.20	[Item 9] UPVC DOOR - Sliding Door, 37mm thick, frame 80x50mm, exceeding 3.5sqm, white colour.	Sq.m	4.32	27496	118783
166	9.21	[Item 9] Flooring - Deluxe quality marble tiles, 13mm thick, setting/jointing/bonding/chemical polishing.	Sqm	79.56	4901	389924

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
167	9.N1	[Item 9] Dry rammed brick or stone ballast 1-1/2" (38mm) to 2" (50mm) gauge.	Cu.m	8.82	19256.8	169845
168	9.N2	[Item 9] ELECTRICAL WORKS/masjid - Removal and refixing of existing electrical wiring, conduits, fittings etc.	Job	1	169845	169844
169		TOTAL				
					GRAND TOTAL:	Rs20,748,204.00

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Scope of Work

The Works comprise the following items of rehabilitation, waterproofing and construction at KTDMC's premises, Sector 38, NC-24, Korangi Creek Industrial Park, adjacent to Pakistan Refinery Limited, Korangi Creek Road, Karachi. Each item is further described in the Specifications and Drawings referenced at Section 12, and shall be priced by the bidder against the corresponding line of the Pricing Schedule at Section 7:

1. Retrofitting for the existing mezzanine floor room's false ceiling in the production area.
2. Rehabilitation of washrooms in the production area.
3. Rehabilitation of student's washrooms on the first floor of the admin block.
4. Rehabilitation of the store roof.
5. Rehabilitation of the seminar/classroom roof.
6. Waterproofing of the workshop's PEB (Pre-Engineered Building) Shed.
7. Construction of the drainage line in the open courtyard area in the admin block.
8. Rehabilitation of all existing building cracks.
9. Construction & Renovation of Masjid.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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]		

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

General Conditions of Contract

Red Book:
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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (“Red book”) Second edition 2017” published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC) and the following “Particular Conditions” which shall complement the General Conditions of the Contract.

The successful Bidder, upon contract award, shall be required to furnish two (02) copies of aforementioned “General Conditions” for incorporation in the Works Contract.

International Federation of Consulting Engineers (FIDIC) FIDIC
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E-mail: **fidic@fidic.org**
Website: www.fidic.org
FIDIC code: ISBN13: 978-2-88432-084-9

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Special Conditions of Contract

PARTICULAR CONDITIONS OF CONTRACT (PCC)

Particular Conditions
(Mandatory Provisions not to be amended/substituted)

The Particular Conditions (PCC) complement the General Conditions (GCC) to specify dates, contractual requirements, and special circumstances related to the Works. The PCC consists of two parts, Part A - Contract Data and Part B - Special Provisions. The provisions to be found in the Special Provisions (Particular Conditions - Part B) take precedence over the equivalent provisions found under the same Sub-Clause number(s) in the General Conditions, and the provisions of the Contract Data (Particular Conditions - Part A) take precedence over the Special Provisions (Particular Conditions - Part B).

PART A - Contract Data

Sub-Clause 1.1.27
Defects Notification Period (DNP): **180** Days

Sub-Clause 1.1.31
Employer's name & address: **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC)), Procurement Head Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).**

Sub-Clause 1.1.35
Engineer's name & address: To be nominated later

To be nominated later

Sub-Clause 1.1.84
Time for Completion: **180** days for whole of the works

Sub-Clause 1.3 (a)(ii)
Agreed method of electronic transmission: Not Agreed

Sub-Clause 1.3 (d)
Address of Empoyer for Communications: **Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).**
Address of Engineer for Communications:

To be nominated later

Address of Contractor for Communications: ----------

Sub-Clause 1.4
Contract shall be governed by the law of: **Islamic Republic of Pakistan**
Ruling language: **English**
Language for communications: **English**

Sub-Clause 2.1
After receiving the Letter of Acceptance, the Contractor shall be given right of access to all or part of the Site within: **14** days after Commencement Date

Sub-Clause 2.4
Employer's financial arrangements:

The Employer has reserved the funds from its own resources.

Sub-Clause 3.2 (e)(ii)
Engineer's Duties and Authority: **Variation resulting in an increase of the Accepted Contract Amount in excess ofone percent (1%)subject to accumulative Variations not exceeding five percent (5%)of the Accepted Contract Amount**

Sub-Clause 4.2
Performance Security (as percentage of the Accepted Contract Amount in Currencies): 10.00%
Form of Performance Guarantee: **Pay Order, Bank Guarantee**

Sub-Clause 4.2.1
List of Insurance Companies:

Not Applicable — for this Contract, Performance Security is accepted only as a Pay Order or Bank Guarantee (Sub-Clause 4.2, Particular Conditions); the insurance-company option is not offered.

Sub-Clause 4.7.2
period for notification of errors in the items of reference: **Twenty Eight (28) days**

Sub-Clause 4.19
Period of payment for temporary utilities: **Each Month**

Sub-Clause 5.1 (a)
Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount): **1** %

Sub-Clause 5.1 (b)
Parts of the Works for which subcontracting is not permitted: 100

Sub-Clause 6.5
Normal working hours on the Site: **8**

Sub-Clause 8.3
Number of additional paper copies of programmes: **3**

Sub-Clause 8.8 & 14.15(b)
Delay Damages payable for each day of delay **0.10**% of the Accepted Contract Amountfor delay in completion of whole of the Works

Sub-Clause 8.8
Maximum amount of Delay Damages **10.00 %** of the Accepted Contract Amount

Sub-Clause 8.14
Applicability of Incentives for Early Completion **No**

Sub-Clause 12.3
Percentage profit (Not more than 10%): **Nil**

Sub-Clause 13.4.(b)(ii)
Percentage rate to be applied to Provisional Sums for overhead charges and profit: **Twenty Five percent**

(25%)

Sub-Clause 14.2
Total Advance Payment: **Fifteen percent (15%) of the Accepted Contract Amount excluding Provisional Sums payable in the currencies and proportions in which the Accepted Contract Amount is payable**

Sub-Clause 14.2.1
Advance Payment Insurance **Allowed**

Sub-Clause 14.2.3
Percentage deductions for the repayment of the Advance Payment: Deduction shall be made at the amortization rate of 17.5 % of the value of the Works executed of each IPC as provided in paragraph (i) of Sub-Clause GCC 14.3, starting from 2nd IPC provided that the advance payment shall be completely repaid prior to the time when 90% of the Accepted Contract Amount less Provisional Sums has been certified for payment. It may be more than 17.5% in the last instalment to ensure full repayment.

Sub-Clause 14.3
Period of payment **One Month**

Sub-Clause 14.3(b)
Number of additional paper copies of Statements: **2**

Sub-Clause 14.3 (iii)
Percentage of retention: **Seven percent (7%)**

Sub-Clause 14.3 (iii)
Limit of Retention Money (as a percentage of the Accepted Contract Amount): **Five percent (5%)**

Sub-Clause 14.5(b)(i)
Plant and Materials for payment when shipped: **Plant and Materials under Bill of "Imported Plant and Materials"**

Sub-Clause 14.5(c)(i)
Plant and Materials for payment when delivered to the Site: Plant and Non Perishable Materials

Sub-Clause 14.6.2
Minimum amount of Interim Payment Certificate (IPC): **Yes**
The Minimum Amount IPC is 500000
[Employer to give value not exceeding one fifth of the average expected value of Interim Payment Certificate]

Sub-Clause 14.7(a)
Period of payment of Advance Payment to the Contractor**: 14 days**

Sub-Clause 14.7b(i)
Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6: **28** days

Sub-Clause 14.7b(ii)
Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.13 (Final Payment)**: 28** days

Sub-Clause 14.7(c)
Period for the Employer to make final payment to the Contractor**: 56** days

Sub-Clause 14.8
Financing charges for delayed payment Local Currency (PKR):
6-Month KIBOR (Offer) +3% per annum.
Foreign Currency:
USD
6-Month SOFR (Secured Overnight Financing Rate for USD) +1% per annum.

EURO
6-Month EURIBOR (EURO Interbank Offered Rate for EURO) +1% per annum.

Others
Appropriate rates +1% (for other foreign currencies, Ref. Schedule-A, A-4 to Bid).

Sub-Clause 14.11.1(b)
Number of additional paper copies of draft Final Statements**: 2**
[insert number of copies say six (06)]

Sub-Clause 14.15
Currencies of payment of Contract Price: **as stated in the Table Schedule of Adjustment Data of Schedule A (if Given)**

Sub-Clause 14.15(a)(i)
Proportions or amounts of Local and Foreign currencies: **as stated in the Table Schedule of Adjustment Data of Schedule A (if Given)**

Sub-Clause 14.15(c)
Currencies and proportions for payment of Delay Damages: **as stated in the Table Schedule of Adjustment Data of Schedule A (if Given)**

Sub-Clause 14.15(f)
rates of exchange: **as stated in the Table IV of Schedule A (If Given)**

Sub-Clause 17.2(d)
Forces of nature, the risks of which are allocated to the Contractor: **Nil**

Sub-Clause 19.1
Permitted deductible limits:
i) insurance required for the Works: **Ten percent (10%) of loss amount on each & every loss**
ii) insurance required for Goods: **Nil**
iii) insurance required for liability for breach of professional duty: **Nil**
iv) insurance required against liability for fitness for purpose (if any is required): **Nil**
v) insurance required for injury to persons and damage to property: **Nil**
vi) insurance required for injury to employees: **Nil**
vii) other insurances required by Laws and by local practice : **Nil**

Periods for submission of insurance:
a) evidence of insurance: Not later than the Commencement Date
b) relevant policies: Within twenty eight (28) day from the Commencement Date

Sub-Clause 19.2.1(b)
Additional amount to be insured (as a percentage of the replacement value): 15% of the replacement value (Accepted Contract Amount)
Sub-Clause 19.2.2
Extent of insurance required for Goods: From Ex-Works (i.e., works, factory, warehouse, etc) to delivery at

the Site
Amount of insurance required for Goods: Full replacement value

Sub-Clause 19.2.3(a)
Amount of insurance required for liability for breach of professional duty: Full replacement value of the Works to be designed by the Contractor

Sub-Clause 19.2.3(b)
Insurance required against liability for fitness for purpose: **Yes**

Sub-Clause 19.2.3
Period of insurance required for liability for breach of professional duty: Until the date of issuance of Performance Certificate

Sub-Clause 19.2.4
Amount of insurance required for injury to persons and damage to property: Injury to person and Fatal case: in accordance with Workmen Compensation Act
Damage to Property: The Amount of Insurance Required for Person Injury is In accordance with the Workmen's Compensation Act
The Amount of Insurance Required for Damage to Property is PKR 60,000,000, without limit to the number of incidents as per his assessment of the adjoining property(ies) other than the Works]
without limit to the number of incidents

Sub-Clause 19.2.6
Other insurances required by Laws and by local practice: All insurances as applicable, to the extent of execution of the project, under Federal and Provincial laws of Islamic Republic of Pakistan

Sub-Clause 21.1
Time for appointment of the DAAB: Within 28 days from the Commencement Date.
In case the Accepted Contract Amount is lesser than PKR one (01) billion, appointment of the DAAB shall be made when Dispute arises between the Parties.

Sub-Clause 21.1
The DAAB shall comprise 1
[insert either “a sole Member” or “Three Members”]
[For a Contract estimated to cost above PKR 2.5billion, the DAAB shall comprise of three members. For a Contract estimated to cost between PKR1billion and PKR2.5billion, the DAAB may comprise of three members or a sole member. For a Contract estimated to cost less than PKR1billion, a sole member is recommended.]

Sub-Clause 21.1
List of proposed members of DAAB
- proposed by Employer

To be inserted at the time of signing of the Contract (DAAB: Sole Member, appointed only when a Dispute arises)

- proposed by Contractor
[to be inserted at the time of signing of the Contract]
1._____
2._____
3._____

Sub-Clause 21.2
Appointing entity (official) for DAAB members Managing Director Public Procurement Regulatory Authority (PPRA) or Chairman Pakistan Engineering Council (PEC) from the list of PEC approved arbitrators published at its website

Sub-Clause 21.6
Rules of Arbitration: PEC Rules of Conciliation and Arbitration or Pakistan Arbitration Act of 1940, if the former is inactive.
The place of Arbitration shall be in the Employer's country: **Pakistan**
[Insert name of city]

Particular Conditions

PartB - Special Provisions

1.1 Definitions

1.1.76 "Specification"
Following is added at the end:
"and consists of two parts i.e.,
i) "Part A - Specific Provisions"; and
ii) "Part B - Technical Provisions"."

1.2 Interpretation

"and" is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).
Sub-paragraph (k) is added:
"(k) The word "tender" is synonymous with "bid" the word tenderer with "bidder", the words "tender documents" with "bidding documents" and "Schedule of Prices" with "Bill of Quantities", as applicable."
1.5 Priority of Documents The documents listed at (a) through (k) of this Sub-Clause are deleted and substituted with the following:
(a) the Contract Agreement;
(b) the Letter of Acceptance;
(c) the Letter of Bid;
(d) the Particular Conditions Part A - Contract Data;
(e) the Particular Conditions Part B - SpecialProvisions;
(f) the General Conditions;
(g) the Specification Part A - SpecificProvisions;
(h) the Specification Part B- Technical Provisions;
(i) the Drawings;
(j) the completed Schedules to Bid includingBillof Quantities;
(k) the JV Undertaking (if the Contractor is a JV); and
(l) any other documents forming part of the Contract.
The addenda/corrigenda, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

1.6 Contract Agreement

In the last line of the 1st paragraph the text "shall be borne by the Employer" is substituted by "shall be reimbursed by the Employer to the Contractor".

3.1 The Engineer

In sub-paragraph (a) the text “as defined in the Pakistan Engineering Council Act, 1975 (Act No.V of 1976)” are added after the words “professional engineer”.

3.2 Engineer’s Duties and Authority

The Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:
(a) Consenting to the subcontracting of any part of the Works under Sub-Clause 5.1 [Subcontractors]
(b) Any action under Sub-Clauses 8.9 [Employer’s Suspension] and 8.12 [Prolonged Suspension]
(c) Issuance of “Taking Over Certificate” under Sub-Clause 10.1 [Taking Over the Works and Sections].
(d) Issuing the “Performance Certificate” under Sub-Clause 11.9 [Performance Certificate].
(e) Sub-Clause 13.1 [Right to Vary]: instructing a Variation, except;
(i) in an emergency situation as determined by the Engineer, or
(ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.
(f) Sub-Clause 13.3 [Variation Procedure]: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.3.2 [Variation by Request for Proposal] or 13.2 [Value Engineering].
(g) Certifying release of second half of the Retention Money under Sub-Clause 14.9 [Release of Retention Money].
(h) Issuing Final Payment Certificate under Sub-Clause 14.13 [Issue of FPC].
(i)

Issue of FPC Sub Clauses

14.13

*[insert Sub-Clause number (not Sub-Clause 3.7 [Agreement or Determination]
Any such requirement shall not be applied to any action by the Engineer under Sub-Clause 3.7 [Agreement or Determination], as stated in Sub-Clause 3.2 [Engineer’s Duties and Authority] of the General Conditions. Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.
Following is added after the words “the Employer’s consent is required” in 4th paragraph:
“stating that the Employer’s consent has been obtained for that specified authority”

4.2 Performance Security

4.2.1 Contractor’s Obligations
The entity issuing the Performance Security and its form shall be as under:
The Performance Security shall be, at the option of the Contractor,issuedin the prescribed form included in the Bidding Documents,by(a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan or (c)an Insurance Companylisted in the Contract Data and rated by PACRA/VIS ofratingas provided in Table below:
Accepted Contract Amount (In Eq. PKR million) Minimum Rating of Insurance Companies
Up to 1000 A (+)

1001 to no limit AA
In case of Joint Venture, the Performance Security shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.
Following paragraph is added at the end of this Sub-Clause:
“The amount of Performance Security shall be reducedto 50%following issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of Conditions of Contract.”

4.3 Contractor’s Representative

In second paragraphthe text “professional engineer as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976) (having temporary licence in case of foreign engineer under Section 12 of the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)” are added after the words “qualified, experienced”.
In the 3rd paragraph the words “28 days” are substituted by “14 days”. In 2nd line of 4thparagraph the text “or appoint a replacement” is substituted by “except appointment of a suitable temporary replacement is deployed at the Site”

4.4 Contractor’s Documents

4.4.2 As-Built Records
First paragraph is deleted and the text in the last paragraph is substituted with the following:
“The Contractor shall furnish to the Engineer 6 copies, one reproducible and one electronic copy(provided the Engineer has made available to the Contractor editable form of the Drawings)of all Drawings amended to conform to the Works as built.In case the Engineer does not make available to the Contractor editable form of the Drawings, the Contractor shall furnish to the Engineer as-built data for incorporation in the Drawings. Upon receipt of PDF versions of the as-built drawings prepared by the Engineer, the Contractor shall furnish to the Engineer 6copies and one reproducible of these Drawings.
The price of such Drawings shall be deemed to be included in the Contract Price.”
Following Sub-Clause is added:
4.4.4 ShopDrawings
The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.
Review and approval by the Engineer shall not exceed 21 days and be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and the Engineer’s review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

4.8 Health and Safety Obligations

The following text is added at the end ofthis Sub-Clause:
In the event of work being carried out outside the normal working hours and in the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer.

4.20 Progress Reports

At the end of sub-paragraph (g) the word “and” is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with “;”, and the following new sub-paragraphs are added as:
(i) planned programme for the execution of the Works for next 56 days to enable the Engineer to determine its programme of inspection and testing;
(j) monthly summery of daily job record indicating weather conditions, deployment of Contractor’s Equipment, labour employment, local material procurement and material import, if any; and
(k) salient contractual and project information.

5.1 Subcontractors

Add the following text at the end of paragraph (ii):
“underSchedule to Bid”
The following is added at the end of the last paragraph of Sub-Clause 5.1:
“All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under sub-paragraph (a) of Sub-Clause 15.2.3 [After Termination].
The Contractor shall give reasonable opportunity to contractors from Islamic Republic of Pakistan for subcontracts for the Works, and endeavour to employ such contractors as Subcontractors.”

5.2 Nominated Subcontractors

5.2.2 Objection to Nomination
In sub-paragraph (c), “and” is deleted from the end of (i);
“.” at the end of (ii) is replaced with: “, and”.
The following is then added as (iii):
“(iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.2.3 [Payment to nominated Subcontractors].”

6.1 Engagement of Staff and Labour

The following paragraph is added at the end of the Sub-Clause:
“The Contractor shall, to the extent practicable and reasonable, employ staff (not less than 50%) and labour (not less than 85%) with appropriate qualifications and experience from sources within the Islamic Republic of Pakistan.”

6.7 Health and Safety of Personnel

The existing text is substituted with the following:
“In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose. The Contractor shall also provide all other medical services and appoint a health and safety officer at Site if stated in the Specifications. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means.”

6.8 Contractor’s Superintendence

Insert at the end of sub-paragraph (a) of this Sub-Clause:
"or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"
The following text is added at the end of this Sub-Clause:
“The Contractor’s authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council.
The Contractor’s authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.”

6.12 Key Personnel

The following is inserted at the end of the last paragraph:
“If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters

available during all working hours in a number deemed sufficient by the Engineer."
The following Sub-Clauses 6.13 to 6.26 are added at the end of Sub-Clause 6.12:

6.13 Foreign Personnel

The Contractor may bring in to the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use all reasonable endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.
The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

6.14 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

6.15 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

6.16 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

6.17 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.

6.18 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

6.19 Festivals and Religious Customs

The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.

6.20 Funeral Arrangements

The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.

6.21 Forced Labour

The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.

6.22 Child Labour

The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in Islamic Republic of Pakistan.

6.23 Employment Records of Workers

The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Contractor's Records].

6.24 Workers' Organizations

The Contractor shall comply with the relevant labour laws of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.

6.25 Non-Discrimination and Equal Opportunity

The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.
Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure nondiscrimination and equal opportunity, including for specific groups such as women, persons with disabilities, migrant workers and children (of working age in accordance with Sub-Clause 6.22).

6.26 Epidemics

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

7.7 Ownership of Plant and Materials

The following is added before the first paragraph:
"Except as otherwise provided in the Contract,"
The following is added at the end of the Sub-Clause:
"No Plant and/or Materials that is the property of the Employer shallbe removed from the Site. If it becomes necessary to:
(i) remove any item of such Plant from the Site for the purposesof repair, the Contractor shall give a Notice, with reasons, tothe Engineer requesting consent to remove the defective ordamaged item off the Site. This Notice shall clearly identifythe item of defective or damaged Plant, and shall give detailsof: the defect or damage to be repaired; the place to whichdefective or damaged item of Plant is to be taken for repair;the

transportation to be used (and insurance cover for suchtransportation); the proposed inspections and testing off theSite; and the planned duration required before the repaireditem of Plant shall be returned to the Site. The Contractorshall also provide any further details that the Employer mayreasonably require; or

(ii) replace any item(s) of such Plant and/or Materials, theContractor shall give a Notice, with reasons, to the Engineerclearly identifying the item(s) of Plant and/or Materials to bereplaced, and giving details of the due date of delivery tothe Site of the replacement item(s).

Where any item of Plant and/or Materials has become the propertyof the Employer under this Sub-Clause before it has been deliveredto the Site, the Contractor shall ensure that such an item is notmoved except for its delivery to the Site.

The Contractor shall indemnify and hold the Employer harmlessagainst and from the consequences of any defect in title orencumbrance or charge (except any reasonable restrictionarising from the intellectual property rights of the manufacturer orproducer) on any item of Plant and/or Materials that has becomethe property of the Employer under this Sub-Clause."

The following Sub-Clause7.9 is added after Sub Clause 7.8:

7.9 Use of Pakistani Materials and Services

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

8.1 Commencement of Works

The following is added before the first paragraph:

“After signing of the Contract Agreement by both Parties,” and thereafter the word “The” is replaced with the word “the”.

8.5 Extension of Time for Completion

The following is added after paragraph (c):

“for last five years”.

The following Sub-Clause 8.14 is added after Sub-Clause 8.13:

8.14 Incentives For Early Completion

If Contract Data does not state applicability of incentives for early completion, this Sub-Clause shall not apply.

The Contractor shall be entitled subject to Sub-Clause 20.2 [Claims for Payment and/or EOT] to bonus payment if the Works and/or each Section is completed earlier than the Time for Completion for the Works or Section (as the case may be). The amount of bonus for early completion of the Works and/or each Section shall be upto a limit and at a rate to 50% of the relevant limit and rate of delay damages prescribed in Contract Data and shall be paid for every day which shall elapse between the relevant Date of Completion of the Works or Section and the relevant Time for Completion.

For the purposes of calculating any bonus payment, the applicableTime for Completion stated in the Contract Data is fixed and noadjustments of this time by reason of granting an EOT will beallowed.

The following Sub-Clause 11.12 is added after Sub-Clause 11.11:

11.12 Supervisory Assistance During DNP

If provided under the Schedule of Prices, the Contractor shall provide supervisory assistance to the Employer during the DNP for the Works. Such supervisory assistance shall be as described in the Specification for the purpose of supporting the Employer's operation and maintenance of the Plant for the period specified in the Schedule of Prices after the Date of Completion.

12.2 Method of Measurement

The following paragraph is added at the end of the Sub-Clause:
“Summary of measured quantity for payment shall be delineated item-wise under four headsnamely; “Schedule of Prices Quantity”, “Quantity Executed To-date”, “Quantity Certified Previously” and “Net Quantity Executed under this Certificate”.

12.3 Valuation of the Works

The following text is added at the end of fifth paragraph of the Sub-Clause:
“Sum of overhead charges and profit for sub-paragraph (a) shall be Twenty Five percent (25%)”.

13.4 Provisional Sums

The following paragraph is inserted as the penultimate paragraph:
“The Provisional Sum shall be used to cover the Employer’s share of the DAAB members’ fees and expenses, in accordance with Clause 21. No prior instruction of the Engineer shall be required with respect to the work of the DAAB. The Contractor shall submit the DAAB members’ invoices and the satisfactory evidence of having paid 100% of such invoices as part of the substantiation of those Statements submitted under Sub-Clause 14.3.

13.6 Adjustments for Changes in Laws

The following paragraphsare added at the end of the Sub-Clause:
“Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].”

14.1 The Contract Price

The following is added at the end of the Sub-Clause:
“Notwithstanding the provisions of subparagraph (b), Contractor's Equipment, including essential spare parts, imported by the Contractor for the sole purpose of executing the Contract shall be temporarily exempt from the payment of import duties and taxes upon initial importation, provided the Contractor shall post with the customs authorities at the port of entry an approved re-export bond or bank guarantee, valid until the Time for Completion plus six months, in an amount equal to the full import duties and taxes which would be payable on the assessed imported value of such Contractor's Equipment and spare parts, and callable in the event the Contractor's Equipment is not re-exported from the Country on completion of the Contract. A copy of the bond or bank guarantee endorsed by the customs authorities shall be provided by the Contractor to the Employer upon the importation of individual items of Contractor's Equipment and spare parts. Upon re-export of individual items of Contractor's Equipment or spare parts, or upon the completion of the Contract, the Contractor shall prepare, for approval by the customs authorities, an assessment of the residual value of the Contractor's Equipment and spare part to be re-exported, based on the depreciation scale(s) and other criteria used by the customs authorities for such purposes under the provisions of the applicable Laws. Import duties and taxes shall be due and payable to the customs authorities by the Contractor on (a) the difference between the initial imported value and the residual value of the Contractor's Equipment and spare parts to re-exported; and (b) on the initial imported value of the Contractor's Equipment and spare parts remaining in the Country after completion of the Contract. Upon payment of such dues within 28 days of being invoiced, the bond or bank guarantee shall be reduced or released accordingly; otherwise the security shall be called in the full amount remaining.”
[The Employer may change or delete this Sub-Clause as per Project requirements]

14.2 Advance Payment

14.2.1 Advance Payment Guarantee
The entity issuing the Advance PaymentGuaranteeand its form shall be as under:
The Advance PaymentGuarantee shall be in the form of Guarantee issued by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistanor (c)an Insurance Companylisted in the Contract Data and rated by PACRA/VIS ofrating as provided in Table below:
Accepted Contract Amount (In Eq. million PKR) Minimum Rating of Insurance Companies
Up to 1000 A (+)
1001 to no limit AA
In case of Joint Venture, the Advance PaymentGuarantee(s)shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.

14.6 Issue of IPC

14.6.1 The IPC
In the first line of the 1st paragraph the words “28 days” are substituted by “14 days”.

14.7 Payment

The words “or through crossed cheque in favour of the Contractor or JV partners. The Payment to JV partners shall be made at the request of the Joint Ventures in the ratio of their shares specified by them” are added at the end of the Sub-Clause.

14.8 Delayed Payment

In the first paragraph, third line, the words “compounded monthly” are deleted.
The text of 2nd paragraph is deleted and substituted with the following:
“The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data.”

14.9 Release of Retention Money

The following is added at the end of Sub-Clause 14.9:
“Unless otherwise stated in the Contract, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and issued by a schedule bank selected by the Contractor, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the second half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security. On receipt by the Employer of the required guarantee, the Engineer shall certify, and the Employer shall pay the second half of the Retention Money. The release of the second half of the Retention Money against a guarantee shall then be in lieu of the release after the latest of the expiry dates of the Defects Notification Periods. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate.

If the Performance Security required under Sub-Clause 4.2 is in the form of a demand guarantee, and the amount guaranteed under them when the Taking-Over Certificate is issued is more than half of the Retention Money, then the Retention Money guarantee will not be required. If the amount guaranteed under the Performance Security when the Taking-Over Certificate is issued is less than half of the Retention Money, the Retention Money guarantee will only be required for the difference between half of the Retention Money and the amount guaranteed under the Performance Security.

15.2 Termination for Contractor’s Default

15.2.1 Notice
Following text is added at the end of sub-paragraph (h) of this Sub-Clause:
“For the purposes of this Contract, corrupt and fraudulent practices have been defined in Public Procurement Rules 2004.”
15.2.3 After Termination
The word “and” at the end of sub-paragraph (ii) of paragraph (b) is deleted the following paragraph is added after sub-paragraph (iii):
“(iv) all Employer-Supplied Materials and/or Employer's Equipment madeavailable to the Contractor in accordance with Sub-Clause 2.6 [Employer-Supplied Materials and Employer's Equipment], and”

15.4 Payment after Termination

The following text is added at the end of this Sub-Clause:
“The Employer shall be entitled to sell any of the Contractor’s Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors.

16.2 Termination by Contractor

16.2.1 Notice
The sub-paragraph (j) is deleted in its entirety.
At the end of sub-paragraph (i) “; or” is replaced with “.” and at the end of sub-paragraph (h) “;” is replaced with “; or”.
In sub-paragraph (f) “84 days” are replaced with “180 days” and text “for reasons not attributable to the Contractor” is added at the end.

16.3 Contractor’s Obligations After Termination

Sub-paragraph (c) is deleted and replaced with:
"(c) deliver to the Engineer all Employer-Supplied Materials and/orEmployer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 [Employer-Supplied Materials and Employer’s Equipment]; and
(d) remove all other Goods from the Site, except as necessary for safety,and leave the Site."

17.1 Responsibility for Care of the Works

After the two instances of “Goods” in the last paragraph, the words “Employer-Supplied Materials and/orEmployer's Equipment” are added.
The following Sub-Clause 17.7 is added after Sub-Clause 17.6:

17.7 Use of Employer’s Accommodation/Facilities

The Contractor shall take full responsibility for the care of the items of the Employer’s facilities and/or accommodation, if any, as detailed in the Specification, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer.
If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor’s risk and cost.

18.1 Exceptional Events

The words “or disorder” are replaced with “disorder or sabotage” in sub-paragraph (c) of the Clause.

18.4 Consequences of an Exceptional Event

The following is added at the end of sub-paragraph (b) after deleting the ".":
", including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [Insurance to be provided by the Contractor]."

18.5 Optional Termination

In sub-paragraph (c), the words "and necessarily" areadded after the words "was reasonably".

19.1 General Requirements

Following text is added at the end of first paragraph:
"The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer's consent."
Following text is added at the end of third paragraph:
"The Contractor shall, within the respective periods stated in the Contract Data submit to the Engineer and the Employer a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5."

19.2 Insurance to be provided by the Contractor

19.2.5 Injury to employees
The words "sickness, disease" are deleted in the third line of first paragraph.

The following Sub-Clause is added after Sub-Clause 19.2.6:
19.2.7 Insurance Company
"The Contractor shall be obliged to place all insurances described in this Clause with insurers listed in the Contract Data and rated byPACRA/VISofrating as provided in Table below:

Accepted Contract Amount (In Eq. million PKR) Minimum Rating of Insurance Companies
Up to 1000 A (+)
1001 to no limit AA

21.6 Arbitration

The word "international" is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following:
"the Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;"
The following Clauses are added after Clause 21

22 Custom Duty

[Employer may incorporate provisions where applicable. However, in order to make the bid more balanced, the payment of Customs Duties should be the responsibility of the Employer.]

23 Taxes

The Contractor, Subcontractors and their employees shall be liable to pay income tax, withholding tax, super tax and other taxes on income arising out of the Contract. The rates and prices as stated in the contract shall be deemed to cover all such taxes.

24 Integrity Part

If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall

be entitled to :

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

(b) terminate the Contract; and

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

The termination under sub-paragraph(b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub-paragraph(a) and (c) of this Sub-Clause.

Appendix General Conditions of Dispute Avoidance/Adjudication Agreement

12 Disputes Under DAAB Agreement

In the first paragraph, third, fourth and fifth line, the text "under the Rules of Arbitration of the International Chamber of Commerce 2017……shall apply" is substituted with "under the Arbitration Act 1940 by sole arbitrator appointed by the Managing Director Public Procurement Regulatory Authority or Chairman Pakistan Engineering Council."

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Bid Securing Declaration

FORM OF BID SECURING DECLARATION

Date:
No.:
Alternative No.: ***P138066***

To: **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC)), Procurement Head Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (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:

(a) have withdrawn our Bid during the period of Bid validity specified in the Letter of Bid; or
(b) having been notified of the acceptance of our Bid by the Procuring agency/Employer during the period of Bid validity, (i) fail or refuse to sign the Contract; or (ii) fail or refuse to furnish the Performance Security (or guarantee), if required, in accordance with the ITB.

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 days after the expiration of our Bid.

Name of the Bidder*
Name of the person duly authorized to sign the Bid on behalf of the Bidder** _____
Title of the person signing the Bid _____
Signature of the person named above _____
Date signed _____ day of _____, _____
*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder
**: Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the Bid.]

Contract Form

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ (month) 20_____ between **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC)), Procurement Head Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).** (hereinafter called the "Employer") of the one part and _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz., **Construction of Various Rehabilitation Works at KTDMC (*P138066*)** should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:

a) This Contract Agreement;
b) The Letter of Acceptance;
c) The Letter of Bid;
d) The Particular Conditions Part A - Contract Data;
e) The Particular Conditions Part B - SpecialProvisions;
f) The General Conditions;
g) The Specifications Part A - SpecificProvisions;
h) The Specifications Part B- Technical Provisions;
i) The Drawings;
j) The Completed Schedules to Bid including Schedule of Prices;
k) the JV Undertaking (if the Contractor is a JV); and
l) [Employer to insert any other documents forming part of the Contract]

The addenda/corrigenda,if any, (Excluding part relating to Instructions to Bidders alongwith Bidding Data) shall be deemed to have been incorporated at the appropriate places in the "Documents forming the Contract".

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

Signature of the Contactor Signature of Employer

(Seal) (Seal)

Signed, Sealed and Delivered in the presence of:

Witness Witness

(Name, Title and Address) (Name, Title and Address)

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

DAAB Agreement

[All italicised text and any text within square brackets (except sub-clause headings) in this form of agreement is for use in preparing the form and should be deleted from the final product].

Name and details of the Contract Construction of Various Rehabilitation Works at KTDMC
_____

This Agreement made the _____day of _____ [month], _____ [year], between

Name and contact details of the Employer **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC)), Procurement Head**
Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).
+92-310-333-4330
ghulam.haider@ktdmc.com

Name and contact details of the Contractor _____ (name)
_____ (address)
_____ (telephone)
_____(email / other contact details);

Name and contact details of the DAAB Member _____ (name)
_____ (address)
_____ (telephone)
_____(email / other contact details);

("DAAB Agreement")

Whereas:
A. the Employer and the Contractor have entered (or intend to enter) into the Contract;
B. under the Contract, the "DAAB" or "Dispute Avoidance/Adjudication Board" means the sole member or three members (as stated in the Contract Data of the Contract) so named in the Contract, or appointed under Sub-Clause 21.1 [Constitution of the DAAB] or Sub-Clause 21.2 [Failure to Appoint DAAB Members] of the Conditions of Contract;
C. the Employer and the Contractor desire jointly to appoint the above-named DAAB Member to act on the DAAB as:
a. the sole member of the DAAB, and where this is the case, all references to the "Other Members" do not apply; or
b. one of three members / chairman [delete the one which is not applicable] of the DAAB and, where this is the case, the other two persons are:

_____ (name) _____ (name)
_____ (address) _____ (address)
_____(telephone) _____(telephone)
_____(email/ other contact details) _____ (email/other contact details)

the "**Other Members**"; and
D. the DAAB Member accepts this appointment.

The Employer, Contractor and DAAB Member jointly agree as follows:

1. The conditions of this DAAB Agreement comprise:
(a) Clause 21 [Disputes and Arbitration] of the Conditions of Contract, and any other provisions of the Contract that are applicable to the DAAB's Activities; and
(b) the "General Conditions of Dispute Avoidance/Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for Construction" Second Edition 2017 published by FIDIC ("GCs"), as amended and/or added to by the following provisions.
2. [Details of amendments to the GCs, if any. For example:
In the procedural rules annexed to the GCs, Rule _ is deleted and replaced by: " … "]
3. The DAAB Member shall be paid in accordance with Clause 9 of the GCs. The currency of payment shall be _____.
In respect of Sub-Clauses 9.1 and 9.2 of the GCs, the amounts of the DAAB Member's monthly fee and daily fee shall be:
monthly fee_____ per month, and
daily fee of_____ per day
(or as otherwise set under Sub-Clause 9.3 of the GCs).
4. In consideration of the above fees, and other payments to be made to the DAAB Member in accordance with the GCs, the DAAB Member undertakes to act as DAAB Member in accordance with the terms of this DAAB Agreement.
5. The Employer and the Contractor shall be jointly and severally liable for the DAAB Member's fees and other payments to be made to the DAAB Member in accordance with the GCs.
6. This DAAB Agreement shall be governed by the law of _____ (if not stated, the law that governs the Contract under Sub-Clause 1.4 of the Conditions of Contract).

SIGNED by:_____	SIGNED by:_____	SIGNED by:_____
Print name:_____	Print name:_____	DAAB Member
Title: _____	Title:_____	Title:_____
for and on behalf of the Employer	for and on behalf of the Contractor	
in the presence of	in the presence of	in the presence of
Witness:_____	Witness:_____	Witness:_____
Name:_____	Name:_____	Name:_____
Address:_____	Address:_____	Address:_____
_____	_____	_____
Date:_____	Date:_____	Date:_____

FORM OF MOBILIZATION ADVANCE GUARANTEE/ BOND

Guarantee No._____ Date _____

WHEREAS _____ (hereinafter called the 'Employer')
has entered into a Contract for _____
(Particulars of Contract)
with _____ (hereinafter called the "Contractor').
AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Pak Rupees _____ (PKR _____) which amount shall be advanced to the Contractor as per provisions of the Contract.
AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.
AND WHEREAS, _____

(hereinafter called the “Guarantor”) at the request of the Contractor and in consideration of theEmployer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.
NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.
Notice in writing of any default,on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.
This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____whichever is earlier.
(Date)
The Guarantor's liability under this Guarantee shall not in any case exceed the sum of
PKR _____ (PakRupees _____).
This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against paymentsfrom Interim Payment Certificates of the Contractor provided that the Guarantor

agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

Guarantor
(Scheduled Bank/ Insurance Company)

Signature _____
Name _____
Title _____

WITNESS:

1. _____

_____

Corporate Secretary (Seal) Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Retention Money Security
Demand Guarantee

_____ [Guarantor letterhead or SWIFT identifier code]
Beneficiary: _____ [Insert name and Address of Employer]
Date: _____[Insert date of issue]
RETENTION MONEY GUARANTEE No.: [Insert guarantee reference number]
Guarantor: [Insert name and address of place of issue, unless indicated in the letterhead]

We have been informed that _____ [insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture] (hereinafter called "the Contractor") has entered into Contract No. _____ [insert reference number of the contract] dated _____ with the Employer, for the execution of _____ [insert name of contract and brief description of Works] (hereinafter called "the Contract").
Furthermore, we understand that, according to the conditions of the Contract, the Employer retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of [insert the second half of the Retention Money orifthe amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and, if required, the ES Performance Security] is to be made against a Retention Money guarantee.
At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ [insert amount in figures] () [amount in words] upon receipt by us of the Employer's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.
A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Employer's bank stating that the second half of the Retention Money as referred to above has been credited to the contractor on its account number _____ at _____ [insert name and address of Contractor's bank].
This guarantee shall expire no later than the …. day of ……, 2…, and any demand for payment under it must be received by us at the office indicated above on or before that date.

_____
[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

Integrity Pact

Integrity Pact

DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BYTHE 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 time the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Name of Employer: ……
Signature: ……
[Seal]

Name of Bidder/Contractor: ……
Signature: …….
[Seal]

Performance Guarantee Form

FORM OF PERFORMANCE SECURITY

Guarantee No._____
Executed on _____
Expiry date _____

Name of Guarantor with address:
_____

Name of Principal (Contractor) with address:_____

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

Letter of Acceptance No. _____Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the **Karachi Tools Dies & Moulds Centre (KTDMC) (Karachi Tools Dies & Moulds Centre (KTDMC)), Procurement Head Sector 38, NC No.24 Korangi Creek, Industrial Park, Adjacent to PRL, Korangi Sub-Division, Korangi (District), Karachi (Division), Sindh (Province).** (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

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

(Name of Contract) for the **Construction of Various Rehabilitation Works at KTDMC** (**P138066**)
_____ (Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause11, Defects After Taking Over, of Conditions of Contract are fulfilled.

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

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

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

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

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

Guarantor
(Schedule Bank/ Insurance Company)
Signature: _____
Name: _____
Title: _____

Corporate Guarantor (Seal)

WITNESS:

1.
_____
_____

2.

_____
_____
Name, Title & Address

Annexure

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Adjustment Data

Schedule of Adjustment Data (Section 13 of the Bidding Document) — cost-indexation formula and Table I (Local Currency) weightings for price adjustment under Sub-Clause 13.7 of the Conditions of Contract: Fixed Portion 0.35; Labor 0.30; Reinforcing Steel 0.15; Cement 0.15; High Speed Diesel (HSD) 0.05.

SBD Document (Read-Only)

See Form Under Additional Forms and Documents: **Adjustment Data** (page number: 105)

Specifications - Electrical

Technical Specifications — Electrical works and list of approved manufacturers, per Section 12 (Additional Forms & Documents), Specifications Part B (Technical Provisions), of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Specifications - Electrical** (page number: 106)

Specifications - Civil

Technical Specifications — Civil works, per Section 12 (Additional Forms & Documents), Specifications Part B (Technical Provisions), of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Specifications - Civil** (page number: 124)

Specifications - Plumbing

Technical Specifications — Plumbing works, per Section 12 (Additional Forms & Documents), Specifications Part B (Technical Provisions), of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Specifications - Plumbing** (page number: 215)

Drawing - Item 1 - Retrofitting Mezzanine Floor False Ceiling

Drawing for Item 1 — Retrofitting for the existing mezzanine floor room's false ceiling in the production area, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 1 - Retrofitting Mezzanine Floor False Ceiling** (page number: 230)

Drawing - Item 2 - Rehabilitation of Washrooms Production Area

Drawing for Item 2 — Rehabilitation of washrooms in the production area, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 2 - Rehabilitation of Washrooms Production Area** (page number: 233)

Drawing - Item 3 - Rehabilitation of Students Washrooms Admin Block

Drawing for Item 3 — Rehabilitation of student's washrooms on the first floor of the admin block, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 3 - Rehabilitation of Students Washrooms Admin Block** (page number: 240)

Drawing - Item 4 - Rehabilitation of Store Roof

Drawing for Item 4 — Rehabilitation of the store roof, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 4 - Rehabilitation of Store Roof** (page number: 247)

Drawing - Item 5 - Rehabilitation of Seminar Classroom Roof

Drawing for Item 5 — Rehabilitation of the seminar/classroom roof, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 5 - Rehabilitation of Seminar Classroom Roof** (page number: 254)

Drawing - Item 6 - Waterproofing of Workshop PEB Shed

Drawing for Item 6 — Waterproofing of the workshop's PEB (Pre-Engineered Building) Shed, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 6 - Waterproofing of Workshop PEB Shed** (page number: 258)

Drawing - Item 7 - Drainage Line Admin Courtyard

Drawing for Item 7 — Construction of the drainage line in the open courtyard area in the admin block, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 7 - Drainage Line Admin Courtyard** (page number: 261)

Drawing - Item 8 - Rehabilitation of Building Cracks

Drawing for Item 8 — Rehabilitation of all existing building cracks, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 8 - Rehabilitation of Building Cracks** (page number: 263)

Drawing - Item 9 - Construction and Renovation of Masjid

Drawing for Item 9 — Construction & Renovation of Masjid, per Section 12 (Additional Forms & Documents) of the Bidding Document.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Drawing - Item 9 - Construction and Renovation of Masjid** (page number: 267)

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Procurement Forms

Past Construction Experiences

See Form Under Additional Forms and Documents: **Past Construction Experiences** (page number: 280)

Contractor's Key Personnel Representative and Their Schedules

See Form Under Additional Forms and Documents: **Contractor's Key Personnel Representative and Their Schedules** (page number: 286)

Average Annual Turnover

See Form Under Additional Forms and Documents: **Average Annual Turnover** (page number: 290)

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Additional Forms and Documents

13. SCHEDULE OF ADJUSTMENT DATA

This Schedule of Adjustment Data (Schedule-A to Bid in KTDMC's original tender for these Works) sets out the cost-indexation formula and weightings applicable to price adjustment, reproduced here from the original tender documentation.

The formulae for price adjustment shall be of the following general type:

$$Pn = a + b \cdot Ln/Lo + c \cdot En/Eo + d \cdot Mn/Mo + ...$$

where "Pn" is the adjustment multiplier to be applied to the estimated Contract value in the relevant currency of the work carried out in period "n", this period being a month; "a" is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments; "b", "c", "d", ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works as stated in the relevant table of adjustment data, such tabulated cost elements being indicative of resources such as labour, equipment and materials; "Ln", "En", "Mn" are the current cost indices or reference prices for period "n", expressed in the relevant currency of payment, each applicable to the relevant tabulated cost element on the date 49 days prior to the last day of the period to which the particular Payment Certificate relates; and "Lo", "Eo", "Mo" are the base cost indices or reference prices, expressed in the relevant currency of payment, each applicable to the relevant tabulated cost element on the Base Date.

The weightings (coefficients) for each of the factors of cost stated in the table below shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable as a result of Variation(s).

13.1 Table I — Local Currency (LC)

Cost Element	Description	Weightage	Applicable Price
a	Fixed Portion	0.35	
b	Labor (Laborer (un-skilled) per day shall be taken as representative of all types of Labour (skilled/unskilled) deployed at site)	0.30	Government of Pakistan (GoP), Pakistan Bureau of Statistics (PBS), Monthly Statistical Bulletin.
c	Reinforcing Steel (½" Ø round M.S. Bars per ton shall be taken as representative of all types and diameters of Steel Reinforcement)	0.15	— do —
d	Cement (SRC cement per bag shall be taken as representative of all types of cement used at the site)	0.15	— do —
e	High Speed Diesel (HSD) (HSD shall be taken as representative of all kinds of fuels used in connection with the Contract)	0.05	As announced by Pakistan State Oil (PSO) and prevalent seven (7) days prior to bid opening date.
	Total	**1.00**	

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TECHNICAL SPECIFICATIONS ELECTRICAL

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1. SCOPE OF WORK:

The Electrical Contractor shall supply all labour, materials and equipment necessary for the complete installation, testing and commissioning of the entire electrical works which shall broadly include but not limited to the following as per specifications, drawings and bill of quantities.

a. Light Fittings & Fans
b. Light, Fan, Socket Wiring
c. Switchgear & Earthing
d. L.V. Main/ Sub-main Cables & Accessories
e. Cable Tray / Ladder / PVC Pipes.
f. Earthing.

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g. Telephone System.

2. GENERAL:

The entire electrical installation shall be carried out by an approved licensed Electrical Contractor authorized to undertake such works.

All works are to comply with the 17th Edition of the IEE Regulations for Electrical Installations UK, the Electricity Act 1910, the Electricity Rules 1937, and in accordance with the requirements of the local inspector, the utility supply authorities (K.E.S.C./WAPDA/Pakistan Telecommunication Corporation), Contract Drawings/specifications, BOQ and to the satisfaction of the Consultant/Owner.

3. 3. APPROVAL FROM ELECTRICAL INSPECTOR:

The Contractor shall be responsible for completing all formalities such as serving notices, submitting drawings / documents and obtaining all permits, sanctions, connections and having the installation passed and commissioned by the relevant authorities and obtain an approval certificate from the concerned Electrical Inspector's Office for the total load of the premises including the load of HVAC machines elevators, pumps, etc. All costs involved in obtaining such permits, sanctions, approvals from the concerned authorities are deemed to be included in the contract price and no extra payment shall be made to the Contractor.

4. 4. STANDARDS:

All materials and equipment such as distribution boards, cables/wires, conduits and conduit accessories, wiring accessories (switches, sockets, dimmers etc.) Circuit breakers, switch boxes lighting fixtures, lamps etc. are to comply with the specifications, the relevant British Standards, Pakistan Standards Institute and underwriters laboratories requirements or equivalent IEC, DIN Standards & NEC Standard. In general, following standards & codes of practices shall be followed.

a). Relevant BS specifications and codes of practices and IEC publications and DIN standards.

b) NFPA/ National electric code.
c) BS 6121: Mechanical cable glands
d) BS 6346 specification for 600V/1000V & 1900/3300 V armored electric cables having PVC insulation.
e) IEC 60034: Rotating electrical machine
f) IEC 60287: Electric cable- calculation of the current rating.
g) BS 7671: Requirements for electrical installations
h) IEC 60909: Short circuit current calculations in 3 phase a.c system.
i) ERA: current rating standards 69-30 parts 5,6,7.
j) Electricity Act 1937

Samples of all materials / equipment are to be submitted to the Consultant / Project Manager/ Owner for approval before purchase or fabrication / installation.

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5. 5. SHOP DRAWINGS:

The locations, routings, and installation heights of electrical equipment, conduits cable trays etc. given on the design drawings are approximate. Based on site conditions and in coordination with civil and mechanical drawings the contractor shall prepare shop drawings showing proposed routes of conduits and positions of equipment, including mounting and fixing details and submit the same to Owner/ Construction Manager/ Consultant for approval. Five sets of drawings (hard & soft copy) and technical literature/ brochures for all the electrical equipment / systems are to be submitted four weeks in advance of the execution of the works and approval obtained before execution / installation of works.

6. 6. DRAWINGS OF LV SWITCHGEAR/DISTRIBUTION BOARDS

The Contractor is required to submit the preliminary drawings of LV switchgear, Main Distribution Board, PFI Plant and associated Distribution / Computer Distribution Panels from one of the approved manufacturer to the Project Manager/ Consultant/ Owner for approval. These drawings will be issued for construction after getting written approval form the Owner.

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7. 7. CLIMATIC CONDITIONS:

Equipment and materials supplied shall withstand under all conditions of continuous operation and without developing any defects, the following environmental conditions.

Maximum temperature	:	50 deg. C
Minimum temperature	:	00 deg. C
Relative humidity	:	90 %

7a. EQUIPMENT PROTECTION:

Unless otherwise stated all equipment supplied shall conform as a minimum to the following protection classes:

Indoor	I.P. 40
Outdoor	I.P. 54 or 65 as applicable

Certification from manufacturer is required / to be submitted.

8. FACTORY INSPECTION OF LV SWITCHGEAR/ PANELS

The Contractor will arrange a visit of Consultants / Owner/ Construction Manager for the Inspection/ testing of LV Switchgear. Distribution / Computer distribution boards, PFI plant etc. at the
Manufacturer's premises before delivery the items to site. The Owner/ Project Manager will have the right to object/ reject any substandard material/ panel found to be unsuitable or not in accordance with the specifications. The Contractor will required to replace the substandard material and rectify the defect/defect objected by the Consultants/Owner/ Project Manager at his own cost.

8a. TESTING AND COMMISSIONING:

During execution and on completion of the works, (as required by Consultant / Owner / Project Manager the following tests shall be performed and a satisfactory performance certificate in respect of each test shall be submitted with the final bill. All equipment/instruments for the tests are to be provided by the Contractor at no extra cost. All test to be performed in the presence of Consultant / Owner or its representative Engineer.

a) Earth Resistance test and earth loop impedance test.

b) Insulation resistance / Meggar test of the entire electrical installation between phases, phase to earth and phase to neutral.

c) Polarity tests on switches, MCB's, fuses, etc.

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d) Operation tests and commissioning of the entire electrical installation including all equipment.

e) Lux level measurement of each area

f) Fluke Test Telecommunication Cables and terminations.

Certificates of Test shall be compiled, for each section of the installation. A master set of these documents shall be kept as the original of the Test Dossier. This dossier will bear the signature of Owner witnessing the tests.

9. MAINTENANCE AND WARRANTY:

The Contractor shall be responsible for the entire electrical works and all equipment supplied by him and warranty the same for a period of twelve months from the date of the completion certificate. Any defect due to the workmanship or equipment failure shall be replaced by the Contractor free of charge during that period.

10. AS-BUILT DRAWINGS:

On completion of the works the Contractor shall supply one reproducible and three copies of as-built drawings which clearly indicate all amendments, junction boxes, pull boxes, etc. These shall be provided at no extra cost. The as-built drawings shall indicate the entire electrical installation as actually carried out on site including telephone, fire alarm, sound system, computer system, electrical wiring, LV switchgear panels, distribution panels, PFI plant & electrical works of building etc and schematic diagrams.

11. SITE CONDITIONS:

The Contractor shall visit the site before submitting his quotation and acquaint himself with the site conditions, and check the specifications, design drawings and the bill of quantities.

Omissions/errors, if any, are to be brought to the attention of the Consultant or included in the bid. After award of the contract no claims shall be entertained.

12. OPERATION AND MAINTENANCE MANUALS:

The Contractor shall submit four sets of manuals & wall mounted charts for all the electrical equipment supplied and installed by him which shall include detailed operation and maintenance instructions for each item as recommended by the manufacturer. These manuals shall be submitted on completion of the works.

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13. ASSOCIATED CIVIL WORKS:

The cost of any civil works, (cutting, chiseling, excavation, backfilling, grouting, drilling etc. and making good) associated with any item of the electrical works shall be included in the quoted price for the item. The Contractor shall be responsible for carrying out these civil works and making good and the cost shall be deemed to be included in the quoted price.

The Contractor shall take care not to damage the structure during execution of his work. If so done, he shall repair and make good all losses at his own cost.

14. CONDUIT AND CONDUIT ACCESSORIES:

Wiring shall generally be in PVC conduit for electrical use minimum 20mm diameter, minimum wall thickness 1.25mm, concealed in structural slab, wall or screed with at least 50mm cover or clipped to the surfaces with metallic saddles, as required. All conduit accessories shall be of the same quality as the conduit. Saddless for fixing conduit on surface shall be provided at 1000 mm spacing.

No conduit shall be laid in the light-weight concrete over the sunken slabs of bathrooms/ toilets.

Manufactured smooth bends shall be used where conduits change directions. Sharp 90 degrees bends and tees shall not be allowed. Round PVC junction boxes for ceiling points shall have adequate capacity for wires and connectors.

The drawings are schematic and do not generally indicate pull boxes, however, these shall be installed in conduit runs to limit the pulling lengths as required.

Where indicated heavy gauge (1.6mm minimum wall thickness) steel conduit, minimum 20mm dia. Protected with two coats of red oxide anti-corrosion primer and two coats of black enamel inside and outside shall be used for wiring. All conduit accessories shall also be treated as above.

Where indicated hot-dip galvanized steel conduit minimum 20mm dia. shall be used for wiring. All accessories shall also be galvanized.

Final connection to motors and other equipment shall be in flexible steel conduit encased in weather-proof plastic.

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15. OUTLET BOXES PULL BOXES ETC.

The outlet boxes for installing switches, sockets, dimmers, etc. shall be of 16 SWG sheet steel de-rusted, degreased, rust-proofed and powder coated. These boxes shall be of suitable dimensions to receive the conduits and the accessories and have ample wiring space. A suitable brass earth terminal shall be provided for connecting the earth continuity conductor in the outlet box. Pull boxes shall generally be of the same specifications as the outlet boxes. All boxes shall have adequate number of knock-outs and have a minimum depth of 50mm.

16. SWITCHES, SOCKETS, CEILING ROSES ETC.

These shall be of white molded plastic suitable for flush mounting in sheet steel outlet boxes. Lighting switches shall be single pole rated for 10 Amps. 250 volts A/C. The switches shall operate with snap action. 3-Pin switch socket outlets shall be rated for 15 amps, 250 volts A/C. Ceiling roses shall be suitable for 5 amps. 250 volts and shall have white plastic molded base plate with copper terminals. The cover of the ceiling rose shall have a suitable cable inlet hole. All other outlets (Computer, telephone etc.) Shall have face plates that match the design of the face plates of switches and sockets. All external switches, sockets and accessories shall be of heavy duty, cast construction, weatherproof type. 5 Amps socket outlets shall be of 3-pin type with integral switch. Power outlets for computers shall be 13A, 250V switch socket 3-Pin with flat terminals. 16A, 2-Pin + Earth Shukko socket outlets to DIN standards shall be provided as indicated on the drawings.

All outdoor switches and sockets shall be of the weather proof type.

17. LV CABLES AND WIRES

In general LV cables and wires shall be with stranded copper conductors PVC insulated, PVC sheathed/unsheathed, single/multi-core, armored/unarmored. For lighting and socket outlet circuits they shall be 450/750 volts grades to BS 6004.

All power cables for main, sub-main feeders and power equipment etc. shall be of 600/1000 volts grade to BS-6346 Phase, neutral and grounding conductors shall be color coded red/yellow/blue, black and green. Each circuit shall have its own neutral and grounding conductor. The looping-in system shall be used throughout the installation. Any joint in wires is not permitted.

Final connection to lighting fixtures from ceiling rose/outlet box shall be made with 3 core 1.0 sq.mm pvc/pvc cable in flexible PVC conduit. Copper lugs shall be used for termination of cables. All multi-core cables shall be provided with glands of suitable size at entry to the panels.

Power cables shall be clipped to the surface by means of heavy duty spacer saddles and Clamps. The saddles and clamps shall be made of cast-iron or steel. Alternatively power cables shall be installed on cable trays or in cable trunking including all installation materials and fixing

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accessories as specified. All installation materials and fixing accessories such as glands, lugs, saddles, clamps, brackets etc. shall be provided without any additional cost.

Cables installed in under floor trenches shall be laid in single tier when laid on the bed of the trench. Cables may also be clamped on the walls of the trench by means of heavy duty spacer saddles and clamps of insulated material or fixed on brackets grouted into the side of the trench at a maximum of 600mm intervals. The center to center distance between cables shall be equal to twice the diameter of the cable. Cable terminations and joints shall be as per manufacturer's recommendations. Conductor connections and terminations shall be made with compression ferrules and lugs. Cable entry into panels shall be made with brass cable glands. Cable terminal lugs/ wire pins shall be of the mechanical compression type, soldered type lugs shall not be used.

The routing and general arrangement of all cables i.e. power, instrumentation, voice and data should be planned concurrently with main pipe racks and wheel access ways etc. to provide unimpeded direct routes wherever possible. Power cable shall be segregated from instrumentation, voice and data cables to eliminate any possibility of electrical interference with voice, data/ control circuitry.

Cable shall be run in continuous unbroken lengths and joints will not be permitted. Unless the route length exceeds the maximum manufactured drum length, or there is specific authorization for jointing of the cable by consultant/construction manager/ owner.

Each cable shall be subjected to an insulation resistance and continuity test after installation and prior to final dressing in to position and termination. Results shall be recorded and approved by consultant/ construction manager/ owner.

All cables including lighting and small power sub-circuits shall be identified and tagged at each end adjacent to their termination point with approved markers on carrier strip. In addition, all underground cables shall be fitted with non-corrodible identification bands at all points where they enter or leave the area, cable ducts, trench ducts or similar. Lighting and power sub-circuits cable shall be identified at each luminaries/ socket outlet.

Underground cables shall be laid in trenches 1000mm deep, Cables shall be laid at the bottom on a 150mm layer of sand. The cables shall then be covered by another 150mm layer of sand. Concrete tiles shall cover the entire length and width of the cable trench on top of the sand layer, caution tape is placed on the top of concrete tiles. The trench shall then be filled with earth. Concrete cable route markers shall be provided at every 20 meter interval and at change of direction.

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All jointing and termination work shall be carried out by practicing, fully trained tradesmen, qualified in such a work for the operating voltage concerned.

Brass glands shall be used which are of the thread fixing, hexagon bodied displacement seal type or equal. They shall be compatible with associated cable and maintain the degree of protection of the equipment enclosure. All glands shall be fitted with PVC or PVC shrouds.

The entire body of the cable must enter the gland. The cable shall be on a straight axis from a point at least six diameter before entering the gland. Seals shall be checked for correct size at the point of application.

Care shall be taken to ensure that creepage and clearance distances are maintained e.g. no washers or loose stands.

In addition to cable identification cable cores shall be positively identified at every terminal point, in accordance with the drawings.

Ferrules used for identification shall be of the interlocking permanently engraved type, designed to encircle the core completely. Markers of the adhesive type will not be permitted. Ferrules shall be correctly sized. There shall be no improvisation and engravings must not be altered.

18. TELEPHONE SYSTEM

Telephone cables shall be based on structured cabling system. It shall be covered under a this contract. However under this contract outlet boxes, conduit / trunking etc. with pull wires and main Tel. Cable shall be executed.

The outlet back boxes shall be of appropriate size. The minimum size of conduit used for the telephone system shall be 25mm in diameter.
Telephone junction boxes shall be fabricated from 16 gauge sheet steel, derusted, degreased, primed with zinc chromate and painted with two coats of enamel with hinged covers. TIP tag blocks with soldering type terminals on both sides with ample space for wiring shall be installed. Outdoor Telephone junction boxes and Main Distribution Frame shall be floor mounted in sheet steel cabinets to IP-54 grade of protection on a concrete base (where required).

19. EARTHING:

The earthing system shall comprise of copper earthing rod as specified 3600mm long copper rod bored 30 ft including 2” dia GI Pipe and earth electrode of 25mm dia as per site requirement as advised by Consultant, from ground level in a 250 Kg mixture of salt and charcoal. This work includes excavation, perfect back filling and all necessary materials as per drawing and as per standard practice according to the satisfaction of Consultant. Two earthing leads of PVC insulated copper wires of specified size in PVC conduit shall be used to connect the earth

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plate(s) to the equipment. G.I Pipe for watering of earth plates shall be provided. The earth resistance test shall be performed as per the Electrical Inspectors requirements. **Earth resistance shall not exceed one ohm for each earth pit**. If the required earth resistance is not achieved, additional earthing set shall be provided and connected in parallel until the specified resistance is achieved (without any extra cost).

Concrete Inspection Chamber(s), heavy duty C.I. covers, fixing clamps all accessories etc. are deemed to be included in the Electrical Contract.

20. LIGHTING FIXTURES AND FANS:

The lighting fixtures shall be as specified in the lighting fixtures schedule. The determination of quality is based on construction material, shape, finish, operation etc. The Contractor shall submit sample of each lighting fixture specified for the approval of the architect / consultant / owner.

20.1 Fluorescent Lighting Fixtures

The Fluorescent Lighting fixtures shall be complete with lamps. The ballast shall be low loss, polyester filled type, totally enclosed and suitable to operate on 230 V. A wiring diagram, wattage, voltage and current ratings shall be printed on the body of the ballast.

The starter shall be glow type with radio interference suppressor/by-pass capacitor. All lighting fixtures shall be provided with power factor improvement capacitors to give power factor of 0.90. The internal wiring of the fixture shall be done with heat resistant wires and provided with a suitable connector. The body of the fixtures shall be minimum 22 SWG sheet steel, de-rusted, degreased, finished in heat resistant paint, stove enameled or alternatively powder coated. Appropriate size bushed wire entry holes, fixing holes and earth terminal shall be provided. The design of recess mounting light fixtures shall be coordinated with the design of the false ceiling. The installation method/detail of recess mounting fixtures shall be submitted to the architect / consultant for approval. Recess mounting fixtures shall be supported by hangers from the slab above to prevent the weight of the fixtures from being transmitted to the false ceiling. For fixing surface mounted fixtures, nylon plugs and galvanized steel bolts or screws shall be used. The pendant type fixtures shall be hung by two 20mm dia. 16 SWG white enameled tubes having swivel joint type hanger at the top for fixing directly on to the recessed outlet or on the ceiling.

20.2 Incandescent Lighting Fixtures

The incandescent lighting fixtures shall be finished as specified. They shall be in standard color unless otherwise stated on the drawing or directed by the Architect / Consultant. Weatherproof incandescent fixtures shall comprise of cast aluminum body

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with gasket clear glass cover. The lamp holder shall be of brass having porcelain outer ring for all incandescent fixtures. All fixtures shall be provided with earth terminals. The surface mounted fixtures shall be installed on wall or ceiling by nylon plugs and galvanized steel screws. The recess mounted fixtures shall be installed in a manner as described for fluorescent fixtures. The fixtures shall be complete with lamps.

20.3 Mercury Vapour/Metal Halide/Sodium Vapour Fixtures

These fixtures shall be of heavy gauge corrosion proof metal construction, with brass/porcelain lamp holders. They shall have an optical system of high purity anodized aluminum reflector and have clear heat resistant toughened glass cover. The fixtures shall be weather proof and water-tight. A compartment for housing of ballast shall be provided on the body of the fixtures. The ballast shall be totally enclosed, polyester filled having leak-proof and corrosion resistant steel body. Insulated terminals shall be provided with the ballast. The fixtures shall be power factor corrected to 0.95. All internal wiring shall be by means of heat resistant wires. The lamps shall be of specified wattage. The fixtures shall be complete with igniter, capacitor, terminals, lamps, etc.

20.4 Ceiling Fans

Ceiling fans shall be of capacitor type of sizes as indicated in BOQ. They shall be complete with appropriate sized down rod, canopies, mounting brackets dimmer/regulator, blades etc.

20.5 Exhaust Fans/Wall Fans

Exhaust fans shall be wall/window mounting type as required of sizes as indicated in the BOQ, complete with louvers, shutters, and all fixing accessories.

Wall Fans shall be bracket mounting type of sizes as indicated in the BOQ complete with all mounting accessories.

21. L.V. SWITCHGEAR

Main, Sub-main Distribution Boards and MCB DBs shall be of the totally enclosed type, dust proof, damp proof and be suitable for floor/surface/flush mounting, and comply with IEC 157, IEC 158, IEC 439, BS 4752.

They shall be suitable for 400/230 volts 3 phase, 4 wires, 50 Hz system and shall have all components rated for insulation class 600 volts minimum.

All main, sub-main and MCB distribution boards shall be factory assembled. Main and Sub-main distribution boards shall be fabricated with 14SWG and MCB DBs with 16 SWG sheet steel, de-rusted, degreased, rust proofed with two base coats of anti-corrosive paint and painted with

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two coats of heavy enamel paint in approved color or powder coated. Indoor distribution boards shall have enclosures of IP-40 grade.

All distribution boards shall be complete with adequately rated electrolytic tinned copper phase, neutral and earth bus bars and be complete with incoming and outgoing cable terminations arrangement, terminal block/line up terminals and shall be suitable for flush mounting of all instruments. The cabling inside the panels shall be suitably numbered and harnessed by means of straps or cords.

Cable entries shall be through removable gland plates.

All components shall be installed on mounting brackets inside the enclosure and protected from the front with screwed sheet steel safety plate. The enclosure shall be provided with rubber gasketting and a lockable hinged door with cam fastener. All distribution boards shall be front access type.

The front side of the distribution boards shall be provided with a name plate designating the board. The inside of the door shall have a chart clearly indicating the circuits with their designations. The door is to be grounded by flexible copper cable. This also applies to the common and front plate.

Suitably rated CTs shall be provided as required CTs shall be of class 0.5 for metering and 1.5 for protection.

Miniature circuit breakers (MCB) and molded case circuit breakers (MCCBs) shall be of the molded pattern and their switching levers shall be such that they are accessible through the safety plate for operation. The short circuit rating of the circuit breakers shall be as indicated on the drawing. They shall comply to IEC Standards 947-2 and 898.

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.

Outdoor feeder pillar shall be housed in weather proof sheet steel cabinets to IP54 or IP65 as applicable, grade fabricated with 14 SWG sheet steel, de-rusted, degreased, rust-proofed with two coats of anticorrosive paint or powder coated. They shall be floor mounted on concrete bases of required dimensions.

All components of feeder pillars shall be on mounting brackets inside the enclosure. They shall be equipped with adequately rated electrolytic tinned copper phase, neutral and earth bus bars and be complete with cable terminations arrangement, terminal block/line up terminals.

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The minimum clearances of the equipment shall be in accordance with the manufacturer's recommendations but not less than the following criteria.

a) Vertical, from highest equipment to bottom of roof beam : 500mm
b) Operation side of 400V switch gear: 1500mm
c) Operation side of distribution panels: 1500 mm

All distribution boards and isolators shall be identified with circuit designations and source of incoming supply. Lighting switches shall also be identified.

Labels for indoor or weather protected areas shall be white-black (or red) wire, laminated plastic with lettering engraved to show the middle layer. Identification and instructions shall be in black lettering. Warning or danger shall be in red.

21a. Circuit Identification

In addition to cable identification, cable cores shall be positively identified at every terminal point, in accordance with the drawings.

The cores of non-flexible cable shall be identified in accordance with the "IEE Wiring Regulations" with the addition of polarity markings for d.c circuits.

Ferrules used for identification shall be of interlocking permanently engraved type, designed to encircle the core completely. Markers of the adhesive type will not be permitted. Ferrules shall be correctly sized. There shall be to improvisation and engravings must not be altered.
Core markings shall be strictly in accordance with the drawings.

22. CABLE TRUNKING

Cable trunking shall be fabricated from sheet steel having a minimum thickness of 1.6mm and having a galvanized finish, and shall include all covers, accessories, supports, etc.

The trunking shall be of such a design that the lid is secured by mushroom headed screws having threads.

Copper links shall be provided on all the trunking interconnection to ensure that the electrical continuity is maintained throughout the trunking runs.

These copper links are to be fitted on the exterior of the trunking where they are readily visible at all times.

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The inside surfaces of all trunking and trunking accessories should be smooth and free from burrs and other defects.

Slotted entries into distribution boards shall be suitably bushed by means of a non-ferrous insulating material securely fixed between the trunking at the distribution boards

Cable retaining clips shall be installed at not greater than 900mm centers within the trunking to prevent damage to cables when the covers are replaced.

Cables within the trunking shall be taped together in groups to denote circuits common to individual pieces of equipment.

The segregation of compartments in trunking shall be maintained at all cross over positions and metal separators shall be fixed to keep the wiring in each compartment completely isolated from the remainder.

The cable capacity of the trunking is to be strictly in accordance with the current edition of the I.E.E. regulations and the stipulated spare space shall be left in all cable trunking.
When trunking passes through a floor, wall, partition or ceiling which constitutes a fire barrier all orifices are to be effectively sealed to restrict the spread of fire.

Generally trunking is to be fixed at not more than 1.8m centres with additional fixing at not more than 150mm on either side of any fitting such as bends and tees. The trunking shall be suspended from structure with steel hangers or supported on walls by angle iron brackets.

23. CABLE TRAY

The Contractor shall supply and install all cable trays with covers, accessories, supports and fixing. Cable trays shall have a minimum thickness of 1.6mm upto 450mm width and 2.0mm thick over 450mm width and shall be heavy duty of the perforated pattern and made from galvanized sheet steel. All cables in any one layer are to be run in flat formation on the cable tray. Cable saddles for securing the cables shall be confined to within the width of the tray and all cable saddle fixing shall be accessible from the front of the cable tray. Cable trays shall have return flange edges.

All cable trays shall be spaced a minimum of distance of 20mm from any surface upon which they are run. All purpose made saddles supporting the cable tray must be supplied by the Contractor and must be painted with one coat of red oxide before erection.
All cable trays shall be fixed at intervals of not more than 1.2m for runs in both horizontal and vertical planes. The Contractor is to ensure that no sagging of the tray occurs. If this is apparent additional supports must be inserted to prevent the cable tray from sagging and to present a neat and workmanlike appearance.

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Horizontal runs are to be hung from the ceiling with GI rods and supported on GI channels of appropriate sizes.

Cable trenches and cable trays/ ladder racks/ pipes shall be designed to allow for 25% spare space capacity for future installation.

24. UNDER FLOOR BOXES

The under floor pull boxes for power, data and telephone cables shall be of galvanized sheet steel construction (minimum 16 SWG thickness). The boxes shall be installed in floor screed. The height of the boxes shall be between 65mm to 70mm or as required. Suitable arrangement of knock outs for conduit and trunking entry into the boxes is to be provided.

Metal adaptors forming barriers / crossovers / tees, etc. shall be provided within the boxes as required for segregation of power cables from data and telephone cables.

The cover together with the frame is to incorporate vertical adjustment. The cover is to be of minimum 14 SWG thick galvanized sheet steel.

Alternatively the frame and the cover may be of sheet steel de-rusted, degreased, rust proofed and powder coated with the box in the screed remaining of galvanized sheet steel construction. The boxes shall include a brass earth terminal.

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LIST OF APPROVED MANUFACTURERS / SUPPLIERS

IMPORTANT

				Bidders Choice Names from Approved Ones
1.	L.V. Switch Gear	:	Premier Engineering Hussain & Co. Taj Engineering Karimi Electromech system	
2.	L.V. Cables	:	Pakistan Cables Limited Pioneer Cables Limited	
3.	General Wiring Cables	:	Pakistan Cables Pioneer Cables	
4.	PVC Conduit and Accessories	:	Galco (Galaxy) Dadex Civic	
5.	Wiring Accessories (Switch, sockets etc.)	:	Clipsal (C-Vevac)– Australia MK – Equivalent	
6.	Back Boxes, Pull Boxes Junction Boxes etc.	:	Hussain & Company EZZI Engineering	
7.	Exhaust Fans	:	Millat Fan, Pak Fan	
8.	Lighting Fixtures	:	Philips, Pierlite, Ohms Britlite, Unilux, Sunlight	
9.	Changeover / Load break Switches/Cam Switches	:	SOCOMEC, Siemens, Breter Telemechanique	
10.	Switchboard Instruments, indication lights (220V)	:	SACI, Siemens Telemechanique Maruyasu, Japan	
11.	Circuit Breakers, ELCB's etc.	:	Terasaki, Japan Merlin Gerin, France ABB, Germany	
12.	Steel Conduit and Accessories	:	Hilal Industries International Industries	

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13.	Emergency Lights	:	Chloride Bardic, UK Menvier, UK Cooper, UK
14.	Cable Trays / Trunking	:	Hussain & Co. Leiamra Engineering Electro Line, Ezzi Engineering
15.	Telephone Junction Boxes	:	Hussain & Company Karimi Electro-Mech
16.	Ballasts, Capacitors, Starters, Lamps	:	Philips, Holland, Australia Schwabe, Germany Osram, Germany
17.	UPVC Pipes	:	Galco, Dadex
18.	Underfloor Outlet Boxes	:	EZZI Engineering Hussain & Co. Clipsal.
19.	Earthing Equipment	:	Locally make but equivalent to Furse-UK.
20.	Voice Cables	:	Clipsal – Australia 3M, Panduit Pony - Japan

Note:

1. Any other material not mentioned above, shall be of best quality and as per advice and approval of Consultant / Construction Manager/ Architect.

2. The Consultants / Construction Manager / Architect shall have right to suggest Contractor to submit sample of any item from any one of the approved manufactures, for installation in the project, if Consultants / Construction Manager / Architect consider it necessary. The Contractor shall be required to comply.

3. Samples / catalogues of all materials and construction drawings of equipment to be manufactured are to be submitted to the Consultants / Project Manager / Architect for approval before purchase or fabrication / installation.

4. **Important:** The bidder is required to fill bidder column to indicate his/their choice names from approved ones with the bid document.

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SPECIFICATIONS FOR BUILDING WORKS

S.NO.	DESCRIPTION	PAGE NOS.
1.	Excavation	EX 1-11
2.	Block Masonry	MB 1-09
3.	General Water Proofing	WP 1-17
4.	Plain & Reinforced Concrete	RCC 1-37
5.	Roof Treatment	RT 1-06
6.	Termite Control	TC 1-04
7.	Structure Steel Works	ST 1-07

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SPECIFICATIONS

EXCAVATION AND EARTH WORK

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SPECIFICATIONS

EXCAVATION AND EARTHWORK

1. SCOPE

The works covered by this section of the Specifications, consist of furnishing all plant, labor, equipment, appliances and materials, and in performing all operations in connection with earthworks, in accordance with this section of the Specifications and the applicable drawings, subject to the terms and conditions of the Contract.

2. GENERAL

a. The CONTRACTOR shall acquaint himself with the nature of the ground, existing structures, foundations and sub-soil conditions which may be encountered during excavation or other earthworks.

b. The Subsoil Investigation Report is available with the ENGINEER for reference. However, the Employer does not guarantee or warrant in any way that the material to be found in the excavation will be similar in nature to that of any samples which may have been exhibited or indicated in the Report, Drawings or in any other Contract Documents or to material obtained from boring or trial holes. The CONTRACTOR shall be deemed to have made local and independent inquiries as to, and shall take the whole risk of the nature of the ground, sub-soil or material to be excavated or penetrated and the CONTRACTOR shall not be entitled to receive any extra or additional payment nor be relieved from any of his obligations by reasons of the nature of such ground subsoil or material.

c. All excavation, cutting, embankments and fill shall be constructed to the lines, levels and gradients specified with any necessary allowance for consolidation, settlement and drainage so that at the end of the Period of Maintenance the ground shall be at the required lines, levels and gradients. During the course of the Contract and during the Period of Maintenance, any damage or defects in cutting and embankments, structures and other works, caused by slips, falls or wash-ins or any other ground movement due to the CONTRACTOR's negligence shall be made good by the CONTRACTOR at his own cost.

3. SITE PREPARATION

a. The CONTRACTOR shall set out the works and shall be responsible for true and perfect setting out of the same and for correctness of the positions, levels, dimensions and alignments of all parts thereof. If, at any time, any error in this respect should appear during the progress of the works, the CONTRACTOR shall at his own expense rectify such an error to the satisfaction of the ENGINEER.

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b. The CONTRACTOR shall construct and maintain accurate bench marks, so that, the lines and levels can be easily checked by the ENGINEER.

c. The CONTRACTOR shall construct and maintain such ditches, in addition to those shown on the plans, as will adequately drain areas under construction.

d. Clearing shall consist of filling and cutting up, or the trimming of trees and the satisfactory disposal of the trees and other vegetation designated for removal, together with downed timber, snags, bushes, and rubbish occurring within the areas to be cleared. Trees, other vegetation, stumps, roots, and bushes in areas to be cleared shall be cut off flush with or below the original ground surface except such individual trees, group of trees, and vegetation as may be indicated on the drawings or designated by the ENGINEER to be left standing. Individual trees, group of trees, and other vegetation, to be left standing shall be thoroughly protected from damage incident to construction operations, by the erection of the barriers or by such other means as the circumstances require, as approved by the ENGINEER. Clearing operations shall be conducted, so as to prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction, and to provide for the safety of workers. so as to provide for the safety of employees and others.

e. Grubbing shall consist of the removal and disposal of all stumps, roots, larger than 1-1/2" (38 mm) in diameter, matted roots in the designated grubbing areas. Stumps, roots, logs or other timber larger than 1-1/2" (38 mm) in diameter, matted roots & other debris shall be excavated and moved to a depth not less than 18" (450 mm) below any sub-grade, shoulder or slope. In areas, where the cut is over 3 ft (1.0m), grubbing shall not be necessary. In areas to be paved, or in areas indicated on the drawings as future paved areas, where, excess excavation from grading operations is placed, or in areas designated by the ENGINEER as future paved areas, where excess excavation from grading operations is placed, grubbing will be necessary.

f. Timber and other refuse to be disposed off by burning, shall be burned at locations specified by the ENGINEER in a manner that will avoid all hazards such as damage to the existing structures, construction in progress, trees and vegetation. The CONTRACTOR shall be responsible for compliance with all pertinent laws and regulations. Disposal by burning shall be kept under constant attention until the fires have been burned out or have been extinguished. No materials will be permitted to be pushed or placed on adjacent private property without prior written approval of the ENGINEER.

4. EXCAVATION

a. Excavation shall include the removal of all material of every name and nature.

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b. The CONTRACTOR shall give reasonable notice that he intends to commence any excavation and he shall submit to the ENGINEER full details of his proposals. The ENGINEER may require modifications to be made if he considers the CONTRACTOR's proposal to be unsatisfactory and the CONTRACTOR shall effect such modifications but shall not be relieved of any of his responsibilities with respect to such work.

c. For major excavations, the CONTRACTOR shall submit for prior approval of the ENGINEER, full details and drawings showing the proposed method or procedure of supporting and strutting, de-watering and maintenance of adjacent structures. The design, provision, construction, maintenance and removal of such temporary works shall be the responsibility of the CONTRACTOR, and all costs in this respect shall be included in the billed rates for the permanent works.

e. The CONTRACTOR shall preserve the completed excavation from damage resulting from slips and earth movements, ingress of water from any source whatsoever and deterioration by exposure to the sun and the effect of the weather.

f. All excavation of every description in whatever material encountered shall be performed to the elevations and dimensions shown on the drawings in such a manner as to avoid interruption to work in other parts of the SITE. The CONTRACTOR shall be responsible for damage to the permanent works caused by excavation in other parts of the work.

g. Excavation shall extend to sufficient distance from walls and footing to allow for placing and removal of forms, installations of services, and for inspection, except where it is required to deposit concrete for walls and footings directly against excavated surface.

h. All excavations in foundations shall be taken to 6" (150 mm) above the final excavation elevations shown on the drawings and the last 6" (150 mm) shall be trimmed carefully to a smooth and level surface. Immediately after trimming to the final elevation a layer of blinding concrete shall be placed to the thickness shown on drawings. All excavations for foundations which have been trimmed shall be covered by lean concrete by the end of the day. It is specifically brought to the notice of the CONTRACTOR, that, any excavation taken down to the trimmed elevation which is left overnight or for any length of time thereafter, uncovered by the blinding concrete, shall be required to be trimmed to such lower elevation as directed by the ENGINEER and any extra work or any consequent increase in the quantities caused thereby shall not be paid to the CONTRACTOR.

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i. No excavation shall be refilled nor any permanent work commenced until the foundation has been inspected by the ENGINEER and his permission to proceed given.

j. If excavation for footings are carried below the required level, as shown in the Drawings or as directed by the ENGINEER, the surplus depth shall be filled with concrete having f'c = 1.5 ksi at the sole cost of the CONTRACTOR.

k. All excavation shall be performed in the dry. The placing of blinding concrete, placing of reinforcement and casting of the permanent works in the excavation shall be carried out in the dry and the CONTRACTOR shall have sufficient equipment for this purpose. Adequate precautions shall be taken to prevent any erosion due to undercutting from underneath the previously constructed adjoining foundations. Any de-watering required for this purpose shall be deemed to be included in CONTRACTOR's rates for this excavation.

l. Shoring, including sheet piling, where required during excavation, shall be installed to protect workmen and the banks, adjacent paving, structures and utilities. The term shoring shall also be deemed to cover whatever methods the CONTRACTOR elects to adopt, with prior approval of ENGINEER, for upholding the sides of excavation and also for planking and strutting the excavation against the side of public roadways and adjoining properties in existing hard-core of any other material. The CONTRACTOR will be held responsible for upholding the sides of all excavations and no claim for additional excavation, concrete or other material will be considered in this respect.

m. Excavations, for deep retaining walls, shall be protected from drying out by covering with tarpaulins or other means, if excavation is to stand open more than 24 hours. This is a precaution to prevent excessive surcharge loads acting on the wall, from the drying out and subsequent swelling of the clay soils when saturated either by rain or capillary action of ground water.

n. If rock is encountered, it shall be removed carefully and without excessive noise and vibration. Blasting, if required shall be done by persons skilled in such work and as directed by the ENGINEER. Necessary permission for blasting should be obtained from respective Government Authorities by the CONTRACTOR. All necessary precautions shall be taken to see that the general public and the properties in the vicinity shall not receive any damage by such blasting. Rock, to receive footings shall be stepped and leveled.

o. Existing utility lines that are shown on the drawings or the locations of which are made known to the CONTRACTOR prior to excavation, which are to be retained, as well as those utility lines constructed during excavation operations, shall be

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protected from damage during excavation and back-filling, and if damaged, shall be repaired by the CONTRACTOR at his own expense. Any existing utility lines, which are not known to the CONTRACTOR in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the CONTRACTOR and adjustment in payment will be made as approved by the ENGINEER. When, utility lines which are to be removed, are encountered within the area of operations, the CONTRACTOR shall notify the ENGINEER in ample time for the necessary measures to be taken to prevent interruption of the service.

p. Excavated material suitable for use as filling material shall be deposited as directed by the ENGINEER. Surplus or material unsuitable for use as filling shall be disposed off by the CONTRACTOR to areas approved by relevant authorities for this purpose.

5. FILLING

a. After completion of foundation work, walls, and other construction below the elevation of the final grades, and prior to filling, forms shall be removed and the excavation shall be cleaned of trash and debris.

b. Filling shall be approved selected material from excavation or other predominantly granular material and free from slurry, mud, organic or other unsuitable matter and capable of compaction by ordinary means.

c. Filling in trenches and foundations shall be placed in 6" (150 mm) layers and compacted to optimum moisture content by mechanical means, where possible.

d. Filling around pipes and cables shall be carefully placed fine material to cover the pipe or cable completely before the normal infilling is placed.

e. Material for bulk filling shall be as approved by the ENGINEER and shall be placed in layers of 6" (150 mm) and saturated with sufficient water or otherwise compacted to produce not less than 95% in-situ density with respect to the maximum density, at optimum moisture content, as per ASTM D- 1557 method C. In place determination of dry density of soil shall be by ASTM D-1556-64.

f. All filled areas shall be left neat, smooth and well compacted, the top surface consisting of the normal SITE surface soil, unless directed otherwise.

g. Filling shall not be placed against foundation walls prior to approval by the ENGINEER. Filling shall be brought up evenly on each side of the walls as far as practicable. Heavy equipment for spreading and compacting the filling shall not be operated closer to the wall than a distance equal to the height of the filling above the top of footing.

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h. All structures retaining the earth shall have a filling of granular material for drainage through the weep holes or rubble drain as shown on the drawings or as additionally directed by the ENGINEER. This granular material shall consist of following gradation requirements.

SIEVE	% PASSING BY WEIGHT
1-1/2"	100
3/4"	80 - 90
# 4	60 - 70
# 10	45 - 55
# 40	15 - 25
# 100	5 - 15
# 200	less than 5

Drainage mediums shall be free of dirt, chemically inert and well graded so that when placed and compacted this filling shall be stable.

e. Fill material to bring sub-grade for slab on grade, exterior pavements, steps etc. To underside of slab shall be free draining granular material such as concrete sand or approved fill material with fineness modulus between 2.7 & 3.0.

6. EMBANKMENT

a. No embankment shall be commenced until the foundations have been approved by the ENGINEER. When approved as suitable by the ENGINEER, material arising from the excavations may be used for filling as required. Mud, slurry, organic matter, peat and any other unsuitable material shall not be used for filling for any purpose on the SITE. Where suitable materials from the excavations are insufficient for filling, the requirements shall be made up of other granular material which the CONTRACTOR shall obtain from sources approved by the ENGINEER.

b. The location of sources of supply of this filling material will be left to the CONTRACTOR, but the quality of the filling material brought from outside will be subject to the approval of the ENGINEER. The ENGINEER shall require the CONTRACTOR to carry out various tests of the filling material. All such tests shall be made at an approved laboratory at the cost of the CONTRACTOR.

Once, a material from a specific source has been approved, the material of the same quality and from the same source shall be used. Any filling material from borrow pits, which has not been approved or the quality of which differs from the approved material shall be rejected outright without recourse. The ENGINEER reserves the right to order the removal of any such materials brought to the SITE of the works, at CONTRACTOR's expense. In order to ensure satisfactory compaction, it will be necessary to carry out, depending upon the type of material, particle size

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distribution tests, determination of organic content tests, maximum and minimum density tests and determination of optimum moisture content for the filling material.

c. The method of compaction, namely type of roller, weight of roller and number of passes proposed by the CONTRACTOR for any particular filling material shall be subject to the approval of the ENGINEER, after the completion of satisfactory field tests, subsequent to the laboratory analysis, using the materials and equipment proposed to be used for the earthwork in conditions similar to those likely to be encountered during construction. The final selection of the soil moisture content, the thickness of layers, the type of compaction equipment and the number of passes shall be decided after these tests, which shall be conducted at CONTRACTOR's expense.

d. Having established the method of compaction to be used, no departure from this approved method shall be permitted without the prior approval of the ENGINEER. The adequate control of the filling and compacting operations shall be ensured by in-situ density tests and in order to obtain significant results, not less than two measurements shall be carried out per one thousand square feet (100 square meter) of area compacted. The frequency of tests shall be determined on SITE and may be varied at the discretion of the ENGINEER as the work proceeds. Tests shall be carried out in accordance with ASTM D - 1557 method C or such other standards as approved by the ENGINEER. The standard of acceptance of the compaction be not less than 95% in-situ density with respect to the maximum density, at optimum moisture content, achieved in accordance with ASTM D - 1557 method C.

e. The exact thickness of layers and the method of placing and compacting the filling shall be determined by the field tests, as stated above, but not withstanding the results of these trials, filling shall not be placed in layers exceeding 6" (150 mm) in thickness. The full width of the embankment shall be placed in one operation. In order to maintain control of the thickness of layers, timber profiles shall be used.

The CONTRACTOR shall provide adequate supply of water and sufficient capacity of mechanical water carriers to ensure uniform and uninterrupted operation of compaction. The ENGINEER may forbid the CONTRACTOR to proceed with pacing and/or compaction of filling and/or removal and re-compaction of such filling if he finds that the CONTRACTOR has insufficient or defective equipment or that the work is improper.

If it is found necessary to alter the moisture content of the filling material in any way, then very strict control shall be exercised over the wetting and/or the drying process and frequent moisture content tests shall be made.

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f. Where directed, earth slopes shall be protected with hand set stone pitching, either dry or in mortar as specified. Pitching stones shall be approved rock rubble, each stone having a minimum depth of 10" (250 mm) and a minimum volume of 0.5 cubic ft (0.015 C.M).

7. MEASUREMENT AND PAYMENT

a. Unless otherwise specifically stated in the Bill of Quantities, or herein, all items shall be deemed to be inclusive of, but not limited to the following:

I Labor and all cost in connection therewith.

ii Materials, goods and all costs in connection therewith (e.g. conveyance; delivery; unloading; storing; returning, packing; handling; hoisting; lowering).

iii. Setting out of works.

iv. Cost of all laboratory and field tests stipulated in these Specifications.

v. Use of Plant.

vi. Wastage of Materials.

vii. Establishment charges, overhead charges & profit.

viii. All other expenses, royalties, charges and taxes specified in Conditions of Contract.

b. Quantities of excavation, filling, embankments, etc. shall be calculated from level taken by the CONTRACTOR and agreed by the ENGINEER before commencement of the work.

c. SITE Preparation

The cost of SITE preparation shall be deemed to be included in cost of excavation.

d. Excavation

i. The quantities given for excavating and subsequent disposal shall be deemed to be the bulk before excavating and no allowance shall be made for any subsequent variation in bulk or for any extra space required to accommodate planking and strutting.

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ii. The unit price for excavation shall be deemed to include the following also:

- Excavating below water-level and excavating in rock.
- Getting out excavated materials by any means necessary and subsequent disposal of excavated material to any lift and lead.
- Keeping excavations free from water, from any source whatsoever, and providing pumps and other equipment, power attendance for pumping and standing time.
- Shoring, which shall mean providing everything requisite to uphold the sides of excavation by whatever means are necessary.
- Placing and compacting of back-filling in the excavations to the required degree and elevations as stipulated in the Drawings and as directed by the ENGINEER.

iii. Excavation and its measurements for foundation/ trenches shall be to the exact dimensions shown on the drawings multiplied by vertical depth of excavation.

iv. The area, shall be that of the lean concrete layer under all footings and shall not include any extra excavation required for shoring, form-work etc. No payment shall be made for any excavation beyond that defined above, or for any unauthorized width and depth.

e. Embankment

i. Quantities for embankment shall be deemed to be the net volume of the embankment after being placed and compacted to the required degree and elevation as stipulated in the Drawings and as additionally directed by the ENGINEER.

ii Treating the surface of the embankment, filling (e.g. leveling, grading to falls, grading to cambers) shall be deemed to be included in the unit price of embankment.

iii. Trimming the sides of embankment to slope shall be deemed to be included in the unit price of embankment.

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S P E C I F I C A T I O N S

CEMENT CONCRETE BLOCK MASONRY

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S P E C I F I C A T I O N S

CEMENT CONCRETE BLOCK MASONRY

1 SCOPE

The work covered by this section of the Specifications consists of furnishing all labour, tools scaffolding, hoisting equipment and masonry materials of every kind; and in performing all operations in connection with procurement, transportation and delivery, erection and building in of all work classified as masonry work and/or included as such herein, i.e., concrete masonry units; masonry mortars; and all related items and appurtenances, including all items supplied by other trades and customarily built-in and/or installed under mason work or required to complete mason work, in strict accordance with the requirements of the Drawings and Schedules, as specified herein, and subject to the Terms and Conditions of the CONTRACT Documents.

2 CODES AND STANDARDS

Unless otherwise specified or shown, the following codes and standards shall apply:

ASTM C31	Making and curing concrete test specimen in the field.
ASTM C39	Compressive Strength of cylindrical concrete specimen.
ASTM C90	Hollow load bearing concrete masonry units.
ASTM C144	Aggregate for masonry mortar
ASTM C270	Mortar for unit masonry
ASTM C404	Aggregate for masonry grout
ASTM E119	Fire tests of building construction and materials
UBC UL-618	Concrete masonry units, fire resistance index
ACI 531	Building code requirements for concrete masonry structure

3 SUBMITTALS

a. Samples:

Submit three samples of each type of block required, and the full range of exposed texture to be used in the completed works. The review will be for texture only

b. Test Reports:

Reports for compressive strengths of masonry units, grout and mortar.

4 SUCTION RATE

NOT REQUIRED

NOT REQUIRED

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The CONTRACTOR shall, at his own cost, satisfy the ENGINEER that the suction rate of the block when determined in accordance with Appendix `A' of BS 3921 does not exceed 20g/cm.sq/min., or that the CONTRACTOR is able to adjust it so that it does not exceed this value on SITE.

5 SOLUBLE SALT CONTENT

NOT REQUIRED

For exposed block work, the contents by weight percent of soluble sulfate, calcium, magnesium, potassium and sodium radicals, shall not exceed 0.30, 0.10, 0.03 and 0.03 percent respectively, when ascertained in accordance with BS 3921 at the cost of the CONTRACTOR.

6 PRODUCTS

6.1 Concrete Blocks

6.1.1 Materials for Blocks

NOT REQUIRED

Cement, aggregate and water for concrete blocks shall conform to the requirements as specified in the section for Plain and Reinforced Concrete.

6.1.2 Concrete Block Making

a. The blocks shall be machine molded. The block making machines shall be of the standard approved by the ENGINEER. They shall be operated according to the instructions laid down by the manufacturers.

b. The blocks shall be continuously water cured by sprinkling for a minimum of 10 days and covered between sprinkling operations with 4 mils thick polyethylene sheeting. After 10 days water-curing period the blocks shall be air dried. Under no circumstances will blocks be used in the work until they are completely dry. During curing period no surface of the block will be allowed to dry.

NOT REQUIRED

c. Cured concrete blocks shall be stored off the ground, stacked on level platforms, which allow air circulation under stacked units. Units shall be covered and protected against wetting.

d. Care shall be exercised in the handling of all concrete blocks. No damaged blocks shall be used in the work.

e. The blocks cast on different dates shall be stacked separately and must be labeled showing the date on which they are cast.

6.1.3 Properties of Blocks

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a. Block sizes, unless otherwise indicated on drawings, shall be 16" by 8" by 4", 6", & 8" thickness (Approximately 400 by 200 by 100, 150 & 200 mm). Physical requirements shall comply with relevant ASTM or equivalent approved standards.

b. For non-load bearing wall the cement, sand and coarse aggregate shall be volume batched in the minimum ratio of one part cement, three parts sand and six parts coarse aggregate and shall be mixed in a concrete mixer.

NOT REQUIRED

c. For load bearing Hollow/Solid block wall the mix unless otherwise stated shall be proportioned to meet the following strength requirements:

i) Solid Load Bearing Concrete Masonry Units shall have a 28 day compressive strength of not lesss than 1500 psi (106 kg/cm. sq.) average of 3 units tested or 1200 psi (85 kg/cm. sq.) per individual unit tested.

ii) Hollow Load Bearing Concrete Masonry Units shall comply with ASTM C90, grade N-1 (moisture controlled), and shall have a 28 day compressive strength of 1350 psi (96 kg/cm. sq.) average of 3 units tested and 800 psi (57 kg/cm. sq.) on individual unit tested.
The compressive strengths shall be verified by tests in accordance with UBC section 2404, para 2

d. The CONTRACTOR shall provide test results proving the average minimum crushing strength of the blocks prior to the commencement of the construction. Further test results shall be provided as required by the ENGINEER, to ensure that all batches of blocks have the minimum specified crushing strength.

e. The test shall be carried out by an authority approved by the ENGINEER. Evidence shall be produced that the block manufacturer has an efficient method of quality control. The ENGINEER will require to periodically test samples of blocks, and the CONTRACTOR shall make any necessary arrangements.

f. Hollow concrete block units wherever specified shall have cores with cross sectional area at least equal to the percent of gross area of block given below:

8 in. (200 mm)	38 percent
6 in. (150 mm.)	30 percent
4 in. (100 mm)	No requirement

g. Minimum shell wall thickness be 1-1/4 in. (32 mm).

h. Permissible tolerance in size of block shall be 1/8 in (3 mm) each way.

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i Special shapes for lintels, corners, jambs, sash, cleanouts, control joints and headers, bonding and other particular needs shall be provided where required.

B **Mortar Constituents**

a. Cement:
Cement shall conform to ASTM C-150, type II low alkali non-staining without air entrainment

b. Sand (Aggregate):
Sand and its grading shall comply with the requirements of ASTM C-144, 100% passing the U.S. equivalent No. 16 sieve. Sand that has been in contact with seawater shall not be used unless it has been thoroughly washed to the satisfaction of the ENGINEER.

c. Water:
Water shall conform to the specifications set forth in Section of Plain and Reinforced Concrete.

d. Lime:
Hydrate lime shall conform to ASTM C-207 type S. If it is not available use quick lime according to ASTM C-5.

7 **MORTAR PROPORTIONS AND MIXING**

a. Cement, and Sand shall be mixed in proportion, by volume, as follows: -

Use 1:4 (Cement: sand) mix subject to the prior approval of the ENGINEER.

b. Mix only as much mortar in a mortar mixer as can be used in 30 minutes after water has been first mixed into the batch.

c. Do not re-temper the mortar.

d. Compressive strength of mortar specimen tested in accordance with ASTM C39 shall not be less than 2500 psi (210 Kg/cm sq.)

8 **REINFORCING AND ANCHORS**

All masonry walls shall be reinforced. At least one vertical and one horizontal reinforcing member shall be provided for every 30 sq.ft (3 sq. m) of wall elevation.

b. Block masonry anchors and ties required to connect masonry with structural member unless shown otherwise on drawings, shall be 3/8” dia. (10-mm dia) bars every 4-5th course, anchored 12" (300 mm) in each jointing element.

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c. Additional details of anchors, if any, are shown on drawings.

d. Alternate compatible anchoring system may be used subject to the approval of the ENGINEER.

e. All reinforcing steel shall conform to ASTM A 615 grade 40 deformed bars as specified in section 3310 plain and reinforced concrete.

9 ERECTION/WORKMANSHIP

a. Blocks shall be laid true to line, level and laid in accurately spaced courses in stretcher bond with vertical joints of each course located at center of units in alternate courses below. Each course shall be properly bonded at corners and intersections of walls. Courses of block shall be kept plumb throughout, and corners reveals shall be true and in plumb.

Standard width of mortar joints for both horizontal and vertical joints shall be 1/2" (12.5 mm) maximum. Mortar joints in walls shall have full mortar coverage on vertical and horizontal faces between the blocks. Mortar joints on wall including struck joints, shall be thoroughly compacted and pressed tight against the edges of the blocks with proper tools. Block terminating against soffits of beam or slab construction shall be wedged tight with wedges and the joint shall be packed solidly with mortar between the top of the block and the bottom of slab or beam. Expansion joints shall be kept free from mortar or other debris.

Unless otherwise shown on the drawings or specified by the ENGINEER, the spaces around door frames and other material or built in items shall be solidly filled with mortar. Spaces around the door and window holdfasts shall be filled in with 3 ksi concrete. Work required to be built in with masonry including door frame anchors, wall plugs, dovetail anchors and accessories shall be built in as the erection progresses.

b. The block work shall be carried up in uniform manner and no portion shall be carried more than 3. ft (1 meter) above the adjoining one at any time. All masonry shall be kept strictly true and square and the whole properly bonded together and leveled round each floor.

c. Sleeves, chases and holes etc. shall be built in as construction proceeds. Chasing of completed walls or the formation of holes shall only be carried out with the approval of the ENGINEER.

d. Walls of blocks indicated as being non-load bearing shall not be constructed on the in-situ concrete floor slab unit until the floor shuttering is struck and the concrete

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has obtained sufficient strength to support their weight. Toothing into load bearing walls shall not be permitted.

10 CURING

Masonry wall shall be cured by keeping it moist with water for at least 10 days after its construction. ENGINEER may direct additional curing if required.

11 SCAFFOLDING

CONTRACTOR shall provide safe scaffolding of adequate strength for use of workmen at all levels and heights at his own expense. Scaffolding which is unsafe in the opinion of the ENGINEER shall not be used until it has been strengthened and made safe for use of workmen. Cost of scaffolding etc., shall be included by the CONTRACTOR in the unit rate for masonry items.

Damage to masonry from scaffolding or from any other object shall be repaired by the CONTRACTOR at his own cost.

12. TOLERANCES

All block work shall be erected plumb and true to line and level with the maximum variation in any story height or any length of wall being 1/8" (3 mm) in 10 feet (3 meter). The maximum tolerance in the length, height or width of any single masonry unit shall be +/- 1/8" (3 mm).

13. MEASUREMENT & PAYMENT

A Unless otherwise specifically stated in the Bill of Quantities or herein, all items shall be deemed to be inclusive of, but not limited to the following:

i. Labour and all costs in connection therewith.

ii. Materials, goods and all costs in connection therewith e.g. conveyance; delivery; unloading; storing; returning packing; handling; hoisting; lowering; making curing etc.

iii. All fixtures and all costs in connection therewith for precast works.

iv. Fitting and fixing materials and goods in position.

v. Use of plant and scaffolding.

vi. Cutting and patching work required for installation of built-in-work.

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vii. Wastage of materials.

viii. Square cutting.

ix. Establishment charges, overhead charges and profit.

x. All other expenses, charges and taxes specified in Conditions of Contract.

b. Works shall be measured net as fixed in position as per Drawings and instructions of the ENGINEER. Each measurement shall be taken to the nearest 1/2" (12.5 mm). This rule shall not apply to any dimensions stated in descriptions.

c. Masonry work will be paid for according to the actual net area of masonry work in square feet (Sq. m.) for the required thickness or the actual net volume of masonry work in cubic feet (C.M.) as described in the Bill of Quantities. All the openings left in the masonry walls will be deducted.

d. Providing and fixing all joint reinforcing bars, reinforcing bar anchors and dovetail anchors shall be deemed to be included in the unit rate for masonry work.

e. Due to different thickness of the slab in different areas or rooms or for any other reason whatsoever, if the chiseling of the masonry is required the CONTRACTOR shall do so at his own cost. Where for any reason whatsoever, the height of the wall is short of ceiling height, the remaining height shall be made good with (f'c = 3000 psi) concrete. This concrete shall neither be measured nor be paid under item of concrete but will be paid for under the item of masonry of the walls. In case where lintel heights are such that the CONTRACTOR has to chisel the masonry or provide cast-in-place concrete to make up the height of the course, no payment will be made for chiseling, but where such cast-in-place concrete is provided, payment for the same will be made at the unit rate for masonry.

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SPECIFICATIONS
General Waterproofing

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SPECIFICATIONS

GENERAL WATERPROOFING

SCOPE

The work covered by this section of the Specifications consists of furnishing all labor, tools scaffolding, equipment and water proofing/ materials of the required kind; and in performing all operations in connection with procurement, transportation and delivery and application/installation etc. of all work classified as water proofing work or included herein, , including all items supplied by other trades and customarily built-in and/or installed under water proofing work or required to complete this work, in strict accordance with the requirements of the Drawings and as specified herein, and subject to the Terms and Conditions of the CONTRACT Documents

PART - A, BITUMINOUS MATERIALS

A.1 CODES AND STANDARDS

The Standards and codes applicable to only a portion of the work specified in this section are referenced in the relevant parts or clauses. Standards and codes which are generally applicable to the work of this section are listed hereinafter:

American Society for Testing and Materials. (ASTM) Standards

D 41	Primer for Use with Asphalt in Damp proofing and Waterproofing.
D 173	Woven Cotton Fabrics Saturated with Bituminous Substances for Use in Waterproofing.
D 226	Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing built-up Roofs.
D 227	Coal-Tar Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-up Roofs.
D 449	Asphalt for Damp proofing and Waterproofing.
D 450	Coal-Tar Pitch for Roofing, Damp proofing and Waterproofing.
D 1665	Woven Glass Fabrics Treated with Bituminous Substances for Use in Waterproofing.

NOT REQUIRED

A.2 SUBMITTALS

The following submittals are required :

-Samples
-Certificates of Compliance

A.3 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

i) Storage

All materials shall be stored in an approved manner and shall be protected from contact with soil and exposure elements.

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ii). Roll Materials

All materials delivered in roll type packaging shall be stacked on end at all times.

iii)Temperature control

Bituminous saturated felts or fabrics shall be protected from freezing temperature or ambient temperatures above 38° C (100° F).

A.4 PRODUCTS

a- Asphalt Primer conforming to ASTM D 41.

b- Coal Tar Saturated Felt conforming to ASTM D 227.

c-. Asphalt Saturated 15-pound type Felt conforming to ASTM D 226,.

d-. Asphalt Saturated Fabric compatible with membrane system. Conforming to ASTM D 173,

e- Glass Fabric, Coal tar or asphalt saturated, compatible with membrane conforming to ASTM D 1668

f- Bitumen

i) Coal Tar Pitch: ASTM D 450, Type B.

ii) Asphalt: ASTM D 449, type best suited to condition of use or as specified.

g-. Protection Board

Seal tight Protection Course (W. R. Meadows, Inc.), Elastiboard (The Celotex Corp.), or approved equal, 3 mm. (1/8 in.) thick.

A.5 EXECUTION

5.1 VERIFICATION IN FIELD

Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

A 5.2. PREPARATION

a. Cleaning and Patching

Cleaning substrate of debris and deleterious material which would impair the work. Patch cracks, voids, and honeycombs to provide a smooth, structurally sound surface. Out off high spots and grind smooth.

NOT REQUIRED
NOT REQUIRED
Public Procurement Regulatory Authority (PPRA)
EPADS

b. Prerequisite Work

Do not proceed with membrane waterproofing until all drains, piping, conduit, vents, ducts, and other projections through the substrate have been installed.

A 5.3. INSTALLATION

a- Prime Coat

Prime surfaces in accordance with manufacturer's instructions, except as hereinafter specified. Use either coal-tar or asphalt systems, but only one type shall be used throughout except for first ply which shall be asphalt-saturated felt set in a full mopping of asphalt bitumen.

b- Bitumen Application

Apply not less than the following amount of bitumen per ply to complete waterproofing; number of piles is shown on drawings.

	ASPHALT	COAL TAR
Each ply	1.5 kg/m^2 (0.3 LB/ft^2)	1.2 kg/m^2 (0.25 LB/ft^2)
Final Coating	3.0/m^2 (0.6 LB/ft^2)	3.4 kg/m^2 (0.7 LB/ft^2)

c- Laying Membrane

Install each ply as a separate course over the entire surface to be waterproofed, except that on vertical surfaces when 5-ply membrane is shown, install in accordance with manufacturer's instructions. Lay the second and succeeding piles so that each course breaks joints with the underlying courses. Mop the surface of each underlying ply with hot bitumen so that the surface is completely covered and immediately bed the next ply into the hot bitumen. Bond each ply smoothly and firmly to the preceding ply. Correct any wrinkles or buckles as required to provide a smooth, tight surface without pockets of air.

d-. Penetrations

Flash piping, conduit, and other projections through the membrane with an additional 2 piles of saturated fabric. Embed each ply in bitumen. Extend the first ply not less than 100 mm (4 in.) onto each surface and feather the second ply out 25 mm (1 in.) beyond the first ply. Apply a final coat of bitumen over the top.

e- Membrane Reinforcement

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Reinforced membrane waterproofing at internal and external corners and at other points where the membrane may be subjected to unusual strain. Reinforced with 2 piles of saturated fabric as specified for flashing. Unless otherwise shown, extend waterproofing 200 mm (8 in.) on vertical surfaces where membrane is turned up or down.

f- Protection Board

Embed protection board in the final mopping of bitumen while it is still hot. Form a continuous overall protective layer for the membrane waterproofing. Butt edges tightly, stagger end joints and cut to fit at all intersecting surfaces.

A 6. PERFORMANCE REQUIREMENTS

Before completed membranes on horizontal surfaces are covered, test for leaks with a 50 mm (2 in.) depth of water maintained for 24 hours. Examine sub-structure for leaks. Repair leaks, if any, and repeat test until no leakage is observed.

PART - B, ELASTOMERIC MEMBRANE

B 1. GENERAL

This section covers elastomeric membrane where indicated in the Drawings and specified here.

B 2. CODES AND STANDARDS

The standards and codes applicable to only a portion of the work specified in this section are referenced in the relevant parts or clauses. Standards and codes which are generally applicable to the work of this section are listed hereinafter :

ASTM Standards.

D 75	Sampling Aggregates
D 395	Compression Set of Vulcanized Rubber
D 412	Tension Testing of Vulcanized Rubber
D 471	Change in Properties of Elastomeric to Vulcanizates Resulting from Immersion in Liquids
D 573	Accelerated Aging of Vulcanized Rubber by the Oven Method
D 624	Tear Resistance of Vulcanized Rubber
D 746	Brittleness Temperatures of Plastics and Elastomers by Impact
D 1148	Discoloration of Vulcanized Rubber : Organic Finish coated or Light Colored.

D 1149 Accelerated Ozone Cracking of Vulcanized Rubber

D 2240 Indentation Hardness of Rubber and Plastics by Means of a Durometer

B 3. SUBMITTALS

The following submittals are required:

-Details Drawings and / or Shop Drawings

-Assembly, Erection and Installation Drawings and Manuals

-Material, Equipment and Fixture Lists

-Manufacturer's Data

-Certificates of compliance

-Test Reports

B 4. TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

a- Fire Protection

Take all necessary precautions against fire and other hazards during delivery, storage and installation of flammable adhesives, solvents, and other materials specified herein.

B 5. PRODUCTS

B 5.1. MATERIALS

a- Elastomeric Membrane (Sheet)

Fabricated from a vulcanized elastomeric compound containing neoprene as the sole elastomer or approved equal, minimum thickness 2 mm (1/16 in.) unless otherwise indicated; smooth, free of pinholes and surfaces blemishes, with no evidence of ply delaminating, and meeting the following requirements when tested by the referenced ASTM Standards.

Physical Property	**Performance Requirements**	**Test Methods**
Hardness, Durometer A	60 + 10	ASTM D 2240
Tensile strength	10.3 MPa (1500 psi) minimum	ASTM D 75
Elongation at break	230 percent minimum	ASTM D 412
Brittleness temperature	-34° C (-30° F)	ASTM D 746
Tear resistance	2100 kg/m (120 lb./in.) minimum	ASTM D 624 (Die C)

Flame resistance	Must not propagate flame	
Resistance to heat aging: Change in original properties after 70 hr. at 100° C (212° F) Hardness Elongation Tensile Strength	 + 10 points maximum - 40 percent maximum - 15 percent maximum	 ASTM D 573
Resistance to oil aging. Change in volume after 70 hr. Immersion in ASTM Oil No. 3 at 100° C (212° F)	+ 80 percent maximum	ASTM D 471
Resistance to ozone : Condition after exposure to 100 ppm ozone in air for 500 hr. at 38° C (100° F). Sample under 20% elongation.	No cracks	ASTM D 1149
Resistance to permanent set : Compression set after 22 hr. at 70°C (158° F)	40 percent maximum	ASTM D 395 (Method B)
Resistance to water : Change in weight after 7 days immersion at 70° C (158° F)	+ 10 percent maximum	ASTM D 471
Resistance to discoloration of applied organic coatings	no discoloration	ASTM D 1148

b- Primer, Adhesive, Cleaners and Reinforcing

As recommended by the elastomeric sheet manufacturer and compatible with the neoprene sheet and with the materials to which it is bonded.

c-. Protection Board

Sealtight Protection Course (W.R. Meadow, Inc.), Elastiboard (The Celotex Corp.), or approved equal ; 3 mm (1/8 in.) thick.

d-. Parging

One part Portland Cement to three parts sand by volume.

B.6 EXECUTION

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B. 6.1 VERIFICATION IN FIELD

Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B.6.2 SURFACE PREPARATION

Substrates shall be firm, fully cured, clean and dry, smooth, and free from dust and foreign matter, deleterious and excess materials and projections. Joints shall be neatly struck. Holes, joints, honeycomb, cracks, or cavities shall be pointed or filled and finished flush with Portland cement mortar. Cut of high spots, or grind smooth.

B 6.3. INSTALLATION

a- Laying Membrane

Apply in accordance with the approved manufacturer's recommendations using continuous sheets as large as practicable. Avoid wrinkles and buckles. Complete the work to assure that no water leakage into the system occurs.

b- Joints and Splices

Follow the recommended technique of the membrane manufacturer for cleaning seam, lap and splice areas, and for the method and sequence of forming field joints and splices in the membrane, where such joints are required.

c- Flashing

Flash all pipes, conduits, sleeves, and other projections passing through elastomeric membrane waterproofing and provide tight construction throughout. Use prefabricated boots or field-fabricated boots of uncured neoprene sheet, fitted coverings, and other accessories as required. Where pipes or conduits pass through floor areas to be waterproofed or where floor drains occur in such areas, apply membrane waterproofing only after flashings around pipes, conduits, and drains are in place. Lap such flashings into the membrane and reinforcing stripes provided as required. Where pipes or conduits which are not flashed pass through floor areas to be waterproofed, clamp the membrane waterproofing to the pipe sleeves with iron clamps and bolts, and solidly caulk with approved cold-setting fibrated asphalt mastic. Install flashing as shown or required, properly lapped and adhered in place.

d-. Water Cut-off

Provide water cut-off in accordance with the approved membrane manufacturer's recommendations.

e- Membrane Coverage

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Elastomeric membrane waterproofing shall cover the entire area of each space designated to be waterproofed, with the waterproofing extending not less than 200 m (8 in.) up or down on vertical surfaces, unless otherwise indicated.

f- Joint Sealing

As soon as the adhesive is fully set and dry, re-check all joints. Where any openings or fish-mouths appear, reseal and re-roll joints.

g-. Membrane Protection

Protect membrane over horizontal surfaces from traffic during and after install at on. Only use rubber-tired vehicles. Provide walkway protection where heavy traffic from other trades is expected. Do not store material on the membrane.

B.7 FLASHING AND REGLETS

a-. Elastomeric Flashings

Provide elastomeric flashings where shown; applied in accordance with the approved manufacturer's recommendations and, generally, as herein specified for installation of elastomeric waterproofing.

b-. Metal Reglets

Continuous metal Reglets, installed as specified in other sections of the specifications, shall receive the exposed edges of membrane waterproofing and elastomeric flashing. Secure membrane into reglet by lead wedges and fill with material as recommenced by manufacturer of waterproofing materials.

c-. Counter-flashing

Reglets and metal counter-flashings are specified in section 4540 "Roof Flashing".

B.8. PERFORMANCE REQUIREMENTS - IN-PLACE TESTING

Before completed membranes on horizontal surfaces are covered, test for leaks with a 50 mm (2 in.) depth of water maintained for 24 hours. Examine sub-structure for leaks. Repair leaks, if any, and repeat test until no leakage is observed.

B.9. PROTECTION

a-. Vertical Membrane Protection

Protect vertical membrane waterproofing with protection board with all edges butting against adjacent edges.

b-. Horizontal Membrane Protection

Protect horizontal membrane waterproofing with protection board unless parging is shown. Parge not less than 19 mm (3/4 in.) thick, uniformly placed and allowed to set before subsequent construction is installed.

PART - C, LIQUID WATER PROOFING

C.1 GENERAL

This section covers furnishing and installing liquid waterproofing where shown in the Drawings and specified hereinafter.

C.2. APPLICABLE CODES AND STANDARDS

The codes and standards applicable to only a portion of the work specified in this section are referenced in the relevant paragraphs. Codes and standards which generally applicable to the work of this section are listed hereinafter :

ASTM Standards

C 836 High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane f - Use with Separate Wearing Course.

C.3. SUBMITTALS

The following submittals are required :

a-. Details Drawings and/or Shop Drawings

Show edge treatment and changes in plane.

b-. Manufacturer's Data

c- Installation Manuals

C.4. QUALITY ASSURANCE

The manufacturer shall be a firm with not less than five years of successful experience in supplying the principal materials for the required work..

a-. Compatibility

Where waterproofing is to be installed beneath epoxy mortar, if waterproofing has not previously been successfully applied beneath epoxy mortar, run tests necessary to ensure compatibility and to ensure that waterproofing and tile work will not be detrimentally affected.

C.5 PRODUCTS

C.5.1. MATERIALS

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A. Urethane Based Waterproofing, One-Component (for roof access walkway Type UB 1)

Cold applied, monolithic, elastomeric liquid material, self-bonding to all normal substrates, white in color unless otherwise shown, compounded specifically for the application method to be used (by hand or spray) for the slope of substrate, not less than 90 percent solids by weight in the uncured blend, recommended by the manufacturer to comply with the following requirements for the cured membrane

PHYSICAL PROPRTTIES	PERFORMANCE REQUIREMENTS	TEST STANDARDS/METHOD
Tensile strength (minimum)	750 psi (5.17 Mpa)	ASTM D 412
Elongation (Min. ultimate)	300%	ASTM D 412
Hardness (Shore 00)	50 Min.	ASTM D 2240
Water Absorption	2%	ASTM D 471
Tear Resistance (Min)	180 psi (1.24 Mpa)	ASTM D 412
Service Temp	-46 C to + 82 C (-50 F to + 180 F)	-----
Fire rating	Suitable for Class a Bldg	----
Adhesion (Min.)	15 psi (103.4 kPa)	FS TT - S- 00227

C.5.2. Urethane Based Waterproofing, Two - Part (beneath ceramic tile/terrazzo/granite except as otherwise indicated) Type UB 2

Polyurethane rubber based liquid materials, self-bonding to all normal substrates, compounded to be compatible with bituminous products, packaged in two components to be mixed at the time of use, compounded specifically for the application method to be used (by hand or spray) and for the slope of substrate, not less than 97 percent solids in the uncured blend, tested by manufacturer to comply with the following requirements for the cured membrane :

Physical Properties	Performnace Requirements	Test Standards/ Methods
Tensile Strength (Min)	40 psi 276 k Pa	ASTM D 412
Elongation (Min ultimate)	400%	ASTM D 412
Hardness (Shore 00)	3 to 5	ASTM D 2240
Water Absorption (Max.)	0.5 % for 21 days at 24 C (75 F)	ASTM D 471
Low Temp Brittleness	-51 C (- 60 F)	ASTM D 746
Heat Aging	No measureable effect from 168 Hours at 70 C (158 F)	ASTM D 573

C.6 MISCELLANEOUS MATERIALS

a) Primer/Filler/Sealer : As recommended by the waterproofing manufacturer and as shown.

b) Flashing, Cant Strips, and Accessories : As recommended by the waterproofing manufacturer as shown.

c) Aggregate : Aggregate shall have a minimum hardness of 6.5 on the Mohs scale. Aggregate shall be sized as recommended by the waterproofing manufacturer so that 75 percent of each granule becomes embedded in the topcoat.

C.7 EXECUTION

C.7.1. JOB CONDITIONS

a-. General

Proceed with the installation of waterproofing only after the substrate construction has been completed, concrete has cured for 28 days minimum and penetrating components have been installed, so that the membrane will not be etched or damaged by subsequent work.

b-. Inspection

Examine the substrates, adjoining construction, and the conditions under which the work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

C.7.2. PREPARATION OF SUBSTRATE

a-. Cleaning

Clean the substrate of dust, debris, oily materials, and other substances detrimental to the work and as recommended by the waterproofing manufacturer.

b-. Accessories

Install cant stripe and accessories as shown and as recommended by the waterproofing manufacturer (even though not shown) in the manner recommended by the manufacturer.

c-. Flashing

Install sheet-type flashing and joint covers where shown and as recommended by the waterproofing manufacturer (even though not shown) in the manner recommended by the manufacturer. If fabric reinforcement is used, embed it in the waterproofing except as otherwise shown, extend flashing onto perpendicular surfaces and other work penetrating the substrate to a point 100 mm (4 in.) from (above) the finished surface to be applied over the membrane. At door openings, extend membrane to top of concrete recess for ceramic tile. At stud partitions, extend sheet flashing up 100 mm (4 in.) behind lathing.

d- Expansion

At locations of possible movement in the substrate construction (including cracks which have developed, width with either a bond-breaker elastic tape (sealed at only the edges) or a heavy coating of inert construction joints, and expansion joints) prepare the substrate to increase the waterproofing capability for bridging the movement without failure. Cover the joint to a 50 mm (

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2 in.) minimum was-type compound. Use only products which have been determined to the compatible with the waterproofing membrane.

e-.. Sealing

Fill voids and nonmoving cracks and joints in the substrate with sealant or other compound as recommended by the waterproofing manufacturer for compatibility. Fill rough areas of substrate (rough within limitations specified by manufacturer) with a feathered-out coating of waterproofing, squeegee-applied to form a smooth top surface.

f-. Priming

Prime substrate as recommended, and only if recommended, by the waterproofing manufacturer.

g-. Masking

Mask off adjoining surfaces not to receive waterproofing to effectively prevent the spillage or migration of liquid materials outside the membrane area.

C.7.2. INSTALLATION

a-. General

Comply with manufacturer's instructions except where more stringent requirements are shown or specified and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

b-. Mixing

Mix separately packaged components in accordance with manufacturer's instructions.

c-. Application

Apply a uniform coating of waterproofing to the substrate and adjoining surfaces indicated.

a) Apply coating either by hand or by machine spray. Comply with manufacturer's recommendations regarding indicated surfaces.

b) Provide a 1.5 mm (60 mil) average thickness, consisting of base and topcoats where manufacturer recommends, with no variations below a 1.27 mm (50 mil) thickness.

c) At roof access walkway, uniformly apply an excess amount of aggregate into the topcoat. When the topcoat attains a tack-free condition, remove excess aggregate. Apply a compatible glaze coat of 0.25 mm (10 mil) average thickness.

D. Curing

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Permit waterproofing to cure without delay and under conditions which will not contaminate or deteriorate the waterproofing material.

C.8 TESTING

Immediately following membrane installation and nominal cure, test horizontal surfaces for leaks in the presence of the Construction Manager by flooding the membrane to a depth of 50 mm (2 in.) for a period of 24 hours. Examine structure for evidence of leakage. Repair leaks, if any, and repeat test until no leakage is observed.

Protection the work. Repair or replace damaged work as required by the Engineer

PART - D, CONCRETE WATER PROOFING

D-1, Through Surface Coating

This section covers furnishing and installing concrete waterproofing through surface coating at all inside cast-in- place concrete surfaces of water reservoirs, basement slab, raft foundations and retaining walls and as specified on the Drawings. In principle, the coating should have the capability to form insoluble crystals into water bearing capillaries and interstices to effectively block passage of water and to ensure permanent water tightness for the life of the structure.

D-1.1 SUBMITTALS

The following submittals are required :

a-. Detail Drawings and/or Shop Drawings

For the proposed system to be used and details of construction joint, expansion joint and edge treatment.

b-. Installation Manuals

Include application procedure, storage procedure and curing time.

c-. Samples

Concrete water proofing material, in sealed containers/ bags.

d-. Manufacturer's recommendations for applications.

f-. Test Reports

Include certified test report on material properties and field test reports.

D-1.2 PRODUCT HANDLING

a-. Delivery

Deliver manufactured materials to the site in original, unopened containers clearly indicating manufacturer's name, brand name, and other identifying information.

b-. Storage

Store material in a dry location, off the ground and in such manner as to prevent damage or intrusion of foreign matter. Replace materials which have become damaged or otherwise unfit for use during delivery or storage.

D-1.3 PRODUCTS

D-1.3.1 MATERIALS

a-. Concrete Waterproofing Material

Material shall be composed of a compound of chemicals, quartz sand and cement. It shall be supplied in powder form ready to be mixed with water and shall be applied as a slurry coat that waterproofs by crystalline growth through the capillary voids in the concrete substrate. Acceptable products shall be one of the following or approved equivalent:

"Masterseal" by FEB of UK

"Xypex" of Canada,

Equivalent product of Vandex of USA, Fosroc of UK, Grace of Hong Kong and Prokrete of USA or approved equal.

b-. Water

Treated (utility water quality), clean and free of deleterious materials which are determined to impair the strength or bond of the waterproofing materials.

D-1.4 EXECUTION

D-1..4.1 CONDITION OF SURFACES

Examine all concrete surfaces to which the waterproofing material will be applied. Waterproofing material shall be applied only to sound concrete. Concrete surfaces shall be clean and free from all form scale, laitance, formwork oil, curing agents and other foreign materials as per the recommendations of the approved manufacturer.

D-1-4.2 PREPARATION

Prepare the concrete surface for waterproofing treatment in accordance with manufacturer's instructions. Prior to the specified final application of waterproofing material, initial applications

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to construction joints and repairs to form-tie holes, honeycombed pockets, faulty construction joints, and cracks shall be completed in accordance with manufacturer's instructions.

D-1.4..3. MIXING, APPLICATION AND CURING

a-. Slurry Coat

Apply first slurry coat of the product as per manufacturers recommendations over any primer if required. Apply second coat if recommended by the manufacturer after a specified time.

b-. Mixing, Application and Curing

Mixing, application and curing of waterproofing material shall be completed by a qualified applicator in accordance with manufacturer's instructions.

D-1.5. CLEANING

Upon completion of work, remove unused materials, containers and equipment from the site. Clean and repair surfaces that are stained, marred, or otherwise damaged by work under this section.

D-1.5.1. CERTIFICATION

Certification of the material and its performance in accordance with the literature submitted earlier for approval, shall be furnished by the supplier from the manufacturer to the satisfaction of the Engineer.

Part - D 2 Waterproofing of Concrete Through Admixture

This section covers furnishing and adding chloride free inorganic copolymer liquid waterproofing admixture that chemically reacts with portland cement to improve the physical and chemical properties of concrete in all stages of development and also protects reinforcing steel from corroding. This admixture shall be added in all reinforced cast-in- place concrete for water reservoirs, basement slab, raft foundations and retaining walls and all under ground works where subsoil water is in contact with the structure and as specified on the Drawings.

D 2.1 APPLICABLE STANDARDS

ASTM STANDARD

C 494, Chemical Admixtures for Concrete, Type A

Other internationally recognised standards are also acceptable.

D 2.2 PRODUCTS

Product shall be chloride free inorgaic copolymer liquid water proofing admixture ready to be mixed with other ingrdients of concrete during batching and or mixing. Acceptable products shall be "Ipanex" manufactured by M/s IPA Systems Incorporated, 2745 North Amber St., Philadelphia, PA 19134, USA and "Rheomac 707" manufactured by m/s FEB represented in Pakistan or any

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other equivalent product of M/s Fosroc, Grace , Vandex and Prokrete etc approved by the Engineer.

D 2.3 SUBMITTALS

The Contractor shall submit all the technical literature and job site dispensing procedure to the Engineer for approval prior to commencement of work.

D 2.4 STORAGE

The product shall be stored at site as per the manufacturer's recommendations.

D 2.5 MIXING

The admixture shall be added at the rate of 16 Oz/ 112 Lb (50 Kg) bag of cement or as recommended by the manufacturer. After adding the admixture the , the drum shall be rotated at a maximum speed for five minutes or as recommended by the manufacturer.

Standard procedure for the curing as specified in the "Plain and Reinforced Concrete" shall be adopted.

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S P E C I F I C A T I O N S

PLAIN AND REINFORCED CONCRETE

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SPECIFICATIONS

PLAIN AND REINFORCED CONCRETE

1. SCOPE

The work covered by this section of Specifications consists of furnishing all plant, labor, equipment, appliances and materials, and in performing all operation in connection with the supply and installation of plain and reinforced concrete work, complete in strict accordance with this section of the Specifications and the applicable drawings, subject to the conditions of the CONTRACT.

2. GENERAL

a. Full co-operation shall be given to other trades to install embedded items.

b. Suitable templates or instructions, or both will be provided for setting items not placed in the forms. Embedded items shall have been inspected, and tests for concrete and other material or for mechanical operations shall have been completed and approved, before concrete is placed.

c. For special concrete finishes and for special methods of construction (e.g. slip forms), formwork shop drawings shall be designed and prepared by the CONTRACTOR at his own cost. Approval of shop drawings as well as that of actual samples of finished concrete shall be obtained before WORK is commenced.

d. CONTRACTOR shall also prepare BAR BENDING SCHEDULE, and get the same approved by the ENGINEER, prior to commencement of work.

e Approximate equivalent conversion of F.P.S. and S.I. units are indicated in the text. Engineer's decision on any specific conversion shall be final and binding on all parties.

3. RELATED SPECIFICATIONS

Latest editions of the following British, ASTM and ACI Standards are relevant to these Specifications where indicated:- (Equivalent Pakistan Standards are also applicable.)

a. British Standards:

B.S. 12-78 Portland Cement, Ordinary and Rapid Hardening (in lieu of C-150).

B.S. 410 Test Sieves.

B.S. 693 General Requirements for Oxyacetylene Welding of Mild Steel

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B.S. 882-1201	Concrete aggregates from Natural Sources.
B.S. 1141	Cold Worked Steel Bars for the reinforcement of Concert. General Requirements for the Metal-Arc Welding of Mild Steel.
B.S. 1881	Methods of Testing Concrete.
B.S. 3148	Tests for Water for Making Concrete.
B.S. 4027	Sulfate-Resisting Portland Cement.
B.S. 4449	Carbon Steel Bars for the Reinforcement of Concrete.
B.S. 4461	Cold Worked Steel Bars for the Reinforcement of Concrete.

b. Latest ASTM Standards:

A 615-94	Deformed Billet-Steel Bars for Concrete Reinforcement.
C 33-93	Standard Specification for Concrete Aggregates.
C 39-93a	Compressive Strength of Cylindrical concrete Specimens.
C 42-90	Standard Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
C 94-94	Standard Specification for Ready Mixed Concrete.
C 138-92	Standard test method for unit weight, Yield, and Air Content (Gravimetric) of Concrete.
C143-90a	Standard Method of Test for Slump of Hydraulic Cement.
C 150-94	Standard Specification for Portland Cement.
C 171-92	Standard Specification for Sheet Materials for Curing Concrete.
C 172-90	Standard Method of Sampling fresh Concrete.
C 173-94	Standard Method of Test for Air Content of freshly Mixed Concrete by the Volumetric Method.
C 208	Standard Specification for Insulating Board (Cellulosic Fiber) Structural and Decorative.

C 231-91b Standard Method Test for Air Content of Freshly Mixed Concrete by the Pressure Method.

C 260-94 Standard Specifications for Air Entraining Admixtures for Concrete

C309-93 Standard Specification for Liquid Membrane-Forming Compounds for curing Concrete.

C 494-92 Standard Specification for Chemical Admixtures for Concrete.

E 329-90 Specification for minimum requirements for agencies engaged in the testing and or inspection of materials used in construction

c ACI Standards:

ACI 318 Building Code Requirements for Reinforced Concrete

d. In addition, the latest editions of other Pakistan and British Standards, American Concrete Institute Standards, American Society for Testing and Materials Standards and other Standards as may be specified by the ENGINEER for special Materials and Construction are also relevant.

4. MATERIALS

*4.1 Aggregates **(Except for light-weight concrete):***

a. The sources of supply of all fine and coarse aggregates shall be subject to the approval of ENGINEER.

b. All fine and coarse aggregates shall be clean and free from clay, loam, silt, and other deleterious matter. If required, ENGINEER reserves the right to have them washed by the CONTRACTOR at no additional expenses. Coarse and fine aggregates shall be delivered and stored separately at SITE. Aggregates shall not be stored on muddy ground or where they are likely to become dirty or contaminated.

c. Fine aggregate shall be hard coarse sand, crushed stone or gravel screenings and shall conform to requirements of ASTM C-33.

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d. Coarse aggregate shall be gravel or broken stone or hard, durable material free from laminated structure and conforming to ASTM C-33 graded as follows for use in mass concrete such as in foundations:

TOTAL PASSING		PERCENT BY WEIGHT
2" B.S	Sieve (50.00 mm)	100
1-1/2"	Sieve (38.10 mm)	95 - 100
3/4"	Sieve (19.00 mm)	35 - 70
3/8"	Sieve (9.50 mm)	10 - 30
No. 4	Sieve (4.75 mm)	0 - 5

Coarse aggregate for all cast-in-place concrete other than mass concrete and thick fair faced cast-in-place concrete shall be graded with the following limits:-

TOTAL PASSING		PERCENT BY WEIGHT
1"	Sieve (25.00 mm)	100
3/4"	Sieve (19.00 mm)	90-100
3/8"	Sieve (9.50 mm)	20- 55
No. 4	Sieve (4.75 mm)	0- 10

Coarse aggregate for thin fair faced cast-in-place concrete shall be graded as follows:-

TOTAL PASSING		PERCENT BY WEIGHT
1/2"	Sieve (12.50 mm)	100
3/8"	Sieve (9.50 mm)	85-100
No. 4	Sieve (4.75 mm)	10- 30

e. The nominal maximum size of aggregate for precast fair faced concrete shall be smallest of the following:

i One-fifth of the narrowest dimensions between sides of forms.

ii One-third of the depth of slabs.

iii. Three-fourth of the minimum clear distance between reinforcing bars or between bars and form.

iv. 1/2" (12.0 mm).

f. The nominal maximum size of the aggregate for normal weight precast concrete shall be smallest of the following:-

i. One-fifth of narrowest dimension between forms.
ii One-third of depth of slab.
iii Three-fourth of clear distance between bars.
iv. 1"

g. The aggregate shall be stockpiled for a period before use so as to drain nearly to constant moisture content (as long as SITE and other conditions permit, preferably for at least a day). The grading of the coarse and fine aggregate shall be tested at least once for every 50 tons (or 750 C. ft) supplied to ensure that the grading is uniform and the same as that of the samples used in the preliminary tests.

4.2 Cement:

a. Cement shall conform to ASTM C - 150.

b. Only one brand of each type of cement shall be used for concrete in any individual member of the structure.

c. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed. There shall be sufficient cement at SITE to ensure that each section of WORK is

completed without interruption. If the cement is supplied by THE OWNER, the CONTRACTOR shall inform ENGINEER of his requirement much before its use in construction.

d. Cement reclaimed from cleaning of bags or from leaky containers shall not be used.

e. CONTRACTOR shall provide and erect, at his own cost, in a suitable place, dry, well ventilated, and water proof shed of sufficient capacity to store the cement.

f. The cement shall be used as soon as possible after delivery, and cement which ENGINEER considers has become stale or unsuitable through absorption of moisture from the atmosphere or otherwise shall be rejected and removed immediately from the SITE at CONTRACTOR's expense. Any cement in containers, damaged so as to allow the contents to spill or access of the atmosphere to the cement prior to opening at the time of concrete

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mixing shall be rejected and removed immediately from the SITE at CONTRACTOR's expense.

g. The mixing together of different types of cement shall not be permitted.

4.3 Water:

Clean and clear water which does not have sweet, saline or brackish taste to be used for mixing and curing of concrete. Where doubt exists, the strength of mortar sample made with questionable water is compared with mortar sample produced with acceptable water (like distilled water). The questionable water may be accepted if the sample yield concrete strength of at least 90% of the other sample made with acceptable water.

Water contaminants under no circumstance shall be greater than following limits:-

Oil	--------	0.00 ppm.
Chlorides	--------	1000 ppm.
Sulfates	--------	1000 ppm.
Turbidity	--------	2000 ppm.
Acids	--------	10,000 ppm.

Potassium and NaOH 0.5 to 1.0% by weight of cement.

Sea water shall not be used for any reinforced concrete works or where concrete is later required to be plastered, painted or otherwise decorated.

4.4 Reinforcement:

a. Reinforcement for concrete shall conform to the respective British, ASTM or other standards as specified in the Drawings and CONTRACT Documents or as may be specified by ENGINEER.

b. Unless otherwise specified, all plain reinforcing bars shall comply with the requirements of B.S. 4449 for plain mild steel bars and shall have a minimum yield stress of 36 ksi, (248 N/mm sq).

c. Unless otherwise specified, all deformed reinforcing bars shall comply with the requirements of B.S. 4461 for deformed cold worked steel bars and shall have minimum characteristic stress of 66 ksi, (460 N/mm sq). with minimum elongation of 12%.

d. Reinforcement shall be obtained only from the manufacturer approved by the ENGINEER. If and when required CONTRACTOR shall provide all necessary facilities to ENGINEER for the selection of test pieces and shall

cause these to be prepared and submitted where directed for tests at CONTRACTOR's cost.

e. If the reinforcement is to be supplied by the OWNER, the CONTRACTOR shall inform ENGINEER of his requirements much before its use in construction.

f. CONTRACTOR shall report immediately on receipt of any consignment, having any deviation in the standard weights of the reinforcing bars beyond those allowed in respective standards mentioned in clause (4.4.b) and (4.4.c) herein before.

5. CONCRETE MIX PROPORTIONS

5.1 General:

a. The proportions of ingredients shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement by the methods of placing and consolidation employed on the WORK, but without permitting the materials to segregate or excessive free water to collect on the surface. Specific approval of the ENGINEER is required to waive limitations on mixture proportions.

b. The proportions of ingredients shall be selected in accordance with Section 5.6 to produce the proper place ability, durability, strength and other required properties.

5.2 Strength:

The Specified compressive strength of the concrete cylinder, shall be 3000 psi, (21 N/mm sq) except where otherwise noted on Drawings. The equivalent cube strength shall be at least 25% higher than the specified cylinder strength. Strength requirements shall be based on the sampling and testing methods of ASTM C 39-72 (and BS 1881 for cube).

5.3 Durability:

Maximum permissible water-cement ratios for concrete in severe exposures to be as follows, unless lower water-cement ratio is required to meet specified strength limits:

Type of Structure	Structure continuously wet	Structure exposed to sea or

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	or frequently	
sulfates		
	freezing and thawing[1]	
i. Thin sections & sections with less than 1" cover over steel	0.45	0.40[2]
ii. All other Structures	0.50	0.45[2]

5.4 Slump:

Unless otherwise permitted or specified, the concrete shall be proportioned and produced to have a slump of 4" (100 mm) or less. A tolerance of upto 1" (25 mm) above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. Concrete of lower than usual slump may be used provided it is properly placed and consolidated. The slump shall be determined by the "Test for Slump for Portland Cement Concrete" (ASTM C-143).

5.5 Admixtures:

If required or permitted, admixtures used shall be in accordance with the manufacturer's instructions except as otherwise specified herein.

5.6 Methods of Obtaining Mix Design:

For concrete of normal weight, mix proportions to provide the desired characteristics shall be developed using the methods/procedure covered by the latest edition of Recommended Practice for Selecting Proportions for Normal Weight Concrete ACI 211.1.

Trial mixtures having proportions and consistencies suitable for the WORK shall be made based on ACI 211.1, using at least three different water-cement ratios which will produce a range of strengths encompassing those required for the WORK. Trial mixes shall be designed to produce the specified slump. The temperature of concrete used in trial batches shall be reported.

For each water-cement ratio, compression test of cylinder/cube shall be made, cured, and tested in accordance with "ASTM C - 39 or BS 1881". From the results of these tests a curve shall be plotted showing the relationship between the water-cement ratio and compressive strength. From this curve, the water-cement ratio to be used in the concrete shall be selected to produce the required/specified design

[1]Concrete should also be air-entrained.

strength. The cement content and mix proportions to be used shall be such that this water-cement ratio is not exceeded when slump is the maximum permitted. Control in the field shall be based upon maintenance of proper cement content and slump.

6. PLANT AND WORKMANSHIP

6.1 Formwork:

a. Forms shall be used, wherever necessary, to confine the concrete and shape it to the required dimensions. Forms shall have sufficient strength to with-stand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.

Structurally adequate, form work shall also conform to the requirements of the special architectural finishes of the in-situ Plain and Reinforced Concrete specified/or shown on the Drawings. Shop drawings of such form shall be subject to the approval of the ENGINEER prior to its use. ENGINEER shall refuse concreting of any part which in his opinion may not yield specified finishes.

b. Earth cuts shall not be used as forms for vertical surface or reinforced concrete work unless required or permitted.

c. Mud centering shall not be permitted without the prior approval of the ENGINEER.

d. Formwork shall be made of either timber, steel, plywood, proprietary building boards and such special material, as may be shown on the drawings or approved by the ENGINEER which gives the required finish to the surface of concrete. Wooden frame work shall be free from loose knots and shall be well seasoned. For the external concrete finishes 1/16" (1.5 mm) thick mild steel sheet forms shall be used. CONTRACTOR shall furnish shop drawings of such formwork prepared on the basis of architectural concept for the approval of the ENGINEER.

e. Formwork shall conform to the shape, lines and dimensions as shown on the plans, and be so constructed as to remain sufficiently rigid during the placing and compacting of concrete, and shall be sufficiently tight to prevent loss of cement slurry. The design and engineering of the formwork, as well as its construction, shall be the responsibility of CONTRACTOR. Where necessary to maintain the specified tolerances, the formwork shall be **cambered** to compensate for anticipated deflections in the formwork due

[2]If S. R. Cement is used, permissible water-cement ratio may be increased by 0.05.

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to the weight and pressure of the fresh concrete and due to construction loads.

CONTRACTOR shall establish and maintain in an undisturbed conditions, and until final completion and acceptance of the WORK, sufficient control points and bench marks to be used for reference purpose to check tolerances.

f. Requirements for facing materials are given in clause 8 "Finishing of formed Concrete". The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members.

g. Where natural plywood form finish, grout cleaned finish, smooth rubbed finish, scrubbed finish, or sand floated finish is required, forms shall be smooth (faced with plywood, liner sheets, or prefabricated panels) and true to line, in order that the surfaces produced with required little dressing to arrive at true surfaces. Where any as-cast finish is required, no dressing shall be permitted in the finishing operation.

h. Where as-cast surfaces, including natural plywood form finish, are specified, the panels of materials against which concrete is cast shall be arranged orderly with joints between panels planned in approved relations to opening, building corners, and other architectural features.

i. Where panels for as-cast surfaces are separated by recessed or otherwise emphasized joints, the structural design of the forms shall provide for locating form ties within the, joints so that patches of tie holes will not fall within the panel areas.

j. Forms shall not be re-used if there is any evidence of surface wear and tear or defect which would impair the quality of the surface. Forms shall be thoroughly cleaned and properly coated before re-use.

k. The formwork may be designed so that soffits of slabs and sides of beams, columns, and wall may be removed first leaving the forms to the soffits of beams and their supports in position.

l. Positive means, wedges or jacks of accurate adjustment and proper removal of shores and struts shall be provided and all settlement shall be taken up during placing of concrete. Forms shall also be securely braced against lateral deflections.

m. Where concreting of narrow members is required to be carried out within formwork of considerable depth, temporary openings in the sides of the

formwork shall be provided where necessary to facilitate the placing and consolidation of the concrete. Small temporary openings shall be provided at the bottom of the formwork to columns, walls and deep beams to permit the cleaning out of debris and observations immediately before concrete is deposited.

n. Form ties shall be constructed so that the ends or end fasteners can be removed without causing appreciable spalling at the faces of the concrete. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than twice the diameter or twice the minimum dimension of the tie from the formed faces of concrete to be permanently exposed to view except that in no case shall this distance be less than 3/4" (19 mm) when the formed face of the concrete is not to be permanently exposed to view, form tie may be cut off flush with the formed surfaces. Through bolts shall be permitted provided that they are greased to allow for easy withdrawal and the holes subsequently made good. Through bolts are not to be used on water-retaining structures.

o. At construction joints, contact surface of the form sheathing for flush surfaces exposed to view shall overlap the hardened concrete in the previous placement by not more than 1" (25 mm). The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint and to maintain a true surface.

p. Runways or planks for moving labor and equipment shall be provided with struts or legs and shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

q. All surfaces of the embedded items shall be cleaned and any accumulated mortar or grout from previous concreting and of all other foreign material is removed before concrete is placed in them.

r. Board forms having joints opened by shrinkage of the wood shall be swelled until closed by wetting before concrete is placed. Plywood and other wood surface not subject to shrinkage shall be sealed against absorption of moisture from the concrete either by (1) a field applied, approved form oil or sealer, or (2) a factory applied non- absorptive liner. When forms are coated to prevent bond with concrete, it shall be done prior to placing of the reinforcing steel. Care shall be taken that such approved coating is kept out of contact with the reinforcement. Where as-cast finishes are required, materials, which will impart a stain to the concrete, shall not be applied to the form surfaces. Where the finished surface is required to be painted, the

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material applied to form surface shall be compatible with the type of paint to be used.

s. In normal circumstances generally where temperatures are above 68°F (20°C) where ordinary cement is used, forms may be struck after expiry of the following periods.

-	Walls, columns and vertical sides of beams directed by the ENGINEER.	48 hours or as
-	Slabs (Shores or props left under, removal and refixing of props not permitted).	10 days
-	Beams soffits(Shores or props left under, removal and refixing of props not permitted).	12 days
-	Removal of shores or props to slabs:	
	1. Spanning upto 14 ft. (4 meters)	10 days
	2. Spanning over 14 ft. (4 meters)	21 days
-	Removal of shores or props of beams:	
	1. Spanning upto 20 ft. (6 meters)	18 days
	2. Spanning over 20 ft. (6 meters)	25 days

For rapid hardening cement 1/2 of the above period will be sufficient in all cases except vertical sides of slabs, beams and columns which should be retained for a minimum of 24 hours.

t. Proper allowance shall be made for the decrease in rate of hardening of concrete in cold weather and the minimum periods must be increased when the mean daily temperature is below 68°F, (20°C).

u. When repair of surface defects or finishing is required at an early age, forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.

v. Top forms on sloping surfaces of concrete shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or the treatment required on such sloping surfaces shall be performed at once and followed by the specified curing.

w. All formwork shall be removed without such shock or vibration as would damage the reinforced concrete.

x. When re-shoring or re-propping is permitted or required, the operations shall be planned in advance and shall be subject to approval. While re-shoring is underway no live load shall be permitted on the new construction. In no case during re-shoring shall concrete in beams, slab, columns or any other structural member be subject to combined dead and construction loads in excess of the load permitted by ENGINEER for the developed concrete strength at the time of re-shoring. Re-shores shall be placed simultaneously with stripping operations are but in no case later than the end of working day on which stripping occurs.

Re-shores shall be tightened to carry their required loads without over stressing the concrete. Re-shores shall remain in place at least until representative tests of the concrete being supported have reached the strength/time specified in 6.1.s.

y. Floors supporting props or shores under newly placed concrete shall have their original supporting props or shores left in place or shall be re-shored. The re-shoring system shall have a capacity sufficient to resist the anticipated loads and in all cases have a capacity equal to at least one half of capacity of the shoring system above. The re-shores shall be located directly under a shore position above unless other locations are permitted.

The re-shoring or re-propping shall extend over a sufficient number of storeys to distribute the weight of newly placed concrete, forms, and construction live loads in such a manner that the design superimposed load of the floors supporting shores or props are not exceeded.

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No loads, other than those permitted by the ENGINEER in connection with the actual work in hand, shall be allowed on suspended floors until 28 days after concreting where ordinary Portland cement is used and 14 days when rapid hardening Portland cement is used.

z. It is required to give forms for reinforced concrete an upward camber to ensure that the beams or slabs including cantilever slabs do not have a sag when they have taken up their deflection. Camber, unless indicated otherwise on drawings, should be about l/240 for supported beams and slabs and l/180 for cantilevers.

6.2 Reinforcement:

a. All metal for reinforcement shall be free from loose mill scale, loose rust, mud, oil, grease, or other harmful matter immediately before the concrete is placed.

b. Reinforcement is to be accurately placed as shown in the Drawings, and secured against displacement by using 18-20 gauge black annealed wire ties or suitable slips at intersections and supported from the formwork by using concrete, metal or plastic chairs and spacers or hangers of an approved pattern. Where concrete blocks are used for ensuring the cover they shall be made of mortar not leaner than 1 part of cement to 2 parts of sand. Where the concrete surface will be exposed to the weather in the finished structure the portions of all accessories in contact with the formwork shall be galvanized or shall be made of plastic.

c. Bars used for concrete reinforcement shall be fabricated in accordance with the dimensions shown in the Bending Schedule .

d. The cutting tolerance for all bars shall be +/-1" (+/- 25 mm).

e. Where an overall or an internal dimension of a bent bar is specified in the schedule, the bending tolerance, unless otherwise stated, shall be as in Table 1.

TABLE 1--BENDING TOLERANCES

DIMENSIONS OF BENT BARS				TOLERANCE			
Over		Upto and Including		Plus		Minus	
Inches	(mm)	Inches	(mm)	Inches	(mm)	Inches	(mm)
--	--	36	900	1/8	3	1/4	6.0

36	900	72	1800	1/4	6.0	½	12.0
72	1800	--	--	1/2	12.0	1	5.0

---

f. Bars shall be placed to the following tolerances:

i. Concrete cover to formed surface: +/- 1/4" (6.0 mm)

ii. Minimum spacing between bars: +/- 1/4" (6.0 mm)

iii. Top bars in slabs and beams:

* Members 8" (200 mm) deep or less: +/- 1/4" (6.0 mm)

* Members more than 8" (200 mm) but not over 24" (600 mm) deep: +/- 1/2" (12.0 mm)

* Members more than 24" (600 mm) deep: +/- 1" (25 mm)

iv. Crosswise of member: spaced evenly within 1" (25 mm)

v. Lengthwise of members: +/- 2" (50 mm)

g. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, resulting arrangement of bars shall be subject to approval of the ENGINEER.

h. Vertical bars in column shall be offset at least one bar diameter at lapped splices. To ensure proper placement, templates shall be furnished for all columns dowels.

i. Reinforcement shall not be bent or straightened in a manner that will injure the material. No bars shall be bent twice in the same place, nor shall they be straightened after bending.

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Unless permitted by the ENGINEER, reinforcement shall not be bent after being partially embedded in hardened concrete. Bars which depend for their strength on cold working shall not be heated for any reason (except for welding) Reinforcement larger than 1-1/2" (38.0 mm) in dia may be bent by the use of heat at (not exceeding 1550 ^{O}F). Bars bent shall not be cooled by quenching.

j. No splice of reinforcement shall be made except as shown on the working Drawings.

k. Welding shall be permitted for bars only under suitable conditions and with suitable safeguards in accordance with B.S 693. 1856, or AWS D 12.1, provided the type of reinforcement bars have the required welding properties. Tack welding may be used to fix in position bars that cross each other, only with prior approval of the ENGINEER.

l. Exposed reinforcement intended for bonding with future extensions is to be effectively protected from corrosion. Protection is also to be provided to reinforcement partly built into concrete exposed part to be built into later concrete.

m. No concreting is to be carried out until the reinforcement has been checked and approved by the ENGINEER.

6.3 Batching:

a. All cement, including cement supplied in bulk, shall be batched by weight. A bag of cement, unless marked otherwise, may be taken as 112 lbs (50 kg) or as directed by the ENGINEER

b. Aggregate shall be batched by weight, due allowance being made for water content. Aggregate may be batched by volume only with the prior permission of ENGINEER. The apparatus for weight batching may be an integral part of the mixer or a separate unit of a type approved by ENGINEER.. It shall be accurate within 2% and shall be checked for accuracy at least once a week.

c. Where the batching plant is of the type in which cement and aggregate are weighed in the same compartment, the cement shall be introduced into the compartment between two sizes of aggregate.

d. Where volumetric batching of aggregate is permitted gauge boxes shall be provided for measuring the coarse and the fine aggregate. These shall be **deep and narrow rather than shallow and wide.** Tests for the bulking of sand shall be made at intervals and the necessary quantity of sand added.

e. Each batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates. Water shall continue to flow for a period which may extend to the end of the first 25 percent of the specified mixing time.

6.4 Mixing:

a. The concrete shall be mixed in an approved batch mixer conforming to the requirement of B.S 1305. It shall be fitted with the manufacturer's plate stating the rated capacity and the recommended number of revolutions per minute and shall be operated in accordance therewith. It shall be equipped with a suitable charging mechanism and an accurate water measuring device.

b. Mixing shall continue for the period recommended by the mixer manufacturer or until apparently the mix is uniform in color, whichever period is longer. If it is desired to use a mixing period less than 1-1/2 minute ENGINEER's approval shall be obtained in writing.

c. Controls shall be provided to ensure that the batch cannot be discharged until the required mixing time has elapsed. At least three quarters of the required mixing time shall take place after the last of the mixing water has been added.

d. The interior of the mixer shall be free of accumulations that will interfere with mixing action. Mixing blades shall be replaced when they have lost 10% of their original height.

e. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be re-tempered, but shall be discarded.

6.5 Transport:

a. The concrete shall be transported from the place of mixing to the place of final deposit as rapidly as practicable by means which will prevent segregation or loss or addition to ingredients. It shall be deposite as nearly as practicable in its final position so as to avoid rehandling or flowing. All skips vehicles, or containers used for transporting the concrete shall be thoroughly cleaned.

b. During hot or cold weather, concrete shall be transported in deep containers to minimize the loss of water/heat.

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6.6 Placing:

a. Before placing of concrete, formwork shall have been completed, water shall have been removed, reinforcement shall have been secured in place, expansion joint material, anchors, and other embedded items shall have been kept in position, and the entire preparation shall have been approved.

No concrete is to be placed into the foundation trenches until the ground to receive the same has been examined and approved by ENGINEER for this purpose.

c. The actual sequence of construction proposed by CONTRACTOR shall be subject to ENGINEER's approval before construction starts on any part of the structure, and this sequence shall not be varied without ENGINEER's prior approval.

d. The concrete shall be placed after it has been mixed as soon as is practicable. Once the concrete has left the mixer no more water shall be added, although the concrete may be mixed or agitated to help maintain workability. The concrete shall not be used if, through any cause, the workability of the mix at the time of placing is too low for it to be compacted fully and to an acceptable finish by whatever means are available.

The time between mixing and placing should be reduced if the mix is richer or the initial workability of the mix is lower than normal, if a rapid hardening cement or an accelerator is used, or if the work is carried out at a high temperature or exposed to a drying atmosphere. CONTRACTOR shall ensure that the delay between mixing and placing does not exceed 30 minutes under any circumstances. Any concrete which does not satisfy this requirement shall not be used.

e. The concrete shall be deposit as nearly as possible in its final position to avoid re-handling. In no circumstances may concrete be made to flow along the forms by the use of vibrators. Concreting shall be carried out on as a continuous operation using methods which shall prevent separation or loss of ingredients.

f. The free fall of concrete shall not be allowed to exceed eight feet and where it is necessary for the concrete to be lowered more than this amount, it is not to be dropped into its final position, but it is to be placed through pipe, the lower end of which shall be kept in, or close to the freshly deposited concrete. The dia. of the pipe shall be not less than 4 times the maximum size of aggregate.

g. For mass concrete, concrete shall be placed in layers approximately 18" (450 mm) thick. Vibrator heads shall extend into the previously placed layer.

h. The workmen carrying concrete to the SITE, and all other workmen moving about before the concrete is placed shall move only along runways or planks placed over the forms.

i. Prior to the laying of concrete on load bearing masonry walls, bearing plates and at other points, as may be directed by ENGINEER, the surface will be brought to a true, hard smooth, level using a cement sand mortar in the ratio of 1 volume of cement to 3 volumes of sand. Two layers of building paper weighing 1.3 oz/sq. ft (400 g/m) will then be laid flat to separate the concrete from the surface on which it is to be laid.

6.7 Construction Joints:

a. Concreting shall be carried out continuously upto construction joints, the position and arrangement of which shall be pre-determined with the approval of the ENGINEER.

b. Joints not shown on the Drawings shall be so made and located as to least impair the strength of the structure and shall need prior approval of ENGINEER. In general, they shall be located near the middle of the spans of slabs and beams unless a secondary beam intersects a main beam at this point, in which case the joint in the main beam shall be offset to a distance equal to twice the width of the secondary beam. Joints in walls and columns shall be at the underside of floors slab or beams, and at the top of footings. Beams, brackets, columns, capitals, haunches, and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

c. All reinforcing steel shall be continued across joints. Key and inclined dowels shall be provided as directed by ENGINEER. Longitudinal keys at least 1-1/2” (40 mm.) deep shall be provided in all joints in walls and between walls and slab or footings.

d. When the work is to be resumed on a surface which has hardened, such surface shall be roughened in an approved manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface.

e. The hardened concrete of construction joints and of joints between footings and walls or columns, between walls or columns and beams or floors they support, joints in un-exposed walls and all others not mentioned below shall

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be dampened (but not saturated) immediately prior to placing of fresh concrete.

f. The hardened concrete of joints in exposed work, joints in the middle of beams, and slabs and joints in work designed to contain liquids shall be dampened (but not saturated) and then thoroughly covered with a coat of cement grout of similar proportions to the mortar in the concrete The grout shall be as thick as possible on vertical surface and at least 1/2" (12.0 mm) thick on horizontal surface. The fresh concrete shall be placed before the grout has attained its initial set.

g. Where the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brush. Care being taken to avoid dislodging of particles of aggregate. The surface shall then be coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 6" (150 mm) in thickness, and shall be well rammed against old work, particular attention being paid to corners and close spots.

h. Stop ends for movement joints or construction joints shall be made by splitting them along the lines of reinforcement or the concrete. Stop ends made of expanded metal or similar material may only be left permanently in the concrete with prior written approval of ENGINEER. Where such stop ends are used , no metal may be left permanently in the concrete closer to the surface of the concrete than the specified cover to the reinforcement. Wood strips inserted for architectural treatment shall be kerfed to permit swelling without pressure on the concrete.

6.8 Embedded Items:

a. The material, design and location of water-stops in joints shall be as indicated in the Drawings. Each piece of pre-molded water stop shall be of maximum practicable length in order that the number of end joints will be held to a minimum.

Joints at intersections and at end of pieces shall be made in the manner most appropriates to the material being used. Joints shall develop effective water tightness fully equal to that of the continuous water-stop material, and shall permanently develop not less than 50% of the mechanical strength of the parent section, and shall permanently retain their flexibility.

b. Electric conduits and other pipes which are planned to be embedded shall not, with their fittings, displace more than four percent of the area of the cross section of a column on which stress is calculated or which is required for fire protection. Sleeves, conduits, or other pipes passing through floors, walls, or beams shall be of such size or in such location so as not to impair

unduly the strength of the construction. Such sleeves, conduits in compression in the displaced concrete, provided that they are not exposed to rusting or other deterioration, are of uncoated or galvanized iron or steel not thinner than standard steel pipe, have a nominal inside diameter not over 2" (50 mm) and are spaced at centers not less than thrice their diameter. Except when plans of conduits and pipes are approved by ENGINEER embedded pipes or conduits other than those merely passing through, shall not be larger in outside diameter than one-third the thickness of the slab, walls, or beam in which they are embedded nor shall be spaced closer than three diameters on center, nor so located as to impair unduly the strength of the construction. Sleeve pipes, or conduits with-in the limitations of this section may be embedded in concrete with the approval of ENGINEER, provided they are not considered to replace the displaced concrete.

c. All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

All CONTRACTORS whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

d. Expansion joint material, water-stops and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

6.9 Consolidation:

a. All concrete shall be consolidated by vibration, so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of form, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Internal vibrators shall have a minimum frequency of 800 vibrations per minute and sufficient amplitude to consolidate the concrete effectively.

Vibrators shall be inserted and withdrawn at points approximately 18" apart (450 mm). At each insertions, the duration shall be sufficient to cause consolidation, generally from 5 to 15 sec. A spare vibrator shall be kept on the SITE during all concreting operations. Where the concrete is to have an as-cast finish, a full surface of mortar shall be brought against the form by the vibration process supplemented if necessary by spading to work the coarse aggregate back from the formed surface.

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b. If there is any tendency for the mix to segregate during consolidation, particularly if this produces excessive laitance, the mix proportions shall be modified to affect an improvement in the quality of the concrete to the satisfaction of ENGINEER and in conformity with the provisions of Clause 5.

c. Vibrators shall not be allowed to contact the formwork for exposed concrete surface.

d. Mechanical vibrators shall be of a type suited in the opinion of ENGINEER to the particular conditions.

e. Over-vibration or vibration of very wet mix is harmful and should be avoided.

6.10 Curing and Protection:

a. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relative constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval of ENGINEER.

b. For concrete surfaces not in contact with forms, one of the following procedure shall be applied immediately after completion and finishing:

- Ponding or continuous sprinkling.
- Application of absorptive mats or fabric kept continuously wet.
- Application of water proof sheet materials approved by ENGINEER.
- Application of other moisture retaining covering as approved.
- Application of curing compound conforming to ASTM C 309. The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any sheen which develops after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other materials to be bonded unless it is proved that the curing compound will not prevent bond, or unless positive measures are taken to remove it completely from area to receive bonded applications.

c. Moisture loss from surface placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping forms wet until they can be safely removed. After form removal, the concrete shall be cured until the end of the limit prescribed in Clause 6.10.d by one of the methods of Clause 6.10.b.

d. Curing in accordance with clause 6.10.a & 6.10.b shall be continued for at least 14 days in the case of all concrete except concrete with Rapid hardening Portland cement for which the period shall be at least 7 days.

Alternatively if tests are made of cylinders/cubes kept adjacent to the structure and cured by the same methods, moisture retention measures, unless stated otherwise on drawings, may be terminated when the average compressive strength has reached 70 percent of the minimum specified works strength. If one of the first four curing procedures of clause 6.10.b is used initially, it may be replaced by one of the other procedures of that Clause any time provided the concrete is not permitted to become surface dry during the transition.

e. When the mean daily outdoor temperature is less than 41 degree F (5 C) then temperature of the concrete shall be maintained between 50-68^{o}F (10^{o}C-20^{o}C) for the required curing period of Clause 6.10.d. When necessary arrangements for heating, covering, insulation or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury to concentration of heat. Combustion heaters shall not be used during the first 24 hours unless approved precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

f. When necessary, provision for windbreak, shading for spraying, sprinkling, ponding or wet covering with a light colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

g. Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 5^{o}F (3^{o}C) in any one hour or 50^{o}F (28^{o}C) in any 24 hour period.

h. During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials or methods by application of curing

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procedures, and by rain or running water, self-supporting structures shall not be loaded in such a way as to over stress the concrete.

6.11 Works in Extreme Weather:

a. Unless adequate protection is provided and approval is obtained concrete shall not be placed during rain. Rain water shall not be allowed to increase the mixing water nor to damage the surface finish.

b. When the temperature of the surrounding air is expected to be below 40 degrees F (4.4 C) during placing or within 24 hours thereafter, the temperature of the plastic concrete, as placed shall be no lower than 55 degrees F (13 - C) for sections less than 12" (300 mm) in any dimension nor 50°F (10°C) for any other sections.

When necessary, concrete materials should be heated before mixing and carefully protected after placing; in general, heating of mixing water alone to about 140°F (60°C) may be sufficient for this purpose. Dependence should not be placed on salt or other chemicals for the prevention of freezing. No frozen material or materials, containing ice shall be used. All concrete damaged by frost shall be removed. It is recommended that concrete exposed to the action of freezing weather should have entrained air and the water content of the mix should not exceed 5.5 gallons (25 liters) per bag of cement. If water or aggregate is heated above 100°F (38°C) the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be mixed with water or with mixtures of water and aggregate having a temperature greater than 100°F (38°C).

c. During hot weather, the temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints and should not exceed 90°F (32.°C). For massive concrete this temperature should not exceed 70°F (21.°C). When the temperature of the concrete exceeds 90°F (32°C),precautionary measures approved by ENGINEER shall be put into effect. When the temperature of the steel is greater than 122°F (50°C) steel forms and reinforcement shall be sprayed with water just prior to placing the concrete. The ingredients shall be cooled before mixing, or flake ice or well-crushed ice of a size that will melt completely during mixing may be substituted for all or part of the mixing water if, due to high temperature, low slump, flash set or cold joints are encountered.
Other precautions recommended by ACI standard 305R-91 shall also be adopted.

7. TEST FOR CONCRETE QUALITY

7.1 General:

CONTRACTOR shall provide samples of concrete for testing at ENGINEER's direction. Proper facilities shall be provided for making and curing the test specimens in accordance with the specifications. A competent person shall be employed by CONTRACTOR whose first duty shall be to supervise all stages in the preparation and placing of the concrete. All test specimens shall be made and SITE tests carried out under his direct supervision and at CONTRACTOR's cost.

7.2 Samples:

Conduct strength tests on at least one test sample per 50 cubic yards of concrete (38 cu meters) with a minimum of one sample per concrete pour. Each test sample shall consist of no less than three concrete test cylinders/cubes made from a single sample of concrete from a randomly selected batch of concrete, taken at point of discharge from mixer or truck, cured under standard conditions. One cylinder/cube from each sample shall be tested at age 3 days and two at age 28 days unless otherwise directed by the ENGINEER.

7.3 Adequacy of Mix:

In case of Concrete mix, the appropriate strength requirement shall be considered to be satisfied if none of the strengths of the specimen is below the specified strength or if the average strength of the three specimens is not less than the specified strength and the difference between the greatest and least strengths is not more than 20% of that average.

When the results of tests show that the strength of any concrete is below the minimum specified, ENGINEER may give instructions for the whole or part of the work concerned to be removed and be replaced at the expense of CONTRACTOR. CONTRACTOR shall bear the cost of any other part of his, or any other CONTRACTOR’s work, which has to be removed and replaced as a result of the defective concrete. If any concrete is held to have failed, ENGINEER may order the proportions of that class of concrete to be changed in order to provide the specified strength.

8. FINISHING OF FORMED CONCRETE

8.1 General:

a. After removal of forms the surfaces of concrete shall be given one or more of the finishes specified below in locations designated by the Drawing or as specified in Clause 8.5.

b. When finishing is required to match a small sample furnished to CONTRACTOR, the sample finish shall be reproduced on an area at least 100

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square feet in an inconspicuous location designated by ENGINEER before proceeding with the finish in the specified location.

8.2 As-Cast Finishes:

a. Rough Form Finish:

No selected form facing materials shall be specified for rough form finish surfaces. Tie holes and defects shall be patched, Unless if required to be retained if so directed by ENGINEER. Fins exceeding 1/4" (6 mm) in height shall be chipped off or rubbed off. Otherwise, surfaces shall be left with the texture imparted by the forms.

b. Smooth Form Finish:

The form facing material shall produce a smooth hard uniform texture on the concrete.

It may be plywood, tempered concrete-form grade hardboard, metal, plastic paper, or other approved material capable of producing the desired finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edge, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. Tie holes and defects shall be patched. All fins shall be completely removed.

8.3 Architectural Finishes:

a. Textured Finishes:

Textured form liners may be of formed plastic sheet, wood, sheet metal, or other material designated in Drawings. Liner panels shall be secured in forms by cementing or stapling, but not by methods which will permit impressions of nail heads, screw heads washers, or the like to be imparted to the surface of the concrete, unless shown otherwise on the Drawings. Edges of textured panels shall be sealed to each other or to dividing strips, if specified or shown, to prevent bleeding of grout. The sealant used shall be non-staining to the surface.

b. Applied Finishes:

When finishes of plaster or similar trowelled materials are to be applied, the surface of the concrete shall be prepared to ensure permanent adhesion of the finish. If the concrete is less than 24 hours old, it can be roughened with

a heavy wire brush or scouring tool. If the concrete is older the surface may be roughened mechanically or by etching with dilute hydrochloric acid. After roughening, the surface shall be washed free of all dust, acid, chemical retarder, and other foreign material before the final finish is applied.

8.4 Rubbed Finishes:

The following finishes shall be produced on concrete with a smooth form finish. Where smooth rubbed finish is to be applied, the forms shall have been removed and necessary patching completed as soon after the placement of the concrete as possible without compromising any structural requirements.

a. Smooth Rubbed Finish:

Smooth rubbed finish shall be produced on newly hardened concrete not later than a day following form removal.

Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until uniform color and texture are produced. No cement grout shall be used other than the cement paste drawn from the concrete itself by the rubbing process.

b. Grout Cleaned Finish:

No cleaning operations shall be undertaken until all contiguous surfaces to be cleaned are completed and accessible. Cleaning as the work progresses shall not be permitted.

Mix 1 part Portland Cement and 1-1/2 part fine sand with sufficient water to produce a grout having the consistency of thick paint. White Portland Cement shall be substituted for a part of the grey Portland Cement in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. Wet the surface of the concrete sufficiently to prevent absorption of water from the grout and apply the grout uniformly with a brush or a spray gun. Immediately after applying the grout, scrub surface vigorously with a cork float or stone and fill all air bubbles and holes. While the grout is still plastic, remove all excess grout by working the surface with a rubber float, sack or other means. After the surface whitens from drying (about thirty minutes at normal temperature) rub vigorously with clean burlap. The finish shall be kept damp for at least 36 hours after final rubbing.

c. Cork Floated Finish:

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1. Remove forms at an early stage, within 2 to 3 days of placement where possible.

2. Remove ties, and all burrs and fins.

3. Mix 1 part Portland cement and 1 part fine sand with sufficient water to produce a stiff mortar.

4. Dampen surface.

5. Apply mortar with firm rubber float or with trowel, filling all surface voids.

6. Apply a small amount of water with a fog spray to prevent too rapid drying of compressed mortar.

7. Apply a small amount of water with a fog sprayer.

8. Produce the final texture with a cork float using a swirling motion.

8.5 Unspecified Finishes:

If the finish is not designated in the Drawings, the following finishes shall be used as applicable:

a. Rough Form Finish:

For all concrete surface not exposed to public view and / or are specified to have subsequent finishing.

b. Smooth Form Finish:

For all concrete surfaces exposed to public view and or are not required to have subsequent finishing.

8.6 Related Unformed Surfaces:

Tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of the formed surfaces. Final treatment on form surfaces shall continue uniformly across the unformed surfaces.

9. REPAIR OF SURFACE DEFECTS:

9.1 General:

a. Any concrete failing to meet the specified strength or not formed as shown on Drawings, concrete with surface beyond tolerances or with defective surfaces which cannot be properly repaired or patched in the opinion of ENGINEER shall be removed and replaced at CONTRACTORS's expenses. ENGINEER may reject any defective concrete and order it to be cut out in part or in whole and replaced at the CONTRACTOR's expense. Only in case of minor surface defects, ENGINEER may approve a surface treatment in accordance with the Clause. 9.2

b. All ties and bolt holes and all repairable defective areas shall be patched immediately after the removal of forms.

9.2 Repair of Defective Areas:

a. All honeycombed and other defective concrete shall be removed down to sound concrete. The area to be patched and area at least 6" (150 mm) wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately 1 part cement to 1 part fine sand or an approved bonding agent shall then be well brushed/ applied into the surface.

b. The patching mixture shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 2-1/2 parts sand by damp loose volume. White Portland cement shall be substituted for a part of the grey Portland cement on exposed concrete in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch.

c. The quantity of mixing water shall be not more than necessary for handling and placing. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.

d. After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to loose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the parch slightly higher than the surrounding surface to permit initial shrinkage; it shall be left undisturbed for at least one hour before being finally finished. The patched area shall be covered by approved curing compound, except as specified in Clause 9.2 g. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.

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e. Where as-cast finishes are specified, the quantity of patched area shall be strictly limited. The combined total of patched areas in as-cast concrete surfaces shall not exceed 2 square ft. in each 1000 square feet (2 sq. m in each 1000 sq.m) of as-cast surface. This is in addition to form tie patches, if the project design permits to fall within as-cast areas.

f. Any patches in as-cast architectural concrete shall be indistinguishable from surrounding surfaces. The mix formula for patching mortar shall be determined by trial to obtain a good color match with the concrete when both patch and concrete are cured and dry. After initial set, surface of patches shall be dressed manually to obtain the same texture as surrounding surfaces.

g Patches in architectural concrete surfaces shall be cured for 7 days. Patches shall be protected from premature drying to the same extent as the body of the concrete.

9.3 Tie and Bolt Holes:

After being cleaned and thoroughly dampened, the tie and bolt holes shall be filled solid with patching mortar.

9.4 Proprietary Materials:

If permitted or required by ENGINEER proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures. Such compounds shall be used in accordance with the manufacturer's recommendation with prior approval of ENGINEER.

10. CONCRETE CONSTRUCTION TOLERANCE

Where tolerances are not stated in the Specifications or Drawing for any individual structure or feature, maximum permissible deviations from established lines, grades and dimensions shall conform to the following. The CONTRACTOR is expected to set and maintain concrete forms so as to ensure completed work within the tolerance limits. These allowable tolerances shall not relieve CONTRACTOR of his responsibility for correct fitting of indicated materials. These tolerances are not cumulative.

10.1 Variation from the plumb (or as specified for sloped walls).

a. In the lines and surfaces of columns, piers and walls.

*	In any 10 ft (3 m) of length or height:	1/4" (6 mm)
*	In any storey or 20 feet (6 meters) Max:	3/8" (10 mm)

* Maximum for the entire length or height: 3/4" (20 mm)

b. For exposed corner columns, control joint grooves and other conspicuous lines.

* In any bay or 20 feet (6 meters) maximum: 1/4" (6 mm)

* Maximum for the entire length or height: 1/2"(12.0 mm)

10.2 Variation from the levels or the grades indicated on Drawings:

a. In floors, ceilings, beam soffits, and in arrises.

* In any 10 feet (3 meters) of length: 1/4" (6 mm)

* In any bay or 20 feet(6 meters) feet maximum: 3/8" (10 mm)

* Maximum for the entire length: 3/4"(20 mm)

b. For exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

* In any bay or 20 feet(6m) maximum: 1/4" (6 mm)

* Maximum for the entire length: 1/2"(12.0 mm)

10.3 Variation of the entire building lines from established position in plan and related position of columns, walls and partitions.

a. In any bay or 20 feet (6 m) maximum: 1/2" (12.0 mm)

* Maximum for the entire length: 1" (25 mm)

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10.4 Variation of the size and locations of sleeves, floors openings and wall openings:

1/4" (6 m)

10.5 Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls.

Minus:	1/4" (6 mm)
Plus:	1/2" (12.0 mm)

10.6 Footings:

a. Variations in dimensions in plan.

*	Minus :	1/2"(12.0 mm)
*	Plus (plus variation applied to concrete only, not to bars dowels):	2" (50 mm)

b. Misplacement or eccentricity of concrete.

*	2 percent of the footing width in the direction of misplacement but not more than	2"(50 mm)

c. Reduction in thickness

* Minus 5 percent of specified thickness.

10.7 Variation in Steps

a.	Rise:	1/8" (3 mm)
	Tread:	1/4" (6 mm)
b.	In consecutive steps	
	Rise:	1/16" (1.0 mm)
	Tread:	1/ 8" (3 mm)

10.8 Tolerance for Precast Concrete:

Forms must be true to size and dimensions of concrete members shown on the plans and be so constructed that the dimensions of the finished product will be within the following limits at the time of placement of these units in the structure, unless otherwise noted on ENGINEER's Drawings.

a. Overall dimensions of members per 10 ft (3 mm): +/- 1/16" (1.0 mm)

b. Cross-sectional dimensions
Section less than 3"(75 mm): +/- 1/16" (1.0 mm)

Section over 3" (75 mm) less than 18" (450 mm): +/- 1/ 8" (3 mm)

Section over 18" (450 mm): +/- 1/ 4" (6 mm)

c. Deviations from straight lines in long sections. Not more than 1/8 inch per10 ft (3mm / 3 m).

d. Deviation from specified camber +/- 1/16" (1.5 mm) per 10 ft (3m) of span. Maximum differential between adjacent units in erected position 1/4 inch (6 mm).

10.9 Tolerance for Pavements:

a. Ramps

* Departure from established alignment +/- 1/2 inch (12.0 mm).

* Departure from established longitudinal +/- 1/4" (6 mm) grade on any line.

* Departure from transverse template contour except at transverse joints +/- 1/8 inch (+/- 3 mm).

* Departure from transverse template control at transverse joints +/- 1/4"(+/-6 mm) in width of one traffic lane.

10.10 Pavements for Parking Areas:

Twice values listed for ramp pavements.

11. ACCEPTANCE OF STRUCTURE

11.1 General:

a. Completed concrete work which meets all applicable requirements will be accepted subject to the other terms of the CONTRACT Documents.

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b. Completed concrete work which fails to meet one or more requirements and which has been repaired to bring it into compliance will be accepted subject to the other terms of the CONTRACT Documents.

c. Completed concrete work which fails to meet one or more requirements and which cannot be brought into compliance may be accepted or rejected as provided in these Specifications or in the CONTRACT Documents. In this event, modifications comply with the requirements.

11.2 Dimensional Tolerances:

a. Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of Section 10 considered potentially deficient in strength and subject to the provisions of Section 11.4.

b. Formed surfaces resulting in concrete outlines larger than permitted by the tolerances of Section 10 may be rejected and the excess material shall be subject to removal. If removal of the excess material is permitted, it shall be accomplished in such a manner as to maintain the strength of the section and to meet all other applicable requirements of function and appearance. Permission is required if excess material is to be removed in accordance with this Section.

11.3 Appearance:

a. Architectural concrete with surface defects exceeding the specified limitations shall be removed in accordance with this Section.

b. Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely effected or misplaced items interfere with other construction.

c. Inaccurately formed concrete surfaces exceeding the limits of Section 6 & of Section 10 and which are exposed to view, may be rejected and shall be repaired or removed and replaced if required.

d. Other concrete exposed to view with defects which adversely affect the appearance of the specified finish may be repaired only by approved methods.

e. Concrete not exposed to view, but of defective appearance, may be accepted at the discretion of the ENGINEER.

11.4 Strength of Structure:

a. The strength of structure in place will be considered potentially deficient if it fails to comply with any requirements which control the strength of the structure, including but not necessarily limited to the following conditions:

- Concrete strength requirements not considered to be satisfied in accordance with Section 7.

- Reinforcing steel size, quantity, strength, position or arrangement at variance with the requirements of Section 4.4 & 6.2 of the CONTRACT Documents.

- Concrete which differs from the required dimensions or location in such a manner as to reduce the strength.

- Curing less than that specified.

- Inadequate protection of concrete from extreme temperature during the early stages of hardening and strength development.

- Mechanical injury, construction fires, accidents or premature removal of formwork likely to result in deficient strength.

- Poor workmanship likely to result insufficient strength.

b. Structural analysis and/or additional testing may be required when the strength of the structure is considered potentially deficient.

c. Core tests may be required when the strength of the structure is considered potentially deficient.

d. If core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be required and their results evaluated in accordance with ACI Standard 318.

e. Concrete work judged inadequate by structural analysis or by results of a load test shall be reinforced with additional construction, if so directed by ENGINEER or shall be replaced, at the CONTRACTOR's expense.

f. The CONTRACTOR shall pay all costs incurred in providing the additional testing and/or analysis required by this Section.

g. THE OWNER will pay all costs of additional testing and/or analysis which is made at his request and which is not required by specifications, or the CONTRACT Documents.

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12. METHODS OF MEASUREMENT OF CONCRETE WORKS

12.1 General:

a. Unless otherwise specifically stated in the Bill of Quantities, or herein, all items shall be deemed to be inclusive of, but not limited to, the following:

i. Labor/plant and all costs in connection therewith.

ii. Materials, goods and all costs in connection therewith, e.g. conveyance, delivery, unloading, storing, returning, packing, handling, hoisting, lowering.

iii. All fixtures and all costs in connection therewith for precast works.

iv. Fitting and fixing materials and goods in position.

v. Waste of materials, and Square cutting.

vi. Mixing, transporting, hoisting, placing in from at any level, compacting through vibration & curing etc. complete including the cost of formwork & its removal(but excluding cost of reinforcement).

vii. Establishment charges, overhead charges and profit.

viii. All other expenses, charges and taxes specified in Conditions of CONTRACT.

b. Works shall be measured net as fixed in position as per drawings and instructions of ENGINEER. Each measurement shall be taken to the nearest 1/2" (12.0 mm). This rule shall not apply to any dimensions stated in the descriptions.

12.2 Concrete:

a. Concrete shall be measured as executed but no deduction shall be made for the following:

- Volume of any steel embedded in the concrete.

- Volume occupied by water pipes, conduits etc., not exceeding 4 square inch (2500 sq. mm) each in cross-sectional area.

- Voids not exceeding 1 square foot in work given in square feet and 0.1 sq M in work given in Sq Meters. If any void exceeds above limit total void shall be deducted.

- Voids not exceeding 1 cubic foot in work given in cubic feet, 0.03 cubic meter in work given in cubic meter. If any void exceeds above limits, unit total void shall be deducted.

b. Voids, which are not to be deducted as per Section 12.2.a above, refer only to openings or vents which are wholly within the boundaries of measured areas. Openings or vents which are at the boundaries of measured areas shall always be subject to deduction irrespective of size.

c. Junctions between straight and curved works shall in all cases be deemed to be included with the work in which they occur.

d. Concrete work shall be classified and measured separately as follows unless otherwise described elsewhere:-

- Buildings, foundation beams, foundation slabs, footings, bases of columns, machine foundations, mass concrete etc., in cubic feet (Cu Meter).
- Floor slabs on ground with floor beams in cubic feet (Cubic Meter).
- Walls in foundations, plinth and superstructure in cubic feet (Cubic Meter) stating thickness.
- Columns, piers, pilasters, pillars etc., in cubic feet (Cubic meter).
- Lintels, beams and brackets in cubic feet (Cubic Meter).
- Suspended floors, roofs and stair landings in square feet (sq. Metre) stating thickness.
- Stairs (excluding landing) in cubic feet (Cubic Meter).
- Railings in cubic feet (Cubic Meter), square feet (Sq. Meter), or linear feet (Meter) stating description.
- Parapets, purdees and the like in cubic feet (Cubic Meter) stating thickness.
- Jali, blocks in square feet (Sq. Meter) stating thickness & description.

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- Precast concrete items shall each be enumerated except if otherwise shown in the Bill of Quantities, separately stating the description.

e. Measurement of walls shall be taken between attached columns, piers or pilasters. The thickness of attached columns, piers or pilasters shall be taken as the combined thickness of the wall and the columns, piers or pilasters. Attached or isolated columns, piers, pilasters and the like (except where caused by openings) having a length on plan not exceeding four times the thickness shall be classified as columns. Those having a length over four times the thickness and caused by openings in walls shall be classified as walls.

Columns shall be measured from the top of footings/beams or floor surfaces to the under side of beams or slabs as the case may be. Where the width of the beams is less than the width of columns, the extra width at the junction shall be included in the beam.

The depth of the beams shall be measured from bottom of the slab to the bottom of the beams, except in case of inverted beams where it shall be measured from top of slab to the top of beam. The cross section below or above the slab.

12.3 Formwork:

a. Formwork (if separate and extra payment is specifically stated in the Bill of Quantities) shall be measured in square feet (Sq. M) as the actual surface of the finished structure which required to be supported during the deposition of the concrete, including the upper surfaces to the work sloping more than 15 degree from the horizontal. No allowance shall be made for overlaps and passing at angles and no deduction shall be made for the following:-

- Voids not exceeding ten square feet(1 Sq. m).
- Intersections of main beams with walls or columns.
- Intersections of secondary beams with main beams.

b. Formwork shall be deemed to be inclusive of, but not limited to items detailed in section 12.1 and the following:-

- Batten, struts, reversed cut strings, bolting, oiling, wedging, easing, striking, removing and making good exposed faces of concrete after removal of formwork. Also yokes, wales sheathing, jack rods, jacks, working platforms and finishers, scaffolds, etc.

c. Forming chamfers not exceeding 2" (50mm) wide and forming splayed internal angles not exceeding 1/2" (12.0 mm) wide shall not be paid for extra.

d. Temporary stop ends for constructed joints shall not be measured and paid for.

e. Classification of formwork (if separate and extra payment is specifically stated in the Bill of Quantities) shall be as follows:-

- To horizontal or sloping soffits of suspended slabs, floors, roofs, staircases, landings and the like.
- To sloping upper surfaces of suspended slabs, floors, roofs and the like where more than 15 degree from horizontal.
- To vertical or battering sides of foundations, foundation beams and slabs, ground beams, machine foundations and the like.
- To vertical or battering sides of walls, solid balustrades and the like.
- To vertical or battering sides.
- To vertical or battering sides of stanchion casings, columns, piers, plasters and the like.
- To sides and soffits of openings in walls, recesses in walls, projecting panels on walls and the like.
- To sides and soffits of horizontal or sloping beam casings, beams, brackets, lintels, staircase, strings and the like.
- To sloping upper surfaces of beam casings, beams, brackets, lintels, staircase-strings and the like where more than 15 degrees from horizontal.
- To edges of beds, roads, footpaths, paving and the like.
- To edges of suspended slabs, floors, roofs, landing and the like.
- To risers of steps and staircases.
- To sides of kerbs, upstands and the like.

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f. Formwork to throats, grooves, chases, rebates, chamfers over 2" wide (50 mm) splayed internal angles over 1/2" wide (12.5 mm) moldings and the like shall each be measured separately in linear feet stating the size.

12.4 Rate for Reinforcement:

a. The rate tendered for any type of reinforcement by the CONTRACTOR shall also be inclusive of the cost of binding wire wastages, and the cost of concrete, metal or plastic chairs and spacers or hangers, etc.

b. All reinforcement shall be provided in length shown in Drawings and as per Specifications.

Should the CONTRACTOR provide lengths of reinforcement which are greater than shown on the Drawings no payment of extra length shall be made. Overlaps, unless clearly shown in working Drawings, shall not be allowed and measured.

c. The CONTRACTOR shall be paid for reinforcement by weight computed from Table-2 and from linear measurements of reinforcements actually used at SITE as per the Drawings, Specifications and instructions of ENGINEER. No payment shall be made for steel chairs or wastage. CONTRACTOR shall not claim for the difference in the actual weights of bars and their standard weights given in Table -2.

TABLE-2:

Nominal Bar Diameter (Inches)[3]	Bar Number	Weight lbs/ft
1/4"	-	0.167
3/8"	# 3	0.376
1/2"	# 4	0.668
5/8"	# 5	1.043
3/4" .	# 6	1.502
7/8"	# 7	2.044
1"	# 8	2.670
1-1/8"	# 9	3.400
1-1/4"	#10	4.303
1-3/8"	#11	5.313
1-3/4"	#14	7.650

[3]To the nearest 1/8

2-1/4"	#18	.....	13.600

(mm)		(kg/m)
8	.....	0.395
10	.....	0.616
12	.....	0.887
16	.....	1.576
20	.....	2.463
22	.....	2.980
25	.....	3.849
28	.....	4.828
32	.....	6.306
36	.....	7.981

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S P E C I F I C A T I O N S

ROOF TREATMENT

(WATER PROOFING AND HEAT INSULATION)

C o n t e n t s

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SPECIFICATIONS

WATER PROOFING AND HEAT INSULATION

1. SCOPE

The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with Heat Insulation between walls, and installation of Water Proofing and Heat Insulation over RCC Roof Slab, flat or sloped as indicated on the Drawings, in strict accordance with this section of the Specifications, and subject to the terms and conditions of the Contract.

2. MATERIALS

a. Asphalt priming oil shall be made by the manufacturer of the asphalt.

b. Bitumen shall be Hy-Carb, A-10 or equivalent or as specified in the Drawing with following characteristics of Hy-carb shall apply:

Softening Point: 80^{O}C to 90^{O}C (204^{O}F) min; (224.6^{O}F) max. Penetration when 100 gms. load is applied at 25^{O}C is 1/10 mm.
Specific gravity at 25 C (770 F):1.02 to 1.06.

c. Thermal insulation shall be expanded polystyrene molded bead-board type (self extinguishing/fire resistant) of minimum density 2 lbs per cu.ft (32 kg/m). Thickness as shown on Drawings. For exterior wall application, use "Styroking" sheets as manufactured by Household products (Pakistan) Ltd, Pakistan or equal.

d. Brick Tiles shall be Burnt Clay Tile of sound quality 12" x 12" 1-1/4" thick (300 x 300 x 30mm thick).

e. Cement, aggregate and water shall be in accordance with Specifications for, "Plain and Reinforced Concrete".

f. Materials and methods not specifically described but required for proper installation, shall be provided by the Contractor subject to prior approval of Engineer, at no additional cost to Owner.

g. Samples of all materials proposed for used under this Section shall be submitted to the Engineer for his approval.

3. PRODUCT HANDLING AND DELIVERY

a. Deliver materials to the job Site and store in asafe dry place with all labels intact and legible at time of installation.

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b. Protect materials before, during, and after installation and protect the installed work and materials of other trades.

c. Do not leave insulation exposed to sunlight. Keep it covered with clean or light coloured material. Apply finish material soon after installation of the insulation. Brush off any sunlight degraded surface material prior to adhering insulation.

d. Boards/sheets chipped, cracked or squashed shall be rejected in the event of damage, immediately make repairs and replacements to the entire satisfaction of Engineer, at no additional cost to Owner.

4. PREPARATORY WORK

a. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

b. Verify that building insulation may be installed in accordance with the original design and the manufacturer's recommendations.

c. In the event of discrepancy, immediately notify the Engineer. Do not proceed with installation in areas of discrepancy until they have been fully resolved.

d. All surfaces to receive water proofing and insulation should be sound, clean, smooth, dry and free of debris, loose material or defects which would otherwise have an adverse effect on the application, bonding, and performance.

5. APPLICATION OF ROOFING

5.1 Base Layer (Screed):

a. Apply cement sand base layer to an average thickness of approximately 40mm, over concrete slab. Mix to consist of one part cement to six (6) parts sand aggregate to Engineer's approval.

b. Wet concrete base slab before screeding.

c. Spread and place screed to conform with slopes indicated on Drawings. Apply in alternate bays not exceeding 250 sq. ft (25 Sq.M. Approx). Form canted fillets at up-stands.

d. Screeding and tamping shall be done immediately after spreading to achieve prescribed slopes.

e. The screed shall then be smoothened and consolidated to a uniform close textured surface with a wood float, to remove high and low spots exceeding 1/4 in (6mm) in 10 ft (3 M. Approx). Avoid excessive floating.

f. Areas showing signs of laitence will be subject to rejection by the Engineer. These faulty areas shall be replaced at no additional cost to the Owner.

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g. Screed layer shall be cured for a minimum of 7 days after finishing.

h. Allow sufficient time for screedto thoroughly harden and dry before allowing other work to be carried out.

5.2 Water Proofing:

a. Prime sloping screed surface with a uniform coating of asphalt primer at the rate of 5 litres (1.1 gals) per 10 sq.M. (12 Sq.yds).

b. Apply uniform coating of Bitumen Hi-Carb, A-10 to a minimum thickness of 1/8" (3 mm approximately) or 30 kg (60 lb.) per 10 sq.m. (100 sq.ft.).

c. Asphalt shall not be applied when its temperature is above 205 C (401 F) nor shall it be heated above 245 C (473 F), or as recommended by the manufacturer.

d. Heating of asphalt shall be strictly regulated by means of an accurate thermometer of approved type, kept constantly suspended in the heating kettle while the work is in progress.

e. Water proofing shall not be laid when the temperature at the location of the work is below 5° C.

f. Water proofing shall not be applied during rain or while surfaces are damp; it shall be applied only to surfaces that are clean and dry.

g. Method of laying water proofing shall be strictly in accordance with the instructions of the Engineer.

5.3 Heat Insulation:

a. Install roof insulation unbonded over water proofing membrane with boards butted tightly together and end joints staggered.

5.4 Roof Finish:

a. Lay burnt clay tiles immediately over insulation. The tiles shall be soaked two hours before installation.

b. Set tiles in patterns with 1/2" (12.5mm) mortar joints. Joints shall be grouted and tooled with cement sand mortar, tinted to match colour of tiles.

c. Area to receive tiles shall be set out to correct alignment, gradients etc.

d. Lay tiles with joints butted and aligned in both directions but not coincidental with insulation joints. Set out tiles to roof areas so that distance remaining at perimeter walls, to receive insitu concrete edge, are equal but are not less than 12 in (300mm) and not greater than 18 in (450mm).

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e. Cut tiles square to face to a tolerance of 1/8 in (3mm). Cutting shall be kept to a minimum.

f. Ensure alignment is correct with adjacent tiles and evidence of movement or rocking is eliminated.

g. Chipped, broken and cracked tiles shall be rejected.

h. Deviations exceeding 1/4" (6mm) in 10 ft (3 M Approx) applied in all directions shall not be accepted.

6. APPLICATION OF HEAT INSULATION IN CAVITY WALLS

Heat insulation between two leaves of block wall(s)/concrete surfaces shall be applied as follows:

a. Place insulating sheets/boards vertical against the thicker of the two leaves of the wall before laying of outer leaf of block wall. Insulation of non-horizontal spaces shall be applied horizontally, closely butted, with vertical joints staggered.

b. The application shall begin at the bottom of the wall and work towards the top.

c. Care should be taken not to damage/puncture the sheets while tying the two leaves of the wall together.

7. MEASUREMENT AND PAYMENT

a. Unless otherwise specifically stated in the bill of Quantities or herein, all items shall be deemed to be inclusive of, but not limited to the following:-

I. Contractor's establishment charges, overhead charges, profit, interest.

ii. All other expenses, charges, taxes specified in conditions of Contract.

iii. Labour and all costs in connection therewith.

iv. Use of plant, equipment and machinery and all costs in connection therewith, e.g. mobilization, demobilization, transporting, fuel, energy charges, grease oil, installing, operating, storing, watching, returning, replacing, handling, maintaining, idle stand, parking, removing, damaged, destroyed, salvage.

v Material and goods e.g. marketing, selecting, conveyance, loading, unloading, storing, watching, returning, handling, hoisting, lowering, cutting, joining, fixing, wastage, destroyed, damaged, salvaged.

b. Works shall be measured net as applied in position as per Drawings and instructions of the Engineer. Each measurement shall be taken to the nearest 1/2" (12.5mm). This rule shall not apply to any dimensions stated in descriptions.

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c. Water proofing and Heat Insulation, except where otherwise stated shall be measured as the net actual visible area of the treated surface in sq.ft (square meters) describing the quality.

d. Rate for each item of treatment/application i.e. screed, water proofing, insulation and clay tiles floor finishes shall be stated separately.

e. Rates for water proofing under RCC or Plain slab on grade shall be quoted separately.

g. Unit rate for water proofing and heat insulation shall be deemed to be inclusive of all preparatory work, scrapping, scratching, cleaning, priming and the like, complete as directed by the Engineer.

h. Unit rate for water proofing and built-up roofing shall be deemed to be inclusive of nailing strips, cant strips, gravel strips, flashings, scuppers, roof drains, grouting of precast panel joints, turn-ups, turn-downs and wedging of felt, laps of felt and the like if specified, complete as directed by the Engineer.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

S P E C I F I C A T I O N S

TERMITE CONTROL

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SPECIFICATIONS

TERMITE CONTROL

1. SCOPE

The work covered by this section of Specification consists of furnishing all labour, materials, equipment, services, miscellaneous and necessary items required to complete Termite Control and, related works as indicated on drawings, and specified herein, in strict accordance with this section of specifications, as subject to the terms and conditions of the Contract.

2. MATERIALS

a) Pesticides shall be 0.4% Termidor and/or as directed by the manufacturer, or solution of 0.5% Dieldrin or a 0.5% Aldrin, mixed in clean water for application in earth, and mixed in pure turpentine for application to wood.

b) Pesticides (dieldrin & aldrin) shall be obtainable from the Government of Pakistan, Department of Agriculture, or other sources approved by Engineer in sealed drums at rates in force at the time of their acquisition and only in the quantity necessary for work of this Project. All mixing shall be done at site and the amount of pesticides used shall be verified by the Engineer.

3. METHOD OF APPLICATION

Pesticides solution shall be applied with approved pressure spraying equipment maintaining a pressure of 150, p.s.i. (10.5kg/cm$^{2)}$ to all application to, on or in earth. Spraying to wood shall be done by hand compression with an approximate pressure of 20 p.s.i.

4. WORKMANSHIP

The treatment operation shall be carried out as follows:-

a) After the excavation for foundation trenches and pits is completed in each and every respect, and passed for concreting work, but before laying of concrete, Pesticide shall be penetrated to a depth of 1" (25 mm) ;minimum in porous earth at bottom and 2" (50mm) to 3" (75 mm) at sides of excavation.

b) Stock piled excavated material to be used as back fill is to be treated as above. After backfilling to required grade the area is again to be sprayed.

c) After grading, compaction and leveling of fill and before installation of any soling, all areas are to be sprayed with pesticide, penetrating a minimum of 1" (25mm) into soil.

d) Pesticide solution shall be applied inside the building lines and for a distance of 10 feet (3 M) out side all building with specified pressure.

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e) All rough wood work for the entire project is to be pesticide treated (before application of soligum in the case of material to receive both treatments). Pesticide shall be sprayed on all surfaces of all the wooden work viz, door frames blocking, furring, planks,, boards etc, before installation. No spraying shall be necessary after field sawing, planning, joining or installation of such material. All spraying will be done within one week of working of the materials.

5. LOCATION AND SCHEDULING

a) Saturation of earth is to be done by adequate personnel and in such a manner as to in no way disrupt the progress of the work.

b) Such work is to be scheduled and done by sufficient skilled personnel manner as to in no way impede the progress of the work.

c) Care shall be exercised to ensure that no mark or damage occurs to the finished building as a result of the work under this section, and Contractor shall verify and ensure that no material used herein will impede the growth of grass or plants at areas where spraying is done.

6. STANDARDS

All methods of termite protections used herein be in accordance with best standard practices of National Pest Control Association, U.S.A. and the British Wood Preserving Association.

7. GUARANTEE

The Contractor is to guarantee that the building shall be free from termites (white ants), wood bores and other pests or rodents which cause damage to wood or other organic material for 10 years from the date of acceptance of the building.

In the event of any damage caused within the guaranteed period, the Contractor shall replace at his own cost such damage material, finishes affected and suitably preserve and treat the entire premises with the best method known to the trade to prevent the spreading of termites.

8. TESTING

All materials and samples shall be subject to testing in accordance with the relevant standards specified herein, and shall be rejected if found below these standards. Rejected materials shall be removed from the site immediately, Contractor shall quote a lump sum rate for the termite control testing and treatment of the ground and excavation covered by this specifications including all ditches, pits, excavations, wood etc., complete.

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9. MEASUREMENT & PAYMENT

a) Unless otherwise specifically stated in the Bill of Quantities or herein, all the work involved within the scope of this section of specification shall be deemed to be inclusive of but not limited to the following:-

i) CONTRACTOR's establishment charges, overhead charges, profit, interest.

ii) All other expenses, charges, taxes specified in the Conditions of CONTRACT.

iii) Labour and all costs in connection therewith.

iv) Use of plant, equipment and machinery and all costs in connection therewith, e.g. mobilizations, demobilization, transporting, fuel, energy charges, grease, oil, installing, operating, storing, watching, returning, replacing, handling, maintaining, idle stand parking, removing, damaged, destroyed, salvaged.

v) Material and goods, e.g. marketing, selecting, conveyance, loading, unloading, storing, watching, returning, handling, hoisting, lowering cutting, joining fixing, wastage, destroyed, damaged, salvaged.

b) The cost of all the works involved within the scope of this specification as per all the Drawings and Conditions of CONTRACT are covered only within the quoted lumpsum rate of the item of the Bill of Quantities.

c) No separate payment will be made for wood work etc. Covered under this section of the specifications, and all cost in connection therewith shall be included in the unit rates of the various items of the wood work affected by treatment.

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TECHNICAL SPECIFICATIONS
(PLUMBING & SANITARY WORKS)

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TECHNICAL SPECIFICATIONS
(PLUMBING & SANITARY WORKS)

1. GENERAL

(a) All fixtures shall be free from imperfections, true as to line, angles, curves and colors, smooth, water tight and complete in every respect.

(b) All fixtures specified to be of vitreous ware, shall be fired vitreous China ware of the best quality, non-absorbent and burned so that the whole mass is thoroughly fused and vitrified producing a material white or colored, which when manufactured will show a homogeneous mass, close drained and free from pores. The glazing and vitreous china fixtures shall be of color approved by the ARCHITECT / CONSULTANT / PROJECT MANAGER/CLIENT, thoroughly fused, and united to the body, without discoloration, ships, or flaws and shall be free from craze. Wrapped or other imperfect fixtures will not be accepted.

All plumbing fixtures proposed to be supplied shall clearly be indicated at the time of tendering, and all fixtures should be approved by the ARCHITECT / CONSULTANT / PROJECT MANAGER/CLIENT prior to installation at site.

(c) All fixtures shall be furnished by one and the same manufacturer unless otherwise specified.

(d) All fittings, cast brass set screws, escutcheons faucets, traps, exposed piping etc. shall be of brass, chrome plated over nickel plate with polished finished. All supports nut, etc. visible shall likewise to chrome plate over nickel plate.

(e) After insulation of plumbing accessories, the Contractor shall ensure their protection against damage, misuse and general deterioration. Fixture outlets shall be plugged with suitable material to prevent entry of external debris. All chrome plated and other metallic fittings shall be provided with a copper of grease to prevent their deterioration. All items prior to handing over must be in perfect condition in the visual and operational sense.

(f) All fixtures and accessories shall be of first quality, locally manufactured, unless otherwise indicated.

1.1 COUNTER TOP

Material : Vitreous China

Color : Colored as approved.

Accessories : Cold water pillar cock tee stop cocks with CP flexible connection, wall flanges, cast iron wall brackets, 32mm dia. CP bottle trap,

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waste fittings with drain plug, dia. 32mm PVC drain pipe, all exposed fittings chromium plated.

Installation : Seal crack between lavatory and wall using approved
Specs : silicon sealant.

Selected : Prime quality, light colored, as approved by Consultant/client.

1.2 EASTERN TYPE WATER CLOSET

Material : Vitreous China for both closet and cistern P or S traps.

Color : Colored as approved by the client/consultant.

Accessories : Best quality solid acrylic seal of approved color, tee stop cock, with C P brass flexible connection.

Installation : Use thimble when connecting W C to drain pipe.

Selected Model : Prime quality, light colored/as approved by Consultant/ client.

1.3 TOILET FITTINGS

1. Lavatory hot/cold tabs Faucet valves with removable seats on 4.0 inch centers with color indexed handles, 0.5 inch male threaded inlets, couplings nuts, 3.5 inch spout, with aerator with 2½ US gpm (9.51min) flow restrictions, all chromium plated (selected model Master).

2. Lavatory Faucet valve with removable seat; 9.5 inch male threaded inlet with coupling nut, 3.5 inch spout with aerator and 2.5 gpm (9.5 Lpm) flow restriction, all chrome plated (selected model Master).

3. Tee stopcocks shall be of dia. 0.5-inch size of C P brass, colored indexed. (Selected model Master).

4. Bibcock shall be of dia. 0.5-inch C P brass color indexed. (Selected model Master).

5. Flexible pipe shall be of C P brass dia. 6mm.

6. Bottle trap shall be of C P brass, dia. 1.25 inch. (Selected model Master).

1.4 TOILET ACCESSORIES

Toilet Paper : C P brass / Stainless steel / Best Quality.

Soap Dish : C P brass / Stainless steel / Best Quality.

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Towel Bar	:	C P brass / Stainless steel / Best Quality.
Cloths Hook	:	C P brass / Stainless steel / Best Quality.

1.5 INSTALLATION

a) All screws, bolts and other anchoring devices shall be of stainless steel of chrome plated brass.

b) Install toilet fixtures, fitting and accessories units in accordance with manufacturer's instructions, using fasteners, which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored with brass screws any nylon anchors as locations and at heights indicated in drawings.

c) Set accessories plumb, level, and square at locations approved, in accordance with manufacturers instructions for type of sub-strata involved.

d) Adjust toilet accessories for proper operation and verify that mechanism function smoothly. Replace damaged or defective times.

e) Remove and replace accessories which are broken, chipped, backed, abraded or damaged in other ways during construction period, including natural causes, accident and vandalism.

f) Clean and polish all exposed surfaces after removing temporary labels, and protective coatings.

2. SCOPE OF WORK

The work to be done under this section of the specifications consists of:

a) Providing all materials and labor for proper installation of pipes, pipe fittings including jointing, clamping, cleaning, painting etc. both above ground and under ground as shown on the drawing or as specified herein.
b) Providing all material and labor, equipment, appliances etc. for proper installation

3. PIPE AND FITTINGS`

Water supply cold and hot water shall be of POLYPROPYLENE OF `POLYDEX` MADE by M/S DADEX ETERNIT LTD. With their specialist fittings & accessories complete in all respects as per B.O.Q & drawings.

4. VALVES AND STAINERS

a) Gate Valves: All valves of 75mm dia and below shall be of copper, alloy confirming to BS 5154 and valve of over 3'"”dia and above all be cast iron confirm to BS 5150.

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Valve shall be of non-rising stem and double wedge or disc type and ends may be screwed or flanged. Make: Hattersley, Overtop

b) Swing Check Valves: All valves of 75mm dia and below shall be of copper alloy confirming to BS 5154, and valve of over 3" dia and above shall be cast iron confirming to BS 5152. Make: Hattersley, Overtop

5. PIPE SUPPORTS

General :

Pipe hangers, brackets saddles, inserts, clamps and pipe rolls including rods, bolts, turn buckles, bases and protection shields shall confirm to standard recommended engineering practice. Design generally accepted as exemplifying good engineering practice, using stock or production parts, shall be utilized wherever possible chain, wire, strap or other make shift devices will not be permitted as hangers, or supports. Pipe hangers shall be capable of supporting the pipe in all conditions of operations. Hangers shall be supported with from beams, clamps, concrete inserts pins. Concrete inserts when used shall be installed in the exact location prior to the pouring of the concrete.

Nominal pipe size Inches (mm)	! 0.5 : 0.75 : 1.0 : 2.0 : 2.5 : 3.0 : 4.0 : 5.0 : 6.0 : 8.0 : 9.0 : 10.0 :
	!(13): (20) :(25):(40) :(50):(65):(75): (100):(125):(150):(150):(250):
	!(13): (20) :(25):(40) :(50):(65):(75): (100):(125):(150):(150):(250):

Pipe Sleeves:

Pipes passing through concrete or masonry walls or concrete floors or roofs shall be provide with pipe sleeves fitted into place at the time of construction. 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 ¼" all around clearance between bare pipe and sleeve, or between jacket over insulation and sleeve. Sleeves in non-bearing walls, floor, or ceilings may be steel pipe, cast iron pipe or GI sheet metal 14 gauge 2.03mm with lock type longitudinal seam. Sleeves in bearing walls shall be steel or cast iron pipe. Sleeves in exterior walls and pits shall be of steel and shall have anchor flanges with the space between the pipe and the sleeve caulked watertight in concrete it shall be filled with non-shrink grout.

6. TESTING

The test pressure should be 150 psi and to be maintained for 4 hours.

7. MEASUREMENT AND PAYMENT

a) Pipes:

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Measurement for pipes shall be in running length and the work to be done shall include providing and fixing of pipe, pipe fittings, jointing hangers, clamps, and brackets, sleeves, insulation, cutting and making it good, applying protection painting, coating, cleaning, testing and disinfecting etc. and the measurement will be for the full work specified herein.

Payment will be made for the actual quantity installed at the unit rate of bid per running foot length of pipe. The amount bid will be the full payment for completion of the work in all respects as specified herein.

8. SOIL AND WASTE PIPING SPECIALITIES

8.1 Scope of Work

The work includes in general the following:

a) Internal Soil, Wastewater, Vent.
b) External soil and waste water piping.
c) All specials shown, specified or needed.
d) Other item specified, or shown on drawings.

9. PIPING MATERIAL

a) UPVC (rubber ring) shall be manufactured by the extruded process and shall confirm to standard BS 4514, heavy duty, of the bell & spigot type. Each pipe and fitting shall be tested at the manufacturer's works and shall show no leakage, sweating or other defects. Pipes supplied shall be accompanied by a test certificate and each pipe shall be so stamped. Pipe shall be Type B

b) U.P.V.C PIPES SHALL BE USED FOR MANHOLE-TO-MANHOLE CONNECTIONS OF THE SIZES AS PER B.O.Q & DRAWINGS.

10. PIPE SUPPORTS

i) All soil and waste lines hung from the ceiling shall be supported at not more than 3 Ft centers for horizontal pipe and 3 Ft for vertical pipes. Provide supports at all special fittings.

11. TESTING AND INSPECTIONS.

a) The entire drainage and vent system and building sever shall be subjected to testing after installation to ensure a leak-proof installation under operation conditions.

All the openings in the piping system shall be tightly closed by inserting test plug so that heavy rubber gasket fits snugly all around the opening. The highest point will be left open to supply water and may be raised if necessary by temporary jointing to develop a minimum head of one pipe length of water at each section of the system.

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Water is filled to the point of overflow and any drop in the level of water will indicate a leak that will be found by inspection. The water level will be checked for no drop for at least 15 to 30 minutes. Stacks will be tested in section, starting from the top section and then connecting top section to next lower section.

13 SCOPE OF WORK

a) The Contractor shall provide all material and equipment and perform all the work necessary for the complete execution and completion, including testing and commissioning of all systems of the plumbing works as shown on the Plumbing drawings and general construction drawings and as specified herein and shall include the following system:

i) Cold Water Supply System
ii) Sanitary Drainage, Sewerage, vent & rain water systems.
iii) Fire Fighting systems

b) Each of the hereinbefore listed systems shall be completed in every respect including connection of these internal systems with external systems of the Fire, Gas, water supply and sewerage are included in the scope and shall be as shown on the drawings and as hereinafter specified.

c) Various U.S. Standards, BSS and DIN Standards.

14 INSTRUCTIONS TO TENDERERS

a) The Tender Specifications and Drawings make reference to certain Standard Specifications and also to certain manufacturers and equipment Model Numbers. The object of these references is to ensure that the equipment and materials offered by the Tenderers and supplied by the CONTRACTOR are in accordance with the required standard of quality, workmanship and capacities, etc. The object is not to limit the selection of equipment to a particular manufacturer unless specifically mentioned in the tender documents that a particular equipment and/or material is to be supplied.

b) It is clarified that the equipment and the materials complying with various U.S. Standards, BSS and DIN Standards, and of manufacturers other than mentioned in the tender documents shall be acceptable provided they meet the required capacities as specified and meet the intent of the specifications regarding quality and workmanship.

c) In case there is any deviation between any item or material offered by the Tenderer from the Tender Specifications and Drawings, the Tenderer shall clearly draw attention to all such deviations and no such item or material shall be supplied by the CONTRACTOR without prior written approval of the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER.

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d) These Specifications and accompanying Drawings are to be considered as supplementing each other and as such are intended to serve jointly as the basis upon which the CONTRACTOR shall establish a Contract Price, and upon which he shall base the performance of the required work.

e) It is the intent of these Specifications and Drawings to call for finished work tested, complete, and ready for operation.

f) These Drawings and Specifications are presented to the Tenderer with the understanding that he is expert and is competent is the preparation of Contract Bid Price on the basis of information such as is contained in these documents, which do not include assurance as the their complete accuracy and validity, in all details, and which may depend, for proper execution, upon interpretation by Representative Engineers and other Authorities, during the course of construction

g) For the above reasons, the Tenderer shall understand that his submission of an unqualified proposal commits him to perform all work expressed and implied in the Drawings and Specifications without additional compensation. He shall further understand such submission commits him without extra compensation, and within the scope of the Contract, to the following:

i) To provide, any small items of work not specifically called for, but required to complete the intended installations.

ii) To provide if required by the Representative Engineer, the items or arrangements of greater quantity, better quality, or higher cost in the event that a disagreement with regard to such items occurs between the drawing and specifications, or within one.

iii) To co-ordinate his work or adjust the same so that conflicts in space do not occur with other trades involved at the project.

iv) To co-ordinate his work or adjust the same to suit site or any other existing conditions.

15 CODES, PERMITS AND INSPECTIONS.

a) All work shall meet or exceed the latest requirements of all authorities exercising jurisdiction over construction work at the project site.

b) All required permits and inspection certificates should be obtained, paid for, and made available at the time of completion of the Works.

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c) All plumbing work shall be carried out in accordance with the Uniform Plumbing Code (UPC) and the Installation of the Fire Protection system shall be in accordance with Uniform Fire Codes (UFC) and NFPA/ F.P.A Codes.

16 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

a) Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any time, in the drawings or specifications or both, carries with it the instructions to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

b) It shall be understood that the specifications and drawings are complimentary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to an individual element of work that takes precedence over the Specifications where they conflict with the same.

c) No exclusions from, or limitations, in the language used in the Drawings or Specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are omitted.

d) The necessary Drawings utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate very item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the mechanical drawings, and in conformity with the dimensions indicated on final Architectural and Structural working Drawings and on equipment shop drawings.

e) No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are executed.

f) Certain details appear on the Drawings, which are specific with regard to the dimensions and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field co-ordination for the indicated work.

g) Information as to the general construction not evident in this specifications and drawings shall be derived from structural and architectural drawings and specifications.

17 SHOP DRAWINGS BY THE CONTRACTOR

a) Prior to commencement of works on Site, and at least 3 (three) weeks in advance of all the drawings being required for actual execution, the CONTRACTOR shall

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submit Shop Drawings in triplicate for approval to the Consultants. The Consultants shall review the drawings (i) approve the drawing or (ii) approve the drawing with comments, or (iii) disapprove the drawing with comments or, (iv) disapprove the drawings with comments for rectifications. The Contractor shall then revise the drawings and resubmit 3 copies to the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER for Approval. On a drawing being approved, the CONTRACTOR shall submit 6 copies for formal approval and distribution to relevant offices.

b) All drawings shall have plans and sections carrying sufficient details to clearly reflect the installation of the plant. All material specifications shall be provided on the drawings. All information required for preparing suitable foundation, for providing suitable access to the plant, for making openings in building structure, for co-ordination with electrical, air-conditioning and other designs etc. shall be clearly provided.

c) Installation shall not be allowed to commence unless approved shop drawings are in possession of the Contractors, for which purpose shop drawings will be submitted by the Contractor to the Consultant sufficiently in advance of actual requirements to allow for ample time in checking and approval and no claim for extension of the Contract time will be considered by reason of the Contractor's failure to submit the drawing on time.

d) Each shop drawing submitted by the CONTRACTOR shall include a certificate by the CONTRACTOR that all related conditions on site relevant to that particular installations have been checked and that no conflict exists.

e) Any expenses resulting from an error, mistake or omission in or delay in delivery of the drawings and information mentioned in Sub-Clause 1.5(b) of this Clause shall be borne by the CONTRACTOR.

f) Drawings approved shall not be departed from except on the instructions of the Consultants.

g) The approval of the, on any submitted data, working drawings, performance curves, test certificates for any items, arrangements and/or layout shall not relieve the CONTRACTOR from any responsibility regarding the performance of the Contract. Such approval shall not also relieve the CONTRACTOR from responsibility or any error in the submitted data and drawings, brought to light at any time subsequent to any approvals.

18 AS BUILT DRAWINGS BY THE CONTRACTOR

a) The CONTRACTOR shall keep a complete record of all piping and accessories installed within the building, and shall mark any deviations adopted on the Shop Drawings.

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b) After the completion of the project, the CONTRACTOR shall transfer all the relevant record on the shop drawings and submit 3 copies for approval to the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER.

c) After receipt of approval the CONTRACTOR shall submit six copies each of the Approved "As Built" drawing and one copy of reproducible. Reproducible tracings shall be intact and on imported reproducible paper to the satisfaction of the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER. Alternately original tracings on good quality tracing paper shall be acceptable.

19 APPROVAL FOR MATERIAL AND EQUIPMENT

a) General : All equipment and material to be used in the works shall be subject to approval by the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER and approval shall be obtained prior to delivery of the same on site. It is to be specifically noted that any approval given by the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER shall not relieve the CONTRACTOR of his obligations under the Contract.

b) Approval of Imported Equipment : For approval of all imported equipment, the CONTRACTOR shall be required to submit within two weeks of the signing of the Contract, detailed submittals stating the equipment proposed to be supplied and providing supporting literature / brochures etc. to enable the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER to check conformance to the Specifications. Performance curves and charts shall be submitted with the operating points clearly marked. All equipment submittals shall be accompanied with a certificate stating that the equipment proposed to be supplied fits into the space allocated for it, with sufficient clearance around it, to allow for installation of related ducting, piping etc. and provide for maintenance clearance as required by the equipment manufacturer, and that all special requirements of the equipment have been accounted for. Any additional information, test reports etc. required by the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER shall be furnished by the CONTRACTOR all work related to the equipment shall only be commenced after receipt of written approval from the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER.

c) Approval of Locally Manufactured Equipment: The procedure of approval of locally manufactured equipment shall be the same as stipulated in Clause 1.7(b) above. Additionally all locally manufactured equipment shall be inspected at the manufacturer's premises by the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER, and approval given prior to delivery on site.

d) Approval of Imported Material: All imported material to be used in the works shall be submitted to the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER and approval obtained.

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Manufacturer's literature/brochure etc. that provide complete information on the material specifications, to enable the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER to check conformance to specification, shall be submitted. Any additional information, test reports etc. required by the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER shall be supplied by the CONTRACTOR. The procedure shall be the same as specified in clause 1.7(b) above.

e) Approval of Locally Procured Material: All locally procured material shall be submitted to the INTERIOR DESIGNER / CONSULTANT / PROJECT MANAGER for approval, and approval obtained prior to delivery of the same on site. The procedure for obtaining approval shall generally be the same as given in clause 1.7(b), except that where manufacturer's literature is not available, a sample of the material shall be submitted along with type written notes indicating relevant source data and specifications on the material. Any other samples information, test reports, etc. required by the ARCHITECT / CONSULTNAT shall be submitted.

20 CUTTING AND PATCHING

Cutting will be done under Specifications of other trades. This CONTRACTOR is called upon to set opening and sleeves for pipes accurately before the concrete floors are poured or may set boxes on the forms so as to leave openings in the floors in which the required sleeves can be subsequently located in which case he is called upon to fill in the concrete voids around the sleeves.

All patching will be done under Specifications of other trades. Should the CONTRACTOR neglect to perform his preliminary work and should cuttings be required in order to install the piping or equipment, then the expense of the cutting and restoring of surface to their original conditions shall be borne by the CONTRACTOR.

21 CLEANING AND PROTECTION

a) The Contractor shall be responsible for his work until its completion and final acceptance and shall replace any of the same, which may be damaged, lost or stolen, without any additional cost to the Employer.

b) All openings left in floor for passage of lines of soil, drain, waste, vent, and supply pipes shall be covered and protected. All set traps shall be sealed. All open ends of pipes shall be closed by a plug fitting to prevent obstruction and damage. The use of new permanent water closets and other new plumbing fixtures during the progress of the work is prohibited.

c) As soon as it is installed, all metal fixtures and trimmings shall be thoroughly covered by the Contractor with the non corrosive grease which shall be maintained until all construction work is completed.

d) Upon the completion of the work, all fixtures and trimmings shall be thoroughly cleaned and polished and left in first class condition.

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e) Prior to delivering the works to the Employer the Contractor shall thoroughly clean all equipment fixtures, fittings.

f) Before final connections are made and before operation of equipment and piping, all piping interior and exterior shall be thoroughly blown out, rod out, or washed out at lease twice in a manner as directed and/or approved by the Engineer, to remove all accumulation of dirt, chips make all temporary connections and furnish all appliances required for the purpose of cleaning at no extra expenses to the Employer.

g) Before erection, all pipes, tubing, valves and fittings shall be thoroughly cleaned of oil, grease, or other combustible materials by washing in a hot solution of sodium carbonate or tri-sodium phosphate mixed in the proportions of one pound to three gallons of water.

h) Scrubbing and continuous agitation of the parts shall be employed where necessary to remove all deposits and ensure complete cleaning. After washing all materials shall be rinsed thoroughly with clean hot water.

i) After cleaning, great care must be exercised in the storage and handling of all materials and in the conditions of tools used in cutting and reaming to prevent oil or grease being introduced into the tubing. Where such contamination is known to have occurred in the materials affected must be re-washed and rinsed.

22 PAINTING, COATING AND STENCILING

General:

Painting shall include furnishing labor, materials equipment, ladders, scaffolding, protective covers, other items required to prepare and finish surface of work specified herein or in any of the other sections. Paint color scheme shall be specified at the time of painting or earlier and shall be based on American Standard 'Scheme for identification of piping system' ASA A-13.1 to 1973.

Surface Preparation

a) Surfaces to be painted shall be dry and free from burrs, weld spatter, dirt, dust, rust, loose mill scale, grease, oil and other foreign matter before any paint is applied.

b) All rust and loose mill scale etc. shall be removed by thoroughly chipping, scrapping and wire brushing, oil, grease, dust etc. shall be removed by washing down with a suitable solvent, as recommended by the paint manufacturer, and wiping with clean rags.

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c) All tools shall be used in such a manner so as not to leave rough or sharp surfaces. No cuts shall be made on steel surface.

d) Before applying the finish coat the primed surface shall be scuffed lightly with sand paper recommended by the paint manufacturer.

Applications:

a) All materials shall be applied in strict accordance with the paint manufacturer's directions unless otherwise specified.

b) Paint shall be applied by brush, spray or any other paint manufacturers approved method in such a manner that a uniform thickness (as per manufacturer's recommendation) is maintained in each coat and no defects are produced in the previous coats.

c) Each coat shall preferably be of different color so as to produce a contacts assuring complete covering by the next coat. Sufficient time shall be allowed between coats to permit drying. A minimum of 24 hours between applications on any one surface shall be allowed unless otherwise specified by the manufacturer.

d) No painting work shall be done on exterior surfaces during rainy, damp, foggy or dust weather and no painting material shall be applied if the temperature is above 50°C or below 5°C. Painting work shall be avoided in cases where the surface is damp or blowing winds. The Engineer shall determine whether the conditions are suitable for painting or not.

e) The primer coat of paint shall be applied as soon as possible after the surface preparation but, in any case, on the same day.

f) Before application of painting materials, the Employer representative shall inspect and approve the quality of surface preparation and the preparation of painting material.

Paint System:

a) Material and Equipment: All materials and equipment factory fabricated, imported or otherwise shall be provided with a fresh coat of paint, of same color as the original factory paint, if in the opinion of the Engineer the same has deteriorated to an extent to require fresh painting. Paint shall be applied as per the accepted norms and as directed by the Engineer.

b) Uninsulated Surface: Including piping, valves, and fittings shall be painted with two coats primer followed by the two coats of enamel paint.

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c) Insulated Surfaces: Shall be painted with one coat of primer and one coat of enamel paint.

d) Underground Galvanized Iron or Black Steel Piping: Or piping concealed in wall chase and concrete shall be wrapped with approved polyethylene anti-corrosive tape.

e) Extent of Painting on Pipes: All exposed interior utility piping and all piping readily serviceable in walk-in utility spaces, and in serviceable spaces, shall be painted as noted above and specified herein.

Paint:

a) Primer for Iron Surfaces: Shall be suitable steel protective prior best local make as approved by the Engineer.

b) Primer for Galvanized Surfaces: Shall be suitable galvanized iron primer best local make as approved by the Engineer.

c) Finishing Paint: Shall be generally enamel paint, unless the application requires special paint, in which case suitable special paint as approved by the Engineer.

23 PIPE SUPPORTS

All soil and waste lines hung from the ceiling shall be supported at not more than 3 Ft centers for horizontal pipe and 3 Ft for vertical pipes. Provide supports at all special fittings.

24 TESTING AND INSPECTION

a) The entire drainage and vent system and building sever shall be subjected to testing after installation to ensure a leak-proof installation under operation conditions.

All the openings in the piping system shall be tightly closed by inserting test plug so that heavy rubber gasket fits snugly all around the opening. The highest point will be left open to supply water and may be raised if necessary by temporary jointing to develop a minimum head of one pipe length of water at each section of the system. Water is filled to the point of overflow and any drop in the level of water will indicate a leak that will be found by inspection. The water level will be checked for no drop for at least 15 to 30 minutes. Stacks will be tested in section, starting from the top section and then connecting top section to next lower section.

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REFURBISHMENT WORKS AT KTDMC.

RETROFITTING FOR THE EXISTING MEZZANINE FLOOR ROOMS FALSE CEILING IN THE PRODUCTION AREA

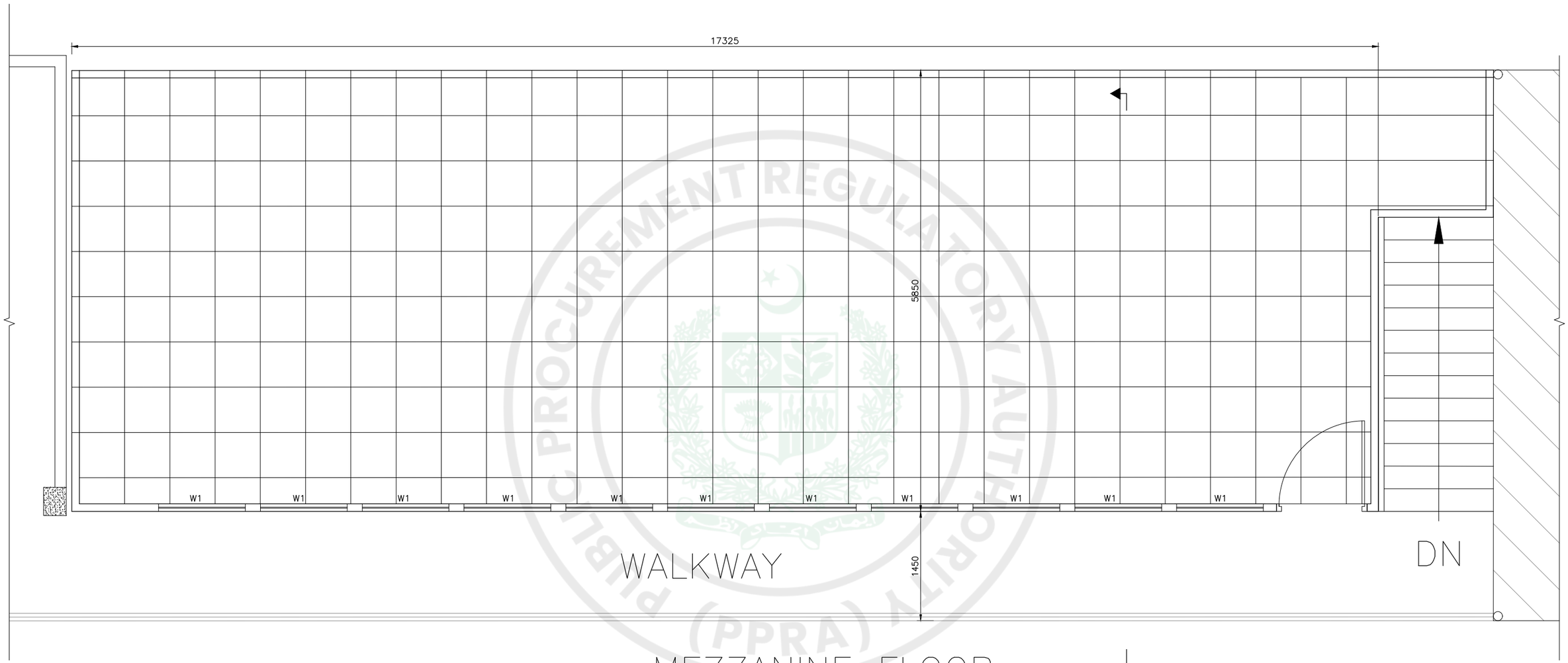
ISSUED FOR TENDER DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

JAN- 2026

Fri, 17 Apr 2026 - 10:24am
rahim 3) MR-AR-101 TO MR-AR-103.dwg

e-Pak Acquisition and Disposal System (EPADS) generated document | © 2026



MEZZANINE FLOOR
HEIGHT 2725

1
MR-AR-103

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

EXISTING FALSE CEILING PLAN

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: HAMDAN BAKHOL
DRAWN: PERVEZ

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MR-AR-101
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 10:25am
rahim 3) MR-AR-101 TO MR-AR-103.dwg

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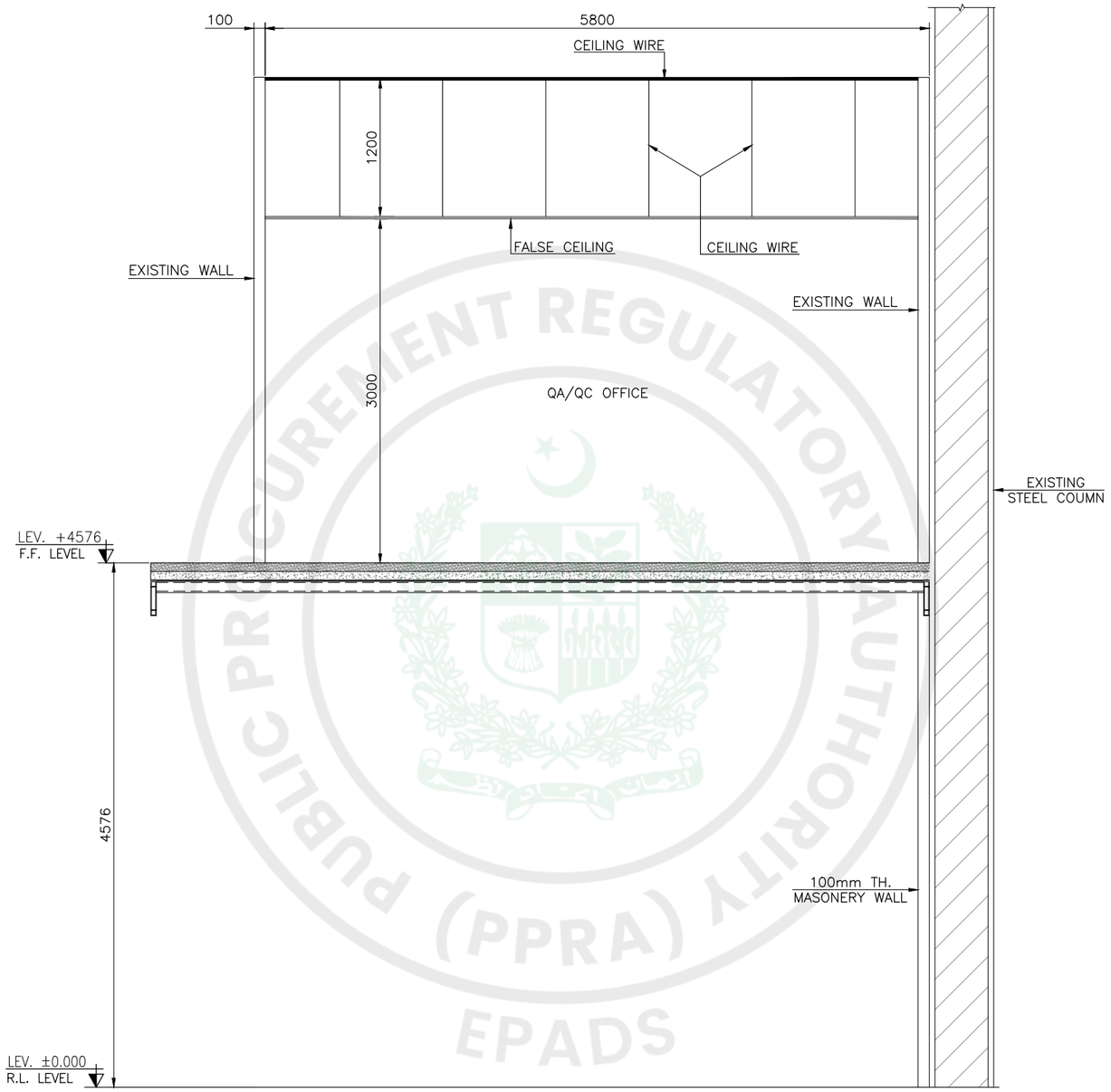

SECTION 1
SCALE:-1:40 MR-AR-102

CLIENT	CONSULTANT	PROJECT
Karachi Tools Dies & Moulds Center Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh KTDMC	logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD	REFURBISHMENT WORKS AT KTDMC. TITLE EXISTING WALL SECTION

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED	TAHSEEN AHMED
CHECKED:	SUMAIRA FATIMA
DESIGNED:	HAMDAN BAKHOL
DRAWN:	PERVEZ

PROJECT CODE: 2529	SCALE 1:50
DRG. NO.	MR-AR-101
DATE: JAN, 2026	REV. 0

Fri, 17 Apr 2026 - 10:26am
rahim 3) MR-AR-101 TO MR-AR-103.dwg

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PROJECT: REFURBISHMENT WORKS AT KTDMC.

REHABILITATION OF WASH ROOMS IN THE PRODUCTION AREA

ISSUED FOR TENDER DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

JAN- 2026

Fri, 17 Apr 2026 - 10:08am
rahim 1) TITLE.dwg

LIST OF ARCHITECTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	LWR-AR-501	EXISTING GROUND AND MEZZANINE FLOOR LABOR WASH ROOMS LAYOUT PLAN	
2	LWR-AR-502	GROUND FLOOR LABOR WASH ROOMS & MEZZANINE FLOOR LABOR WASH ROOMS	
3	LWR-AR-503	GROUND FLOOR PLUMBING PLAN OF LABOR WASH ROOMS GROUND FLOOR WATER DRAINAGE PLAN OF LABOR WASH ROOMS	
4	LWR-AR-504	MEZZANINE FLOOR PLUMBING PLAN OF LABOR WASH ROOMS AND MEZZANINE FLOOR WATER DRAINAGE PLAN OF LABOR WASH ROOMS	
5	LWR-AR-505	ARCHITECTURE PLUMBING DETAILS	

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

CLIENT

KTDMC

Karachi Tools Dies & Moulds Center

Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING

GROUND FLOOR LABOR WASH ROOMS & MEZZANINE FLOOR LABOR WASH ROOMS

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED

CHECKED: SUMAIRA FATIMA

DESIGNED: SUMAIRA FATIMA

DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529

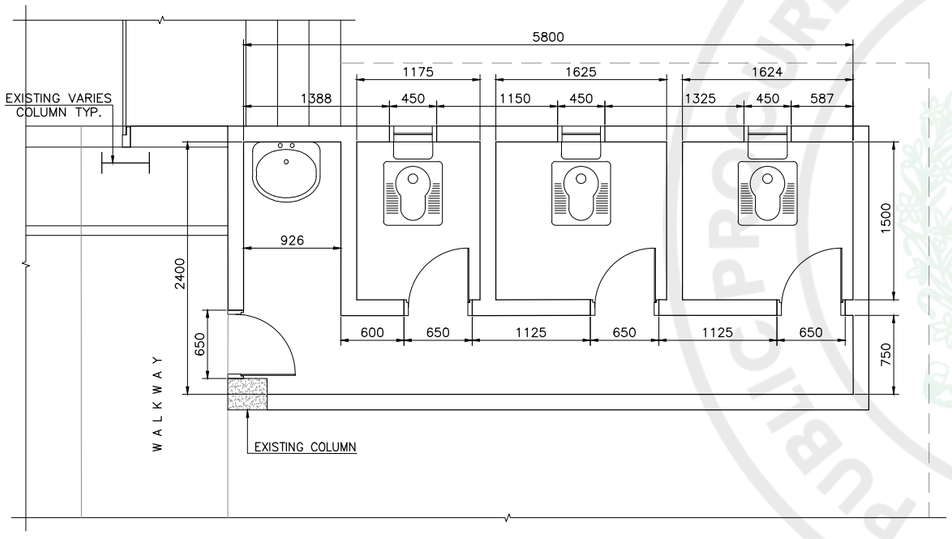
SCALE: 1:50

DRG. NO.: LWR-AR-LST-501

DATE: JAN, 2026

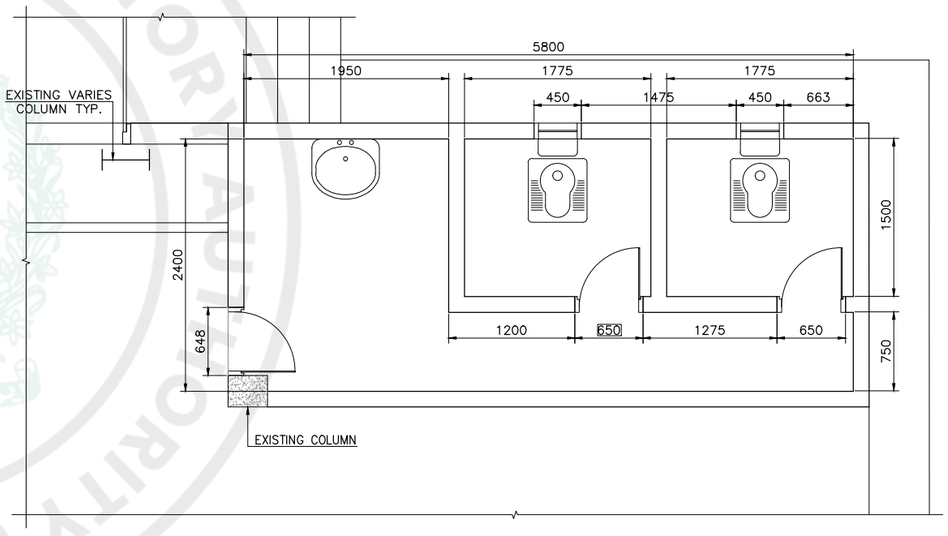
REV.: 0

Fri, 17 Apr 2026 - 9:51am
rahim 2\ LWR-AR-LST-501.dwg



GROUND FLOOR LABOR WASH ROOM LAYOUT PLAN

SCALE:-1:50 (CEILING CLEAR HEIGHT 2825)



MEZZANINE FLOOR LABOR WASH ROOM LAYOUT PLAN

SCALE:-1:50 (CLEAR HEIGHT 2725)

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park,
Sector252938, Korangi Creek Rd, Karachi
City, Sindh

KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

GROUND AND MEZZANINE FLOOR
LABOR WASH ROOMS PLAN

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	20250112252025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: LWR-AR-501
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 9:51am
rahim 3) LWR-AR-501 to 504.dwg

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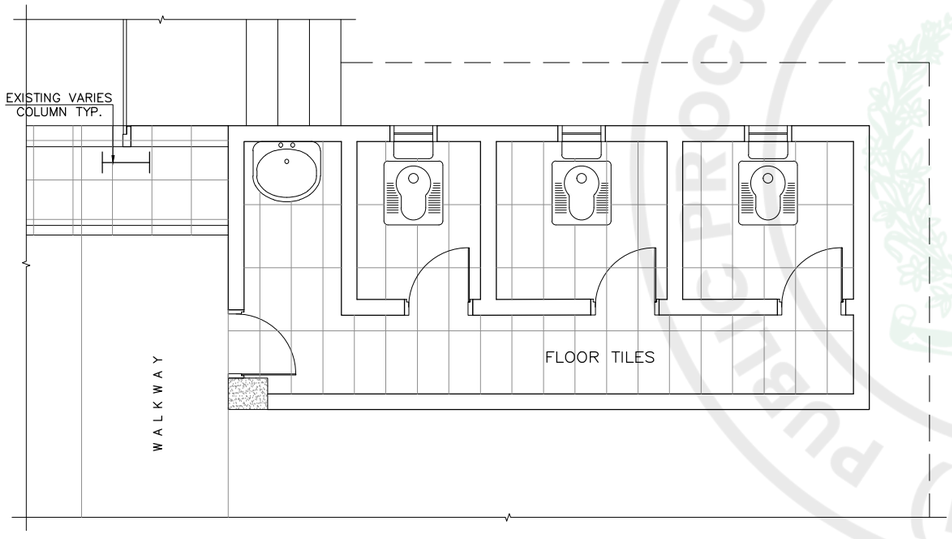
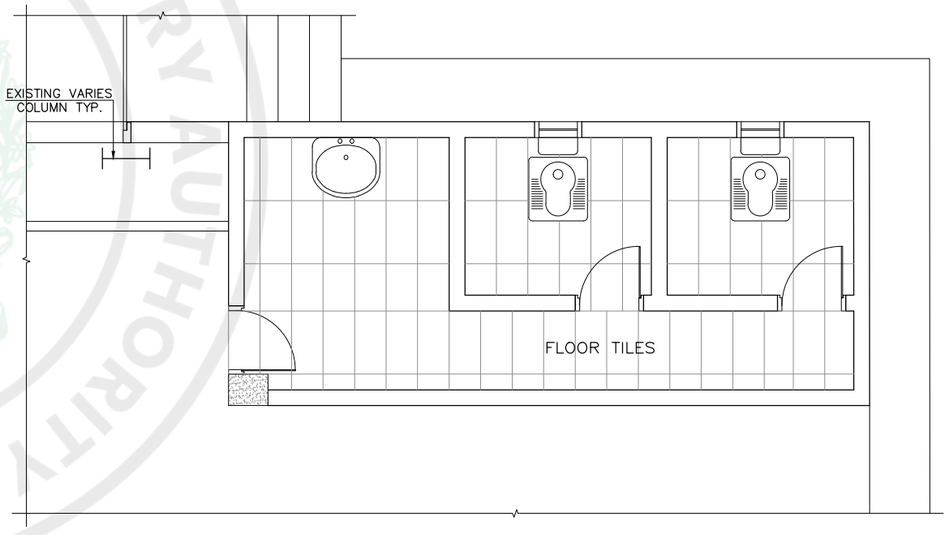


GROUND FLOOR LABOR WASH ROOMS
SCALE:–1:50 (CEILING CLEAR HEIGHT 2825)



MEZZANINE FLOOR LABOR WASH ROOMS
SCALE:–1:50 (CLEAR HEIGHT 2725)

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

CLIENT

Karachi Tools Dies & Moulds Center
KTDMC
Korangi Creek Industrial Park, Sector252938, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

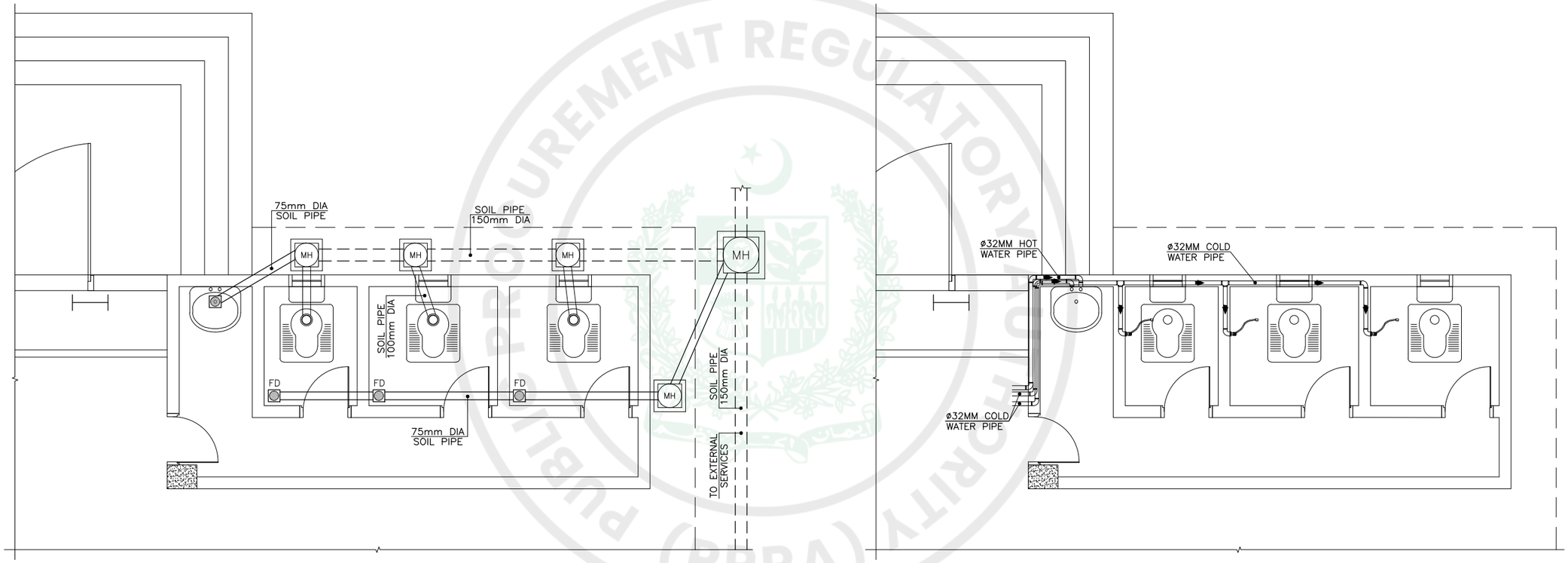
GROUND FLOOR LABOR WASH ROOMS &
MEZZANINE FLOOR LABOR WASH ROOMS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	20250112250205

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: LWR-AR-502
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 9:52am
rahim 3\ LWR-AR-501 to 504.dwg



GROUND FLOOR PLUMBING PLAN OF LABOR WASH ROOM
SCALE:-1:50

GROUND FLOOR WATER DRAINAGE PLAN OF LABOR WASH ROOMS
SCALE:-1:50

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector252938, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

GROUND FLOOR PLUMBING PLAN OF LABOR WASH ROOMS
GROUND FLOOR WATER DRAINAGE PLAN OF LABOR WASH ROOMS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252511252620 25

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: LWR-AR-503
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 9:52am
rahim 3) LWR-AR-501 to 504.dwg

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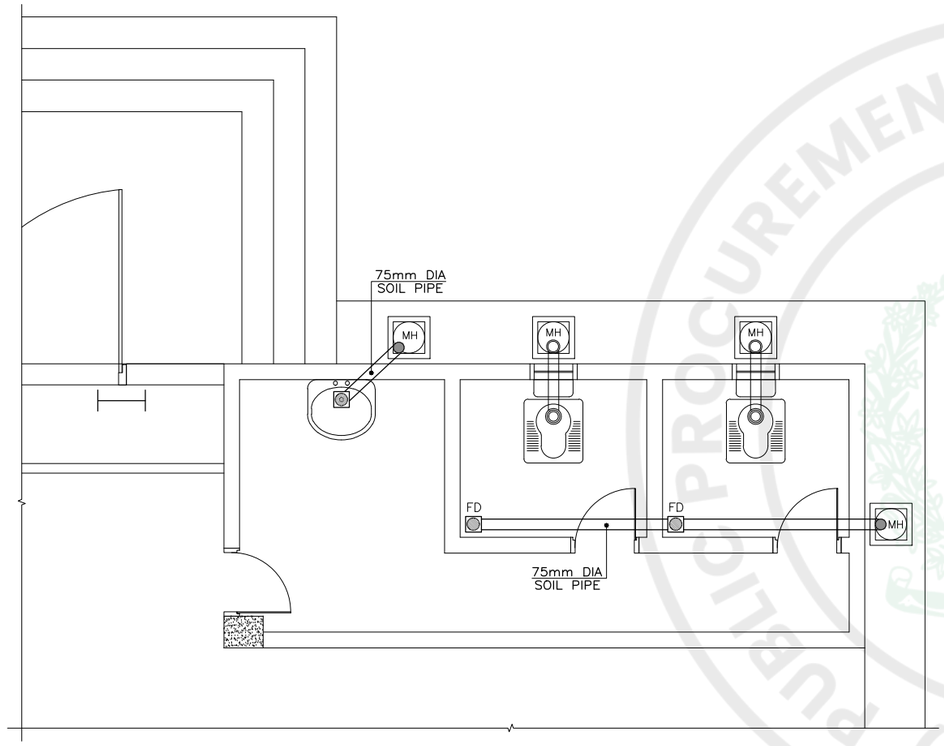
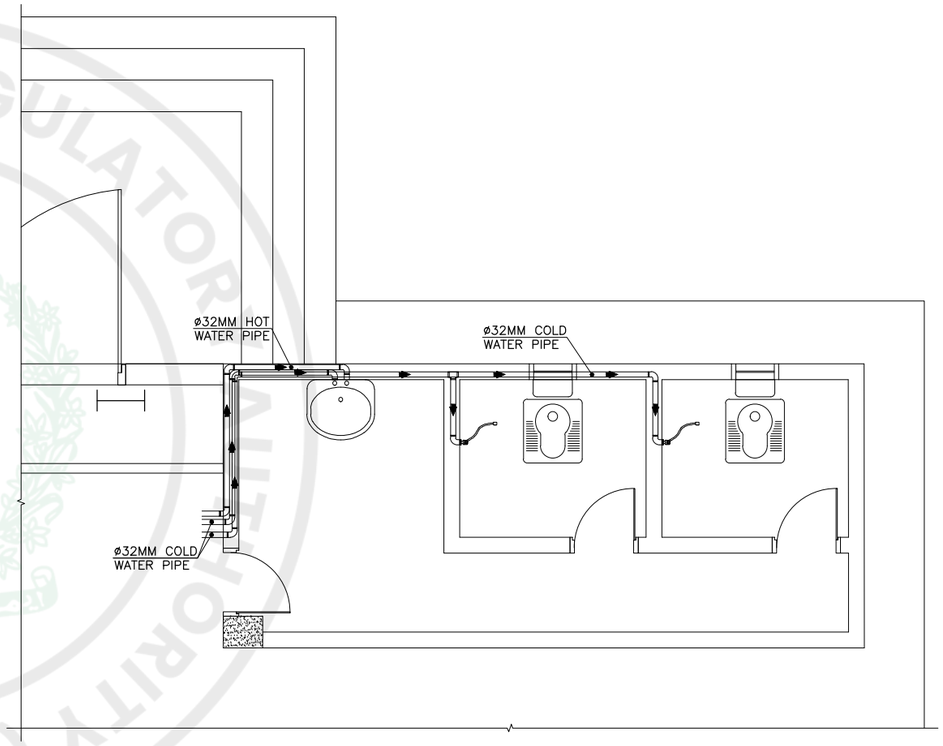


MEZZANINE FLOOR PLUMBING PLAN OF LABOR WASH ROOMS

SCALE:–1:50



MEZZANINE FLOOR WATER DRAINAGE PLAN OF LABOR WASH ROOMS

SCALE:–1:50

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park,
Sector252938, Korangi Creek Rd, Karachi
City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

MEZZANINE FLOOR PLUMBING PLAN OF LABOR WASH ROOMS AND MEZZANINE FLOOR WATER DRAINAGE PLAN OF LABOR WASH ROOMS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252612526025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: LWR-AR-504
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 9:53am
rahim 3) LWR-AR-501 to 504.dwg

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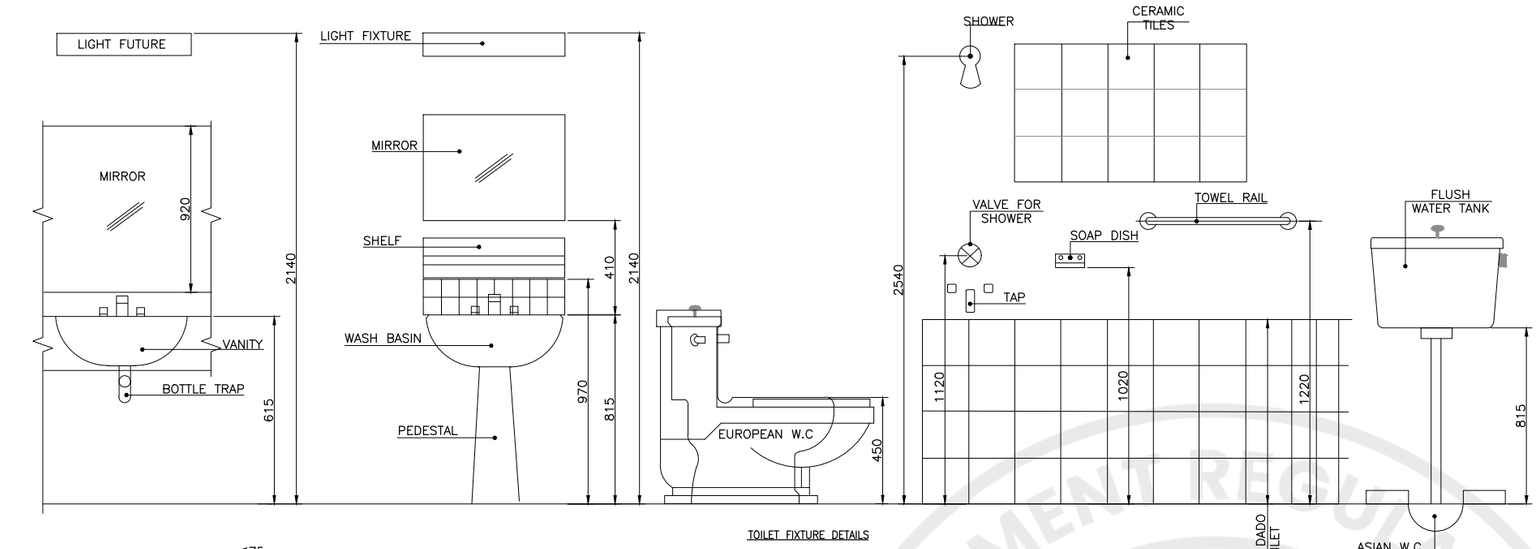
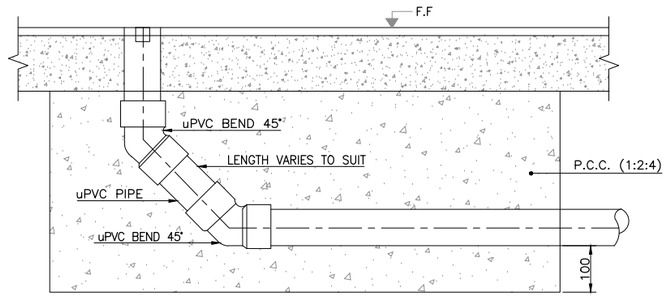
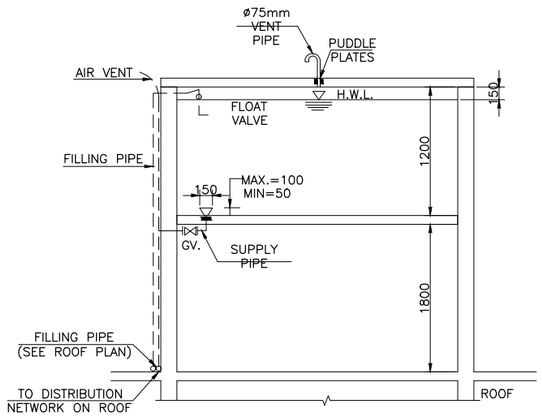


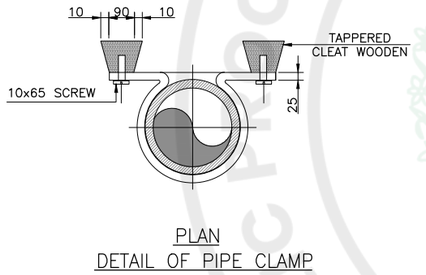
TOILET FIXTURE DETAILS



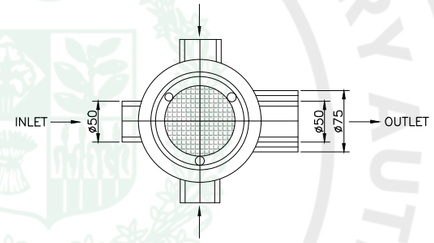
DETAIL OF FLOOR CLEANOUT



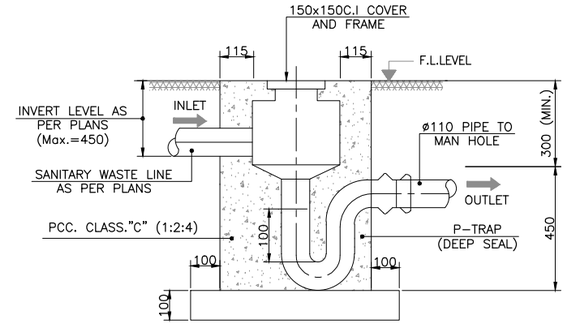
(O.H.W.T)
DETAIL OF FILLING AND SUPPLY PIPE



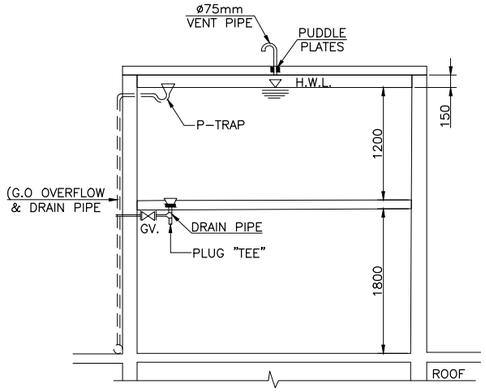
PLAN
DETAIL OF PIPE CLAMP



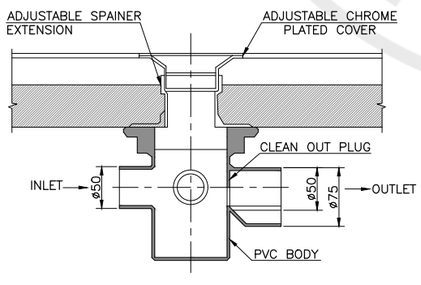
PLAN
MULTI FLOOR TRAP



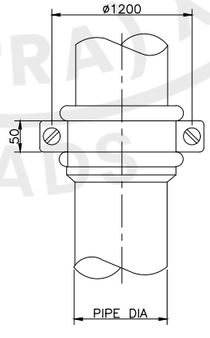
DETAILS OF GULLY TRAP



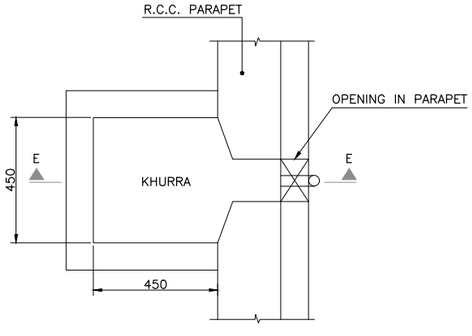
(O.H.W.T)
DETAIL OF OVER FLOW AND DRAIN PIPE



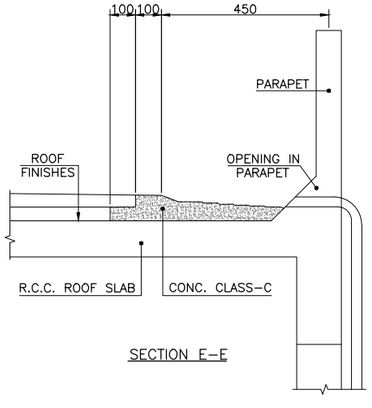
ELEVATION
DETAIL OF MULTI FLOOR TRAP



ELEVATION



PLAN
DETAIL OF KHURRA



SECTION E-E

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector252938, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

ARCHITECTURE PLUMBING DETAILS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252511252026025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: LWR-AR-505
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 9:53am
rahim 3) LWR-AR-501 to 504.dwg

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REFURBISHMENT WORKS AT KTDMC.

REHABILITATIUON OF STUDENT'S WASHROOMS ON THE FIRST FLOOR OF ADMIN BLOCK

ISSUED FOR TENDER DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

KTDMC

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

JAN- 2026

Fri, 17 Apr 2026 - 10:31am
rahim 1) TITLE.dwg

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LIST OF ARCHITECTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	MFWR-AR-501	FIRST FLOOR ADMIN BLOCK MALE WASH ROOMS LAYOUT PLAN	
2	MFWR-AR-502	FIRST FLOOR ADMIN BLOCK MALE WASH ROOMS FLOORING PLAN	
3	MFWR-AR-503	FIRST FLOOR ADMIN BLOCK PLUMBING DETAILS OF MALE WASH ROOMS	
4	MFWR-AR-504	FIRST FLOOR ADMIN BLOCK DRAINAGE PLAN OF MALE WASH ROOMS	
5	MFWR-AR-505	ARCHITECTURE PLUMBING DETAILS	

CLIENT

KTDMC

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING
REHABILITATIUON OF STUDENT'S WASHROOMS
ON THE FIRST FLOOR OF ADMIN BLOCK

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MFWR-AR-LST-501
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 11:06am
rahim 2) MFWR-AR-LST-501.dwg

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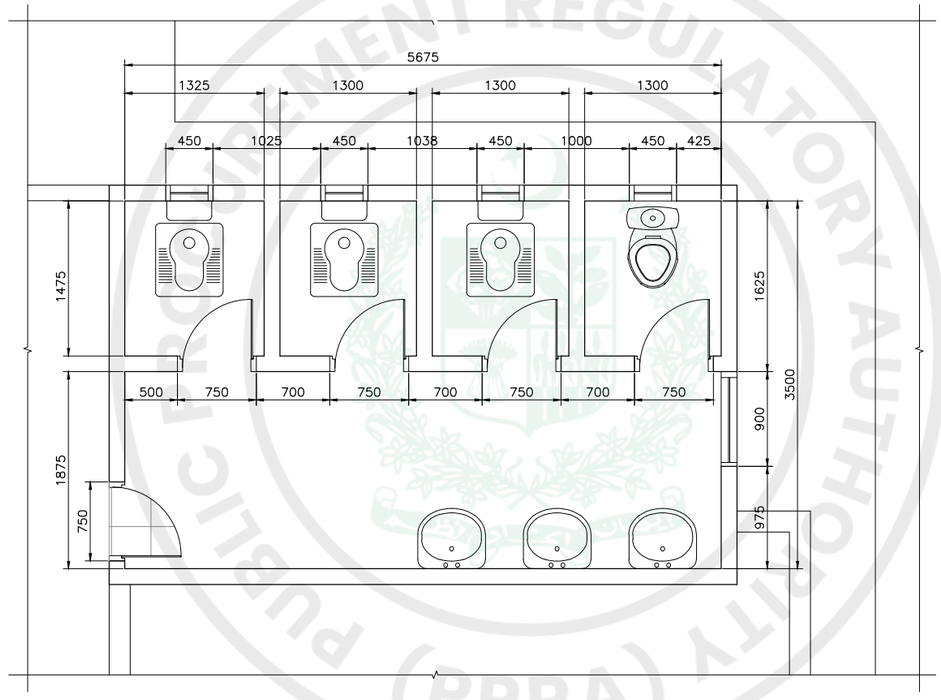

FIRST FLOOR WASH ROOM LAYOUT PLAN

SCALE:-1:50 (CLEAR HEIGHT 2675)

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park,
Sector252938, Korangi Creek Rd, Karachi
City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

FIRST FLOOR ADMIN BLOCK
MALE WASH ROOMS LAYOUT PLAN

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252912522025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MFWR-AR-501
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 10:49am
rahim 3) MFWR-AR-501 to 505.dwg

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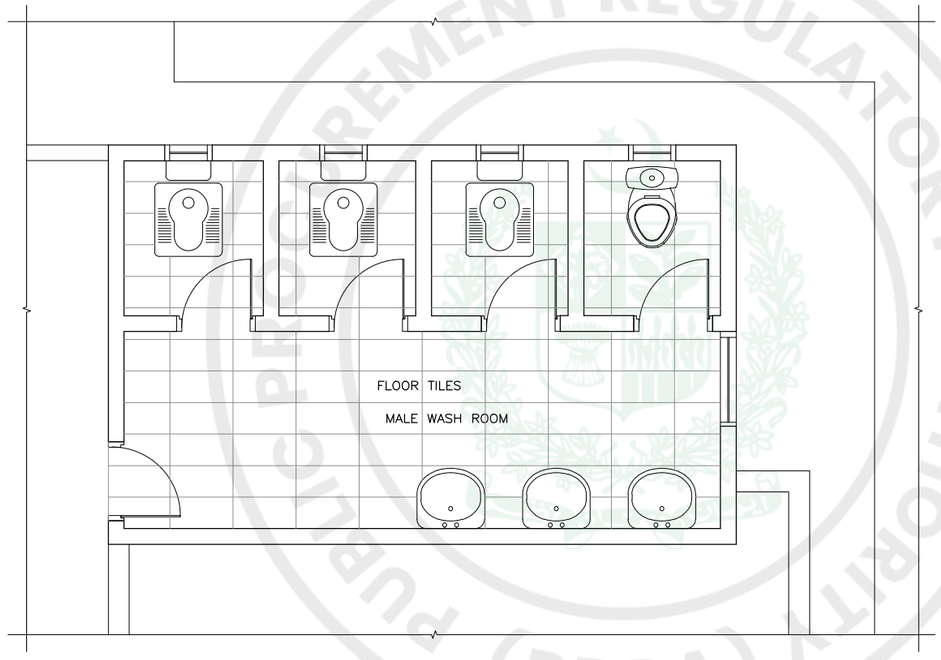

FIRST FLOOR WASH ROOMS
SCALE:-1:50 (CLEAR HEIGHT 2675)

CLIENT

Karachi Tools Dies & Moulds Center
KTDMC
Korangi Creek Industrial Park,
Sector252938, Korangi Creek Rd, Karachi
City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

FIRST FLOOR ADMIN BLOCK
MALE WASH ROOMS FLOORING PLAN

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252911252026025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MFWR-AR-502
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 10:49am
rahim 3) MFWR-AR-501 to 505.dwg

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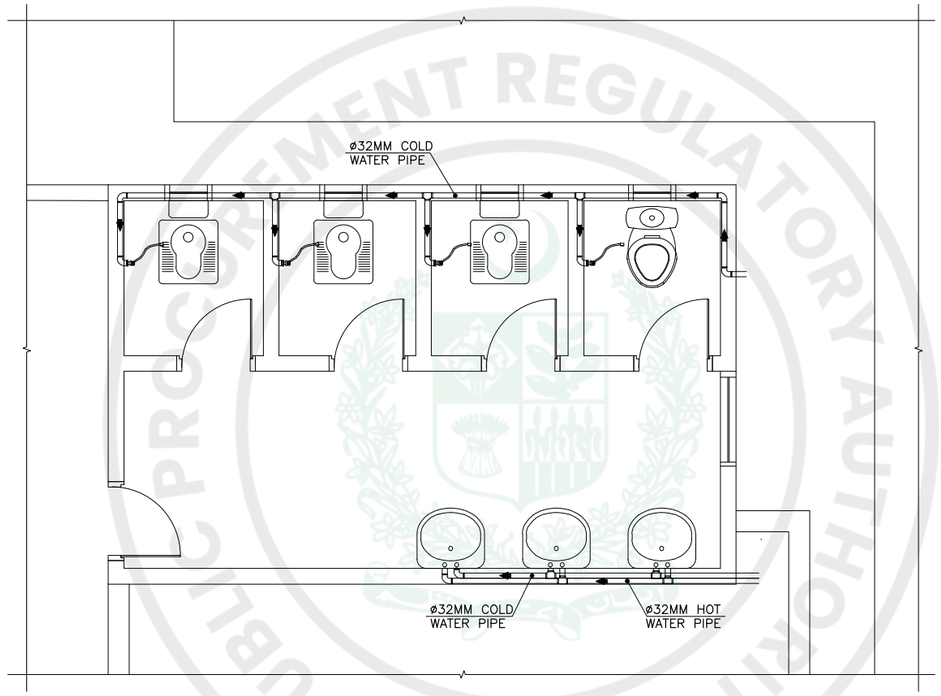

FIRST FLOOR PLUMBING DETAILS OF MALE WASH ROOMS

SCALE:-1:50

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector252938, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

FIRST FLOOR ADMIN BLOCK
PLUMBING DETAILS OF MALE WASH ROOMS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252911252026025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MFWR-AR-503
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 10:50am
rahim 3) MFWR-AR-501 to 505.dwg

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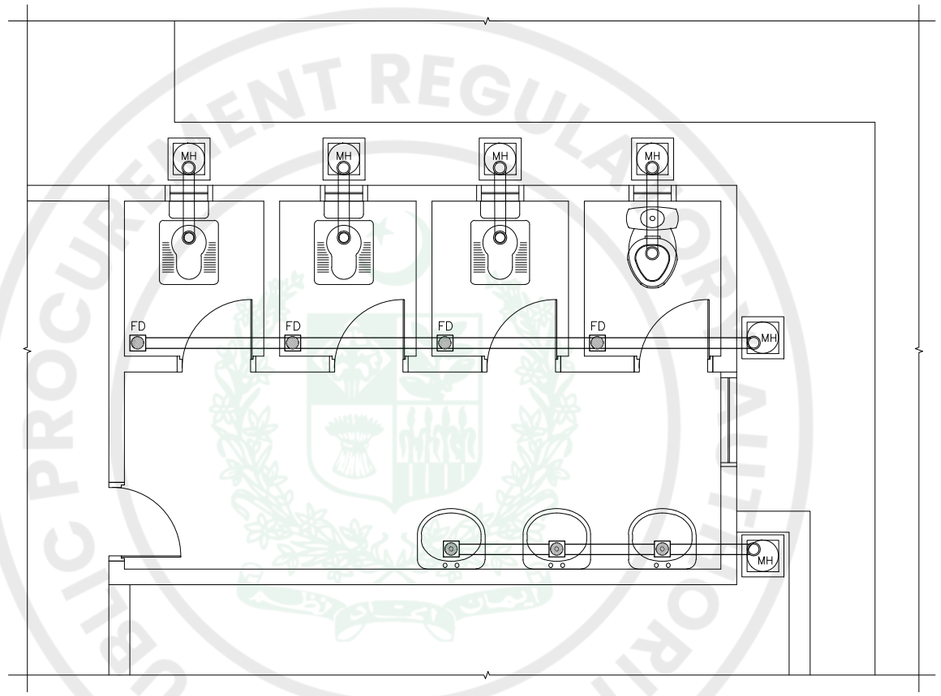


FIRST FLOOR PLUMBING PLAN OF MALE WASH ROOMS

SCALE:-1:50

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA)
EPADS

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector252938, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

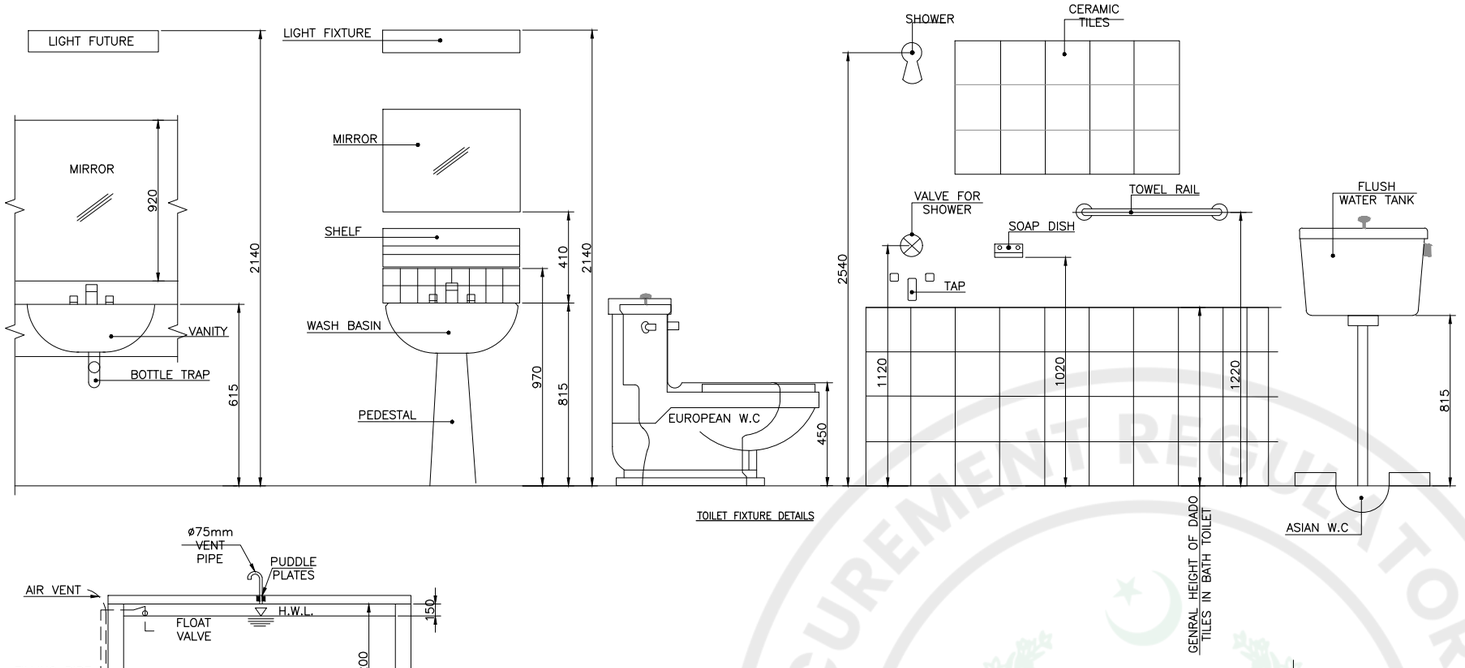
FIRST FLOOR ADMIN BLOCK
DRAINAGE PLAN OF MALE WASH ROOMS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252912526202 5

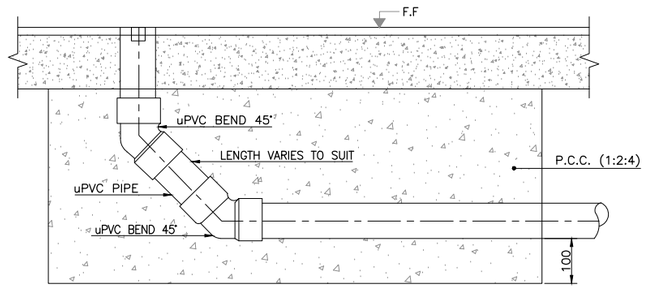
APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MFWR-AR-504
DATE: DEC, 2025
REV.: 0

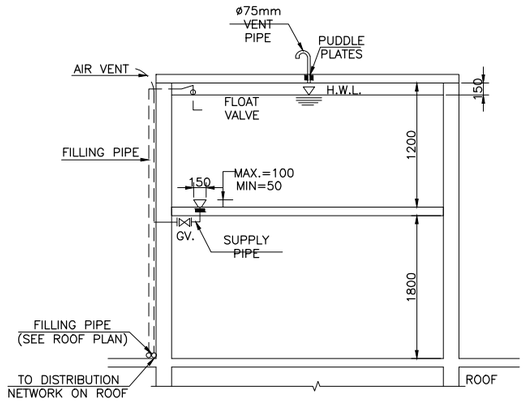
Fri, 17 Apr 2026 - 10:50am
rahim 3) MFWR-AR-501 to 505.dwg



TOILET FIXTURE DETAILS

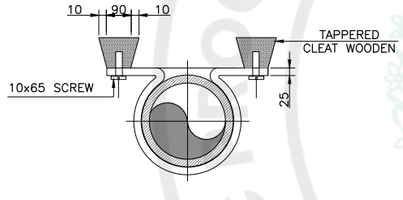


DETAIL OF FLOOR CLEANOUT



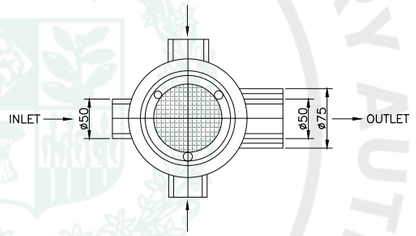
(O.H.W.T)

DETAIL OF FILLING AND SUPPLY PIPE



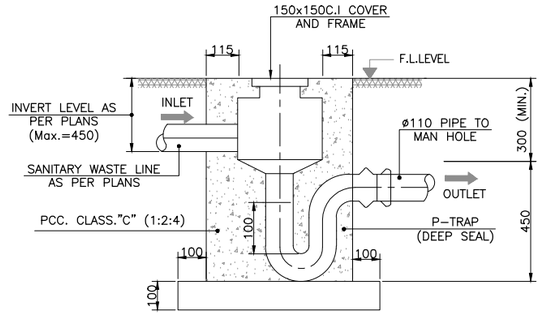
PLAN

DETAIL OF PIPE CLAMP

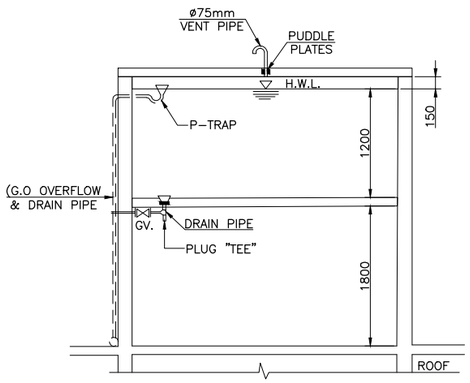


PLAN

MULTI FLOOR TRAP

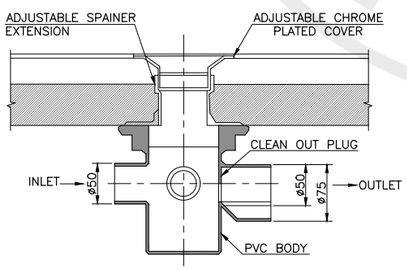


DETAILS OF GULLY TRAP



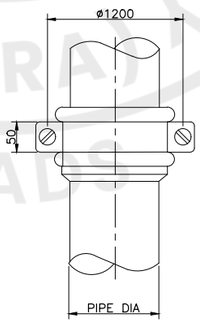
(O.H.W.T)

DETAIL OF OVER FLOW AND DRAIN PIPE

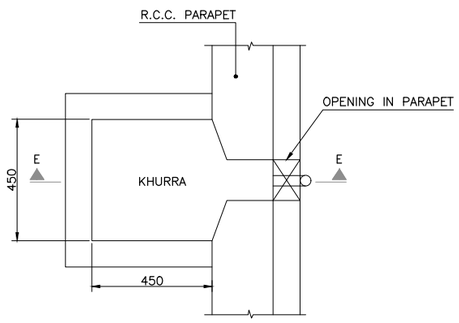


ELEVATION

DETAIL OF MULTI FLOOR TRAP

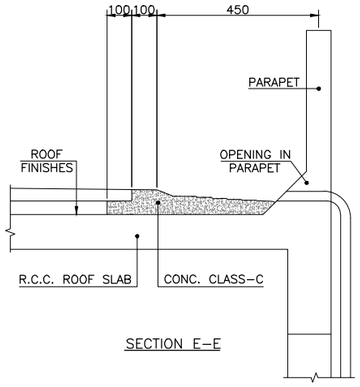


ELEVATION



PLAN

DETAIL OF KHURRA



SECTION E-E

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector252938, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

ARCHITECTURE PLUMBING DETAILS

REV.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	26252911252620025

APPROVED: TAHSEEN AHMED
CHECKED: ABDUL WAHAB
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MFWR-AR-505
DATE: DEC, 2025
REV.: 0

Fri, 17 Apr 2026 - 10:51am
rahim 3) MFWR-AR-501 to 505.dwg

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REFURBISHMENT WORKS AT KTDMC.

REHABILITATION OF THE STORE ROOF

ISSUED FOR TENDER DRAWING

KTDMC

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

MAY-2026

Mon, 11 May 2026 - 11:59am
rahim 1) TITLE.dwg

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STRUCTURAL DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	SR/AR-201	GROUND FLOOR PLAN	1
2	SR/AR-202	SECTION -A	1
3	SR/ST-201	ROOF SLAB FRAMING PLAN	1

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING

REHABILITATION OF THE STORE ROOF

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026
1	ISSUED FOR TENDER	11-05-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: ADNAN AYUB

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: SR-LD-201
DATE: MAY, 2026
REV.: 1

Mon, 11 May 2026 - 12:02pm
rahim 2) RR-LST-201.dwg

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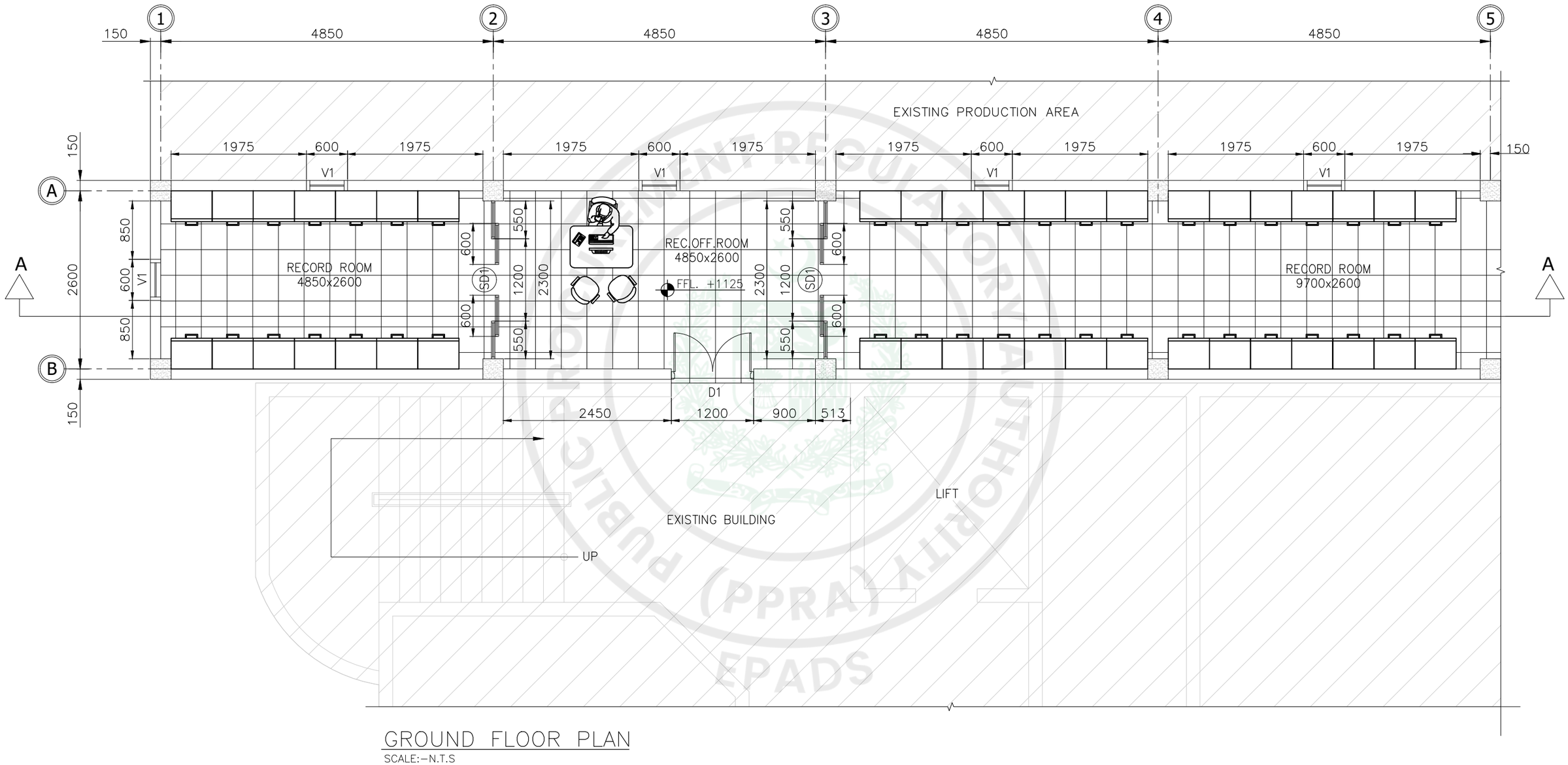
ARCHITECTURE DRAWINGS



GROUND FLOOR PLAN

SCALE:-N.T.S

CLIENT	Karachi Tools Dies & Moulds Center Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh KTDMC	
CONSULTANT	logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD	
PROJECT	REFURBISHMENT WORKS AT KTDMC.	
TITLE	GROUND FLOOR PLAN REHABILITATION OF THE STORE ROOF	

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026
1	ISSUED FOR TENDER	11-05-2026

APPROVED	TAHSEEN AHMED
CHECKED:	SUMAIRA FATIMA
DESIGNED:	SUMAIRA FATIMA
DRAWN:	ADNAN AYUB

PROJECT CODE:	2529
SCALE	1:50
DRG. NO.	SR-AR-201
DATE:	MAY, 2026
REV.	1

Mon, 11 May 2026 - 12:04pm
rahim RR-AR-201 & RR-AR-203.dwg

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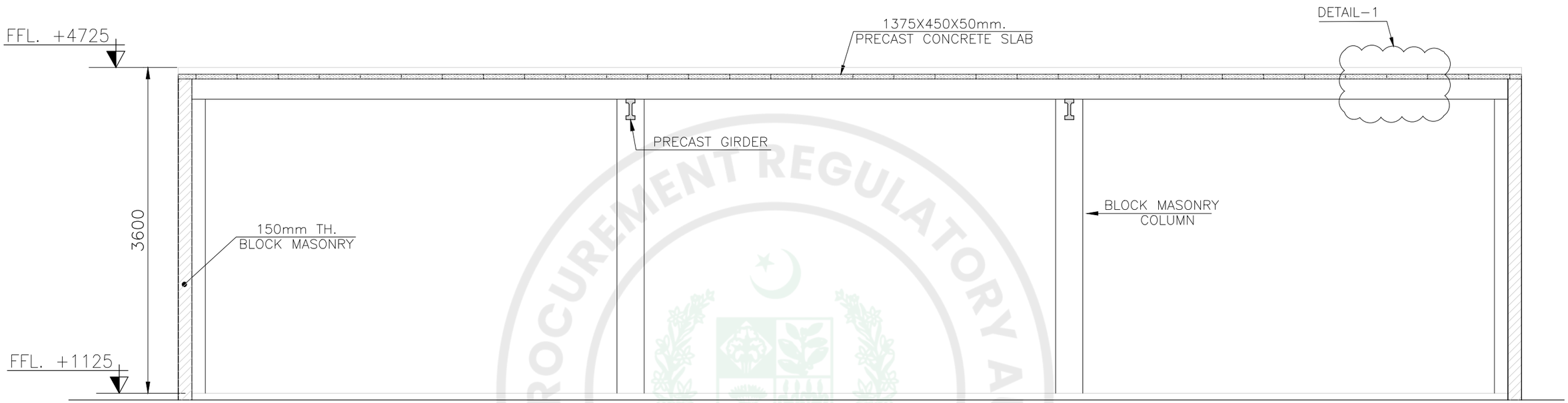
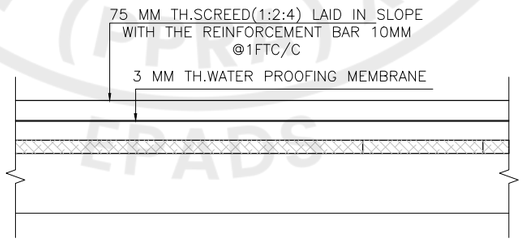


SECTION A
SCALE:-1:50



DETAIL-1

CLIENT

Karachi Tools Dies & Moulds Center
KTDMC
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

SECTION-A

REHABILITATION OF THE STORE ROOF

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026
1	ISSUED FOR TENDER	11-05-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: ADNAN AYUB

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: SR-AR-202
DATE: MAY, 2026
REV.: 1

Mon, 11 May 2026 - 12:33pm
rahim RR-AR-201 & RR-AR-203.dwg

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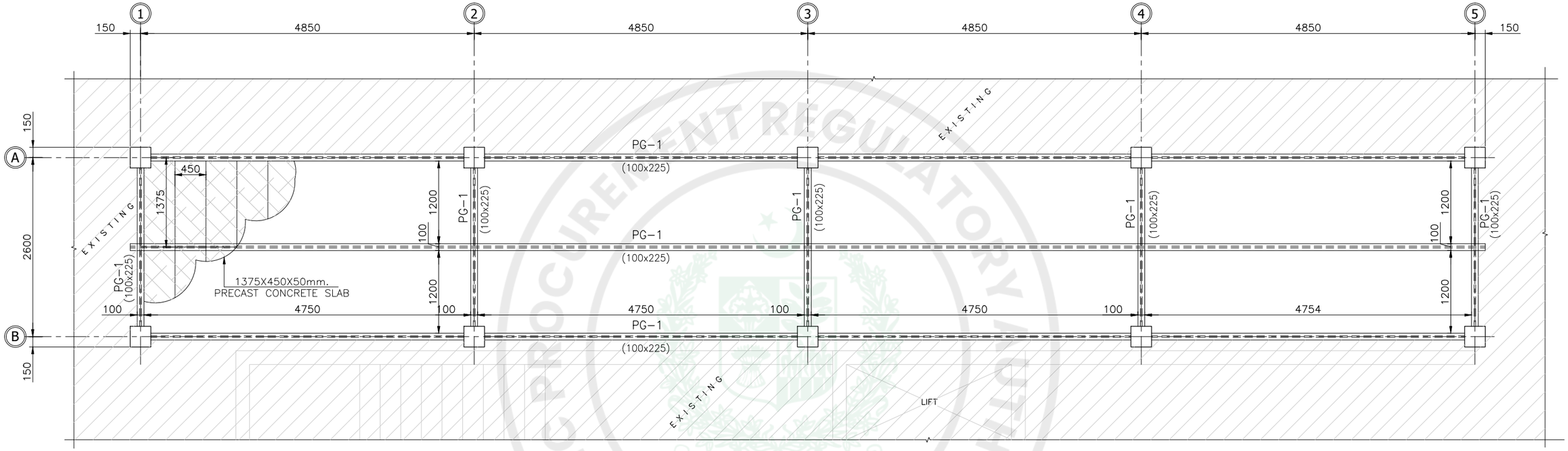
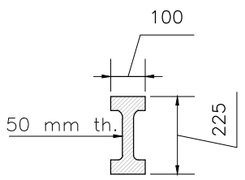
STRUCTURAL DRAWINGS



ROOF SLAB FRAMING PLAN



TYP. SEC. OF PG–1

SCALE:–N.T.S

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

ROOF SLAB FRAMING PLAN & BEAM

REHABILITATION OF THE STORE ROOF

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	20-01-2026
1	ISSUED FOR TENDER	11-05-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: ADNAN AYUB

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: SR-ST-201
DATE: MAY, 2026
REV.: 1

Mon, 11 May 2026 - 12:27pm
rahim 4) RR-ST-201 TO RR-ST-205.dwg

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REFURBISHMENT WORKS AT KTDMC.

REHABILITATION OF THE SEMINAR/ CLASS ROOM ROOF

ISSUED FOR TENDER DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

KTDMC

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

JAN- 2026

Fri, 17 Apr 2026 - 12:40pm
rahim 1), TITLE.dwg

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LIST OF STRUCTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	CR/ST-701	DEMOLISH EXISTING SECOND FLOOR PART SLAB & RECAST SECOND FLOOR PART SLAB	

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING
(REFURBISHMENT OF CLASS ROOMS AT KTDMC FACILITY.)

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: CR-LST-701
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 12:41pm
rahim 2) CR-LST-701.dwg

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1. GENERAL

1. ALL DRAWINGS SHOULD BE READ IN CONJUNCTION WITH ARCHITECTURAL, STRUCTURAL AND OTHER RELEVANT DRAWINGS, AND SPECIFICATION IN CASE OF ANY DISCREPANCY REFER TO THE ENGINEER BEFORE COMMENCEMENT OF WORK.
2. THE CONTRACTOR SHALL REVIEW AND DETERMINE THAT DIMENSIONS ARE COORDINATED BETWEEN ARCHITECTURAL STRUCTURAL AND OTHER DRAWINGS PRIOR TO FABRICATION OR START OF CONSTRUCTION.
3. BEFORE CASTING OF ANY STRUCTURAL MEMBER, THE CONTRACTOR SHALL ENSURE THAT ALL EMBEDDED ITEMS FOR ELECTRICAL, MECHANICAL, HVAC, PLUMBING STRUCTURAL STEEL AND OTHER WORKS ARE PROPERLY LOCATED AND FIRMLY SECURED IN PLACE.

2. REINFORCING STEEL

1. REINFORCEMENT STEEL SHALL BE AS PER ASTM A615 HAVING MINIMUM YIELD STRENGTH OF 60,000 Psi
2. ALL REINFORCING BARS TO BE FABRICATED AS PER THE BENDING SCHEDULES PREPARED. BY THE CONTRACTOR AND CHECKED AND APPROVED BY ENGINEER.
3. ALL LAPS OF THE REINFORCEMENT SHOULD BE STAGGERED.
4. ALL REINFORCING STEEL SHALL BE ACCURATELY LOCATED IN THE FORMS AND HELD FIRMLY IN PLACE BEFORE & DURING THE PLACEMENT OF CONCRETE, BY MEANS OF WIRE AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

3 MATERIALS

2. STRUCTURAL STEEL MATERIAL FOR COLUMNS, TRUSSES, AND PLATES SHALL CONFORM TO ASTM. A992, FY=50 KSI.
2. MATERIAL FOR THE BOLTS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO ASTM A–325.
3. ALL WELDING SHALL BE CARRIED OUT USING 6013 ELECTRODES MADE BY BOC OR APPROVED EQUIVALENT.

4 PAINTING:

1. ALL STRUCTURAL STEEL, NUTS BOLTS SURFACE TO BE PAINTED WITH 2 COATS OF RED OXIDE AFTER WIRE BRUSHING CLEANING AND TWO COATS APPROVED ENEMAL COATS. MINIMUM PAINT THICKNESS REQUIRED IS 125 MICRON.

5 WELDING:

1. WELDING SHALL BE CARRIED OUT BY QUALIFIED WELDER.
2. ALL WELD SHALL BE CONTINUOUS ALL AROUND. WITH FULL RETURNS AT ENDS
3. WELDING SHALL CONFORM TO AWS. USING E70XX ELECTRODES.

6. REINFORCED CONCRETE

1. CONCRETE WORK SHALL CONFIRM TO ACI 301 SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS AND IN ACCORDANCE WITH SPECS.
2. STRUCTURAL DESIGN IS BASED ON THE BULIDING CODE REQUIREMENTS FOR REINFORCED CONCRETE OF AMERICAN CONCRETE INSTITUTE (ACI 318–05).
3. NO CONCRETING SHALL BE CARRIED OUT UNTIL PERMISSION IS GIVEN IN WRITING BY THE ENGINEER.
4. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE CYLINDER STRENGTH AT 28 DAYS AS FOLLOWS:
   ALL STRUCTURAL CONCRETE OF COLUMNS AND RETAINING WALLS IS 4000 Psi.
   ALL STRUCTURAL CONCRETE OF FOUNDATIONS, BEAMS AND SLABS IS 3000 Psi
5. CEMENT CHARACTERISTICS SHALL CONFIRM TO ASTM C150 SR CEMENT TYPE II
6. WATER USED FOR MIXING OF CONCRETE, CLEANING AND CURING ETC. SHALL BE PORTABLE AND FREE FROM INJURIOUS AMOUNTS OF OILS, ACIDS, ALKALIS, SALTS, ORGANIC MATERIALS
7. MAINTAIN MINIMUM CONCRETE COVERAGE FOR REINFORCING STEEL AS FOLLOWS UNLESS OTHERWISE NOTED IN THE DRAWINGS.

COVERS FOR STRUCTURAL MEMBERS			
FOUNDATION		COLUMNS	= 37.5mm
BOTTOM	= 75mm	SLABS	= 3/4 inch
TOP & SIDES	= 50mm	WALLS	= 25mm
BEAMS			
TOP & BOTTOM	= 37.5mm		
SIDE	= 25mm		

A METHODOLOGY

1. ALL DIMENSIONS AND SIZES SHOWN ON DRAWINGS ARE IN MILLIMETERS (MM) UNLESS NOTED OTHERWISE.
2. STRUCTURAL STEEL MATERIAL FOR COLUMNS, TRUSSES, AND PLATES SHALL CONFORM TO ASTM. A992, FY=50 KSI.
3. H.S STEEL COLUMNS TO BE ERECTED AS PER APPROVED DRAWINGS AND SPECIFIED TOLERANCES.
4. BASE PLATES AND ANCHOR BOLTS TO BE INSTALLED AND GROUTED PRIOR TO COLUMN ERECTION.
5. PERIMETER STEEL TRUSS MEMBERS TO BE FABRICATED AND ERECTED AS PER DETAILED DRAWINGS AND CONNECTION DETAILS.
6. TEMPORARY BRACING TO BE PROVIDED TO ALL STEEL MEMBERS UNTIL FULL STRUCTURAL STABILITY IS ACHIEVED.
7. CHECKERED STEEL PLATE TO BE FIXED OVER SUPPORTING STEEL MEMBERS, ACTING AS PERMANENT FORM WORK.
8. CHECKERED PLATE TO BE PROPERLY SEATED, ALIGNED, AND WELDED/BOLTED AS INDICATED ON DRAWINGS.
9. SHEAR CONNECTORS/MECHANICAL INTERLOCKS TO BE PROVIDED WHERE SPECIFIED TO ENSURE COMPOSITE ACTION.
10. REINFORCEMENT MESH TO BE PLACED OVER CHECKERED PLATE WITH REQUIRED SPACING AND CONCRETE COVER.
11. R.C.C. SLAB THICKNESS = 75 MM (3 INCHES) TO BE CAST OVER CHECKERED PLATE AS PER SPECIFIED CONCRETE GRADE.
12. CONCRETE TO BE POURED UNIFORMLY TO AVOID UNBALANCED LOADING ON STEEL STRUCTURE.
13. PROPER VIBRATION, FINISHING, AND SURFACE LEVELING OF CONCRETE TO BE ENSURED.
14. CURING OF R.C.C. SLAB TO BE CARRIED OUT FOR THE SPECIFIED DURATION BEFORE APPLICATION OF SUPERIMPOSED LOADS.
15. COMPOSITE ACTION SHALL BE CONSIDERED EFFECTIVE ONLY AFTER CONCRETE ACHIEVES THE SPECIFIED DESIGN STRENGTH.
16. ALL WORKS TO BE EXECUTED IN ACCORDANCE WITH APPROVED DRAWINGS, PROJECT SPECIFICATIONS, AND APPLICABLE CODES.

B METHODOLOGY

1. EXCAVATE THE SOIL/SOG TO EXPOSE THE FOUNDATION SURFACE.
2. DRILL VERTICAL HOLES IN THE FOUNDATION AND FIX THE DOWELS WITH APPROVED EPOXY.
3. CHIESEL–OFF PLASTER TO EXPOSE ORIGINAL CONCRETE.
4. DRILL HORIZONTAL HOLES IN THE COLUMN SURFACE AND GROUT THE ANCHORS WITH APPROVED EPOXY.
5. TIE STEEL REINFORCEMENT AS SHOWN ON DRAWINGS.
6. FIX FAIRFACE FORMWORK TO ALL SIDES OF THE REINFORCEMENT.
7. APPLY APPROVED SBR PRIOR TO CONCRETING.
8. POUR CONCRETE 3000 PSI CYLINDRICAL STRENGTH AND VIBRATE WITH A PENCIL VIBRATOR.
9. REMOVE FORMWORK AFTER 24 HOURS AND CURE THE CONCRETE FOR 14 DAYS

CLIENT: Karachi Tools Dies & Moulds Center, Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh (KTDMC)

CONSULTANT: logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT: REFURBISHMENT WORKS AT KTDMC.

TITLE: GENERAL NOTES (REFURBISHMENT OF CLASS ROOMS AT KTDMC FACILITY.)

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: HAMDAN BKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529 | SCALE: 1:50
DRG. NO.: CR-GN-701
DATE: JAN, 2026 | REV.: 0

Fri, 17 Apr 2026 - 12:42pm rahim 3) CR-GN-701.dwg

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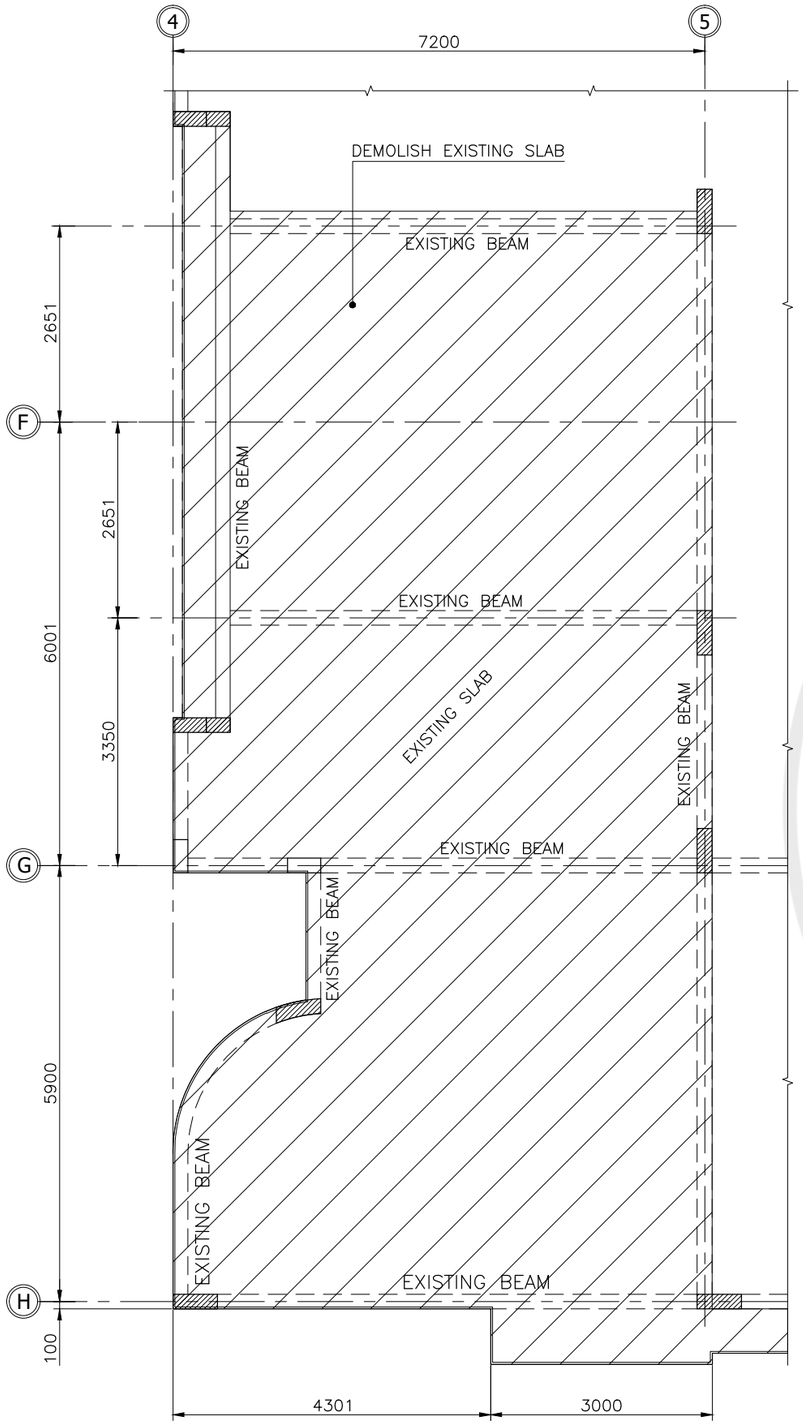
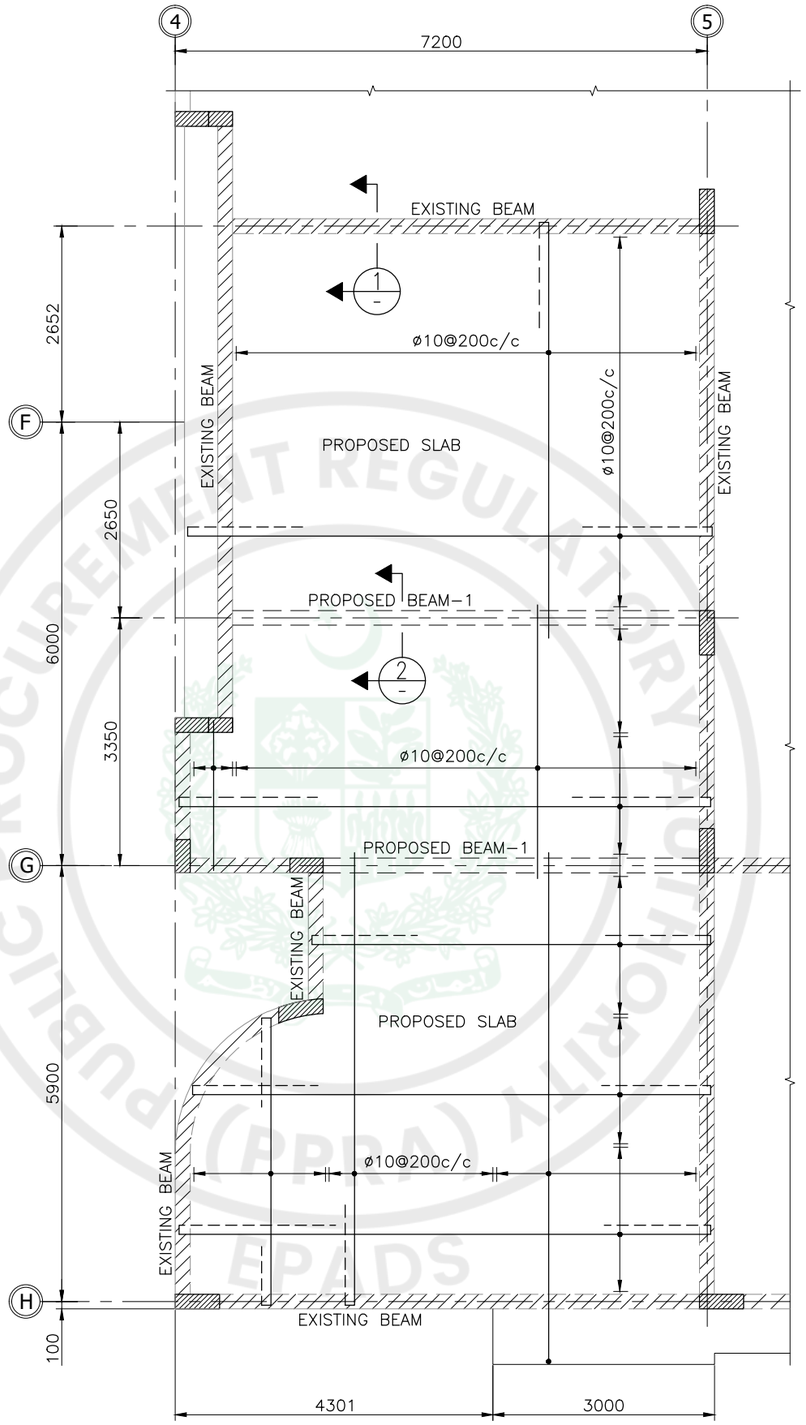


SECOND FLOOR EXISTING FRAMING PART PLAN

SCALE:-1:50

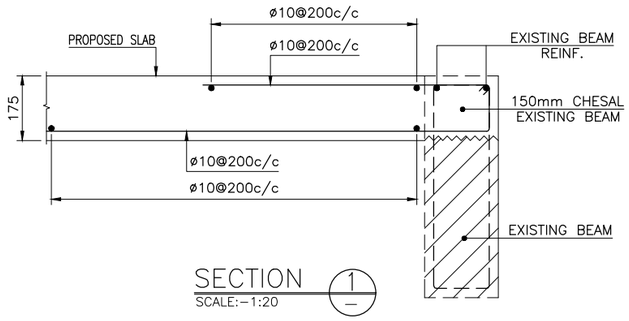


SECOND FLOOR PROPOSED FRAMING & REINF. PART PLAN

SCALE:-1:50

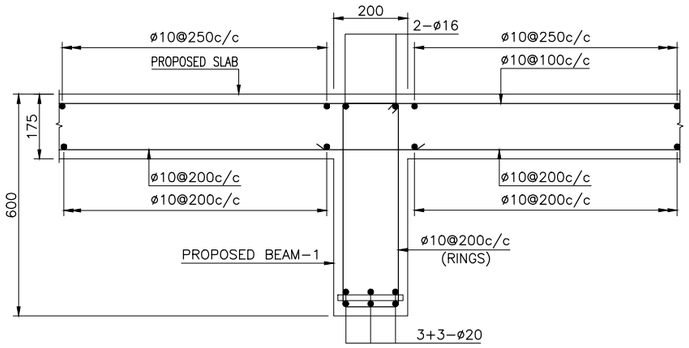
NOTES:

1- FOR GENERAL NOTES REFER DRG. NOS. CN-GN-301



SECTION 1

SCALE:-1:20



SECTION 2

SCALE:-1:20

CLIENT

KTDMC

Karachi Tools Dies & Moulds Center

Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

DEMOLISH EXISTING SECOND FLOOR PART SALB & RECAST SECOND FLOOR PART SLAB

(REFURBISHMENT OF CLASS ROOMS)

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-02-2026

APPROVED: TAHSEEN AHMED

CHECKED: SUMAIRA FATIMA

DESIGNED: HAMDAN BAKHOL

DRAWN: RAHEEM

PROJECT CODE: 2529

SCALE: 1:40

DRG. NO.: CR-ST-701

DATE: JAN, 2026

REV.: 0

Fri, 17 Apr 2026 - 12:42pm
rahim 4) CR-ST-701.dwg

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REFURBISHMENT WORKS AT KTDMC.

WATERPROOFING OF THE WORKSHOP'S PEB (PRE-ENGINEERED BULIDING) SHED

ISSUED FOR TENDER DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

JAN- 2026

Fri, 17 Apr 2026 - 2:18pm
rahim 1) TITLE.dwg

LIST OF STRUCTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
2	WPM-SK-801	TYP. PLAN OF WATER PROOFING MEMBRANE	

PROCUREMENT REGULATORY AUTHORITY PUBLIC (PPRA) EPADS

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

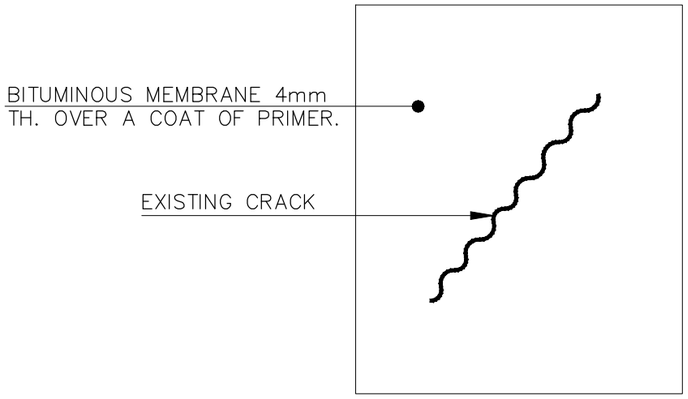
LIST OF DRAWING
(WORKSHOP'S PEB SHED ROOF.)

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: WPM-LST-801
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:19pm
rahim 2) WPM-LST-801.dwg



NOTE:- MEMBRANE TO EXTEND 50mm ON ALL SIDE OF THE CRACK.

TYPICAL PLAN OF WATER PROOFING MEMBRANE

METHODOLOGY:

1. **SURFACE PREPARATION:** ENSURE THE PEB SHED ROOF SUBSTRATE (METAL DECK/CONCRETE TOPPING, AS APPLICABLE) IS CLEAN, DRY, SOUND, AND FREE FROM DUST, OIL, GREASE, RUST, AND LOOSE MATERIALS. REMOVE SHARP PROJECTIONS AND ENSURE ALL JOINTS, FASTENERS, AND SURFACE IRREGULARITIES ARE PROPERLY TREATED. VERIFY ROOF SLOPE AND DRAINAGE AS SHOWN ON APPROVED DRAWINGS.
2. **PRIMER APPLICATION:** APPLY ONE UNIFORM COAT OF APPROVED BITUMINOUS PRIMER COMPATIBLE WITH PEB SHED SUBSTRATE ON THE PREPARED SURFACE USING BRUSH, ROLLER, OR SPRAY. AS PER MANUFACTURERS' RECOMMENDATIONS. ALLOW PRIMER TO DRY COMPLETELY BEFORE MEMBRANE APPLICATION.
3. **MEMBRANE LAYOUT:** UNROLL 4mm THICK APP MODIFIED BITUMEN WATERPROOFING MEMBRANE, REINFORCED WITH NON-WOVEN POLYESTER, TO CHECK ALIGNMENT AND POSITIONING PRIOR TO TORCH APPLICATION.
4. **TORCH APPLICATION OF MEMBRANE:** APPLY MEMBRANE USING GAS TORCH, HEATING THE LOWER SURFACE OF THE MEMBRANE AND THE PRIMED PEB SHED SURFACE SIMULTANEOUSLY. ROLL THE MEMBRANE FORWARD GRADUALLY TO ACHIEVE FULL ADHESION WITHOUT WRINKLES, FISH MOUTHS, OR AIR ENTRAPMENT.
5. **INSPECTION & REPAIRS:** INSPECT INSTALLED MEMBRANE FOR UNIFORM ADHESION, PROPER JOINT SEALING, AND SURFACE DEFECTS. REPAIR ANY DAMAGED OR DEFECTIVE AREAS BY PATCHING WITH THE SAME MEMBRANE MATERIAL, MAINTAINING MINIMUM 150mm OVERLAP.
6. **COMPLETION:** COMPLETE WATERPROOFING WORKS IN ALL RESPECTS IN ACCORDANCE WITH MANUFACTURERS' SPECIFICATIONS' AND RECOMMENDATIONS, APPROVED DRAWINGS, AND INSTRUCTIONS OF THE ENGINEER.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

CLIENT: Karachi Tools Dies & Moulds Center, Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh (KTDMC)

CONSULTANT: logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT: REFURBISHMENT WORKS AT KTDMC

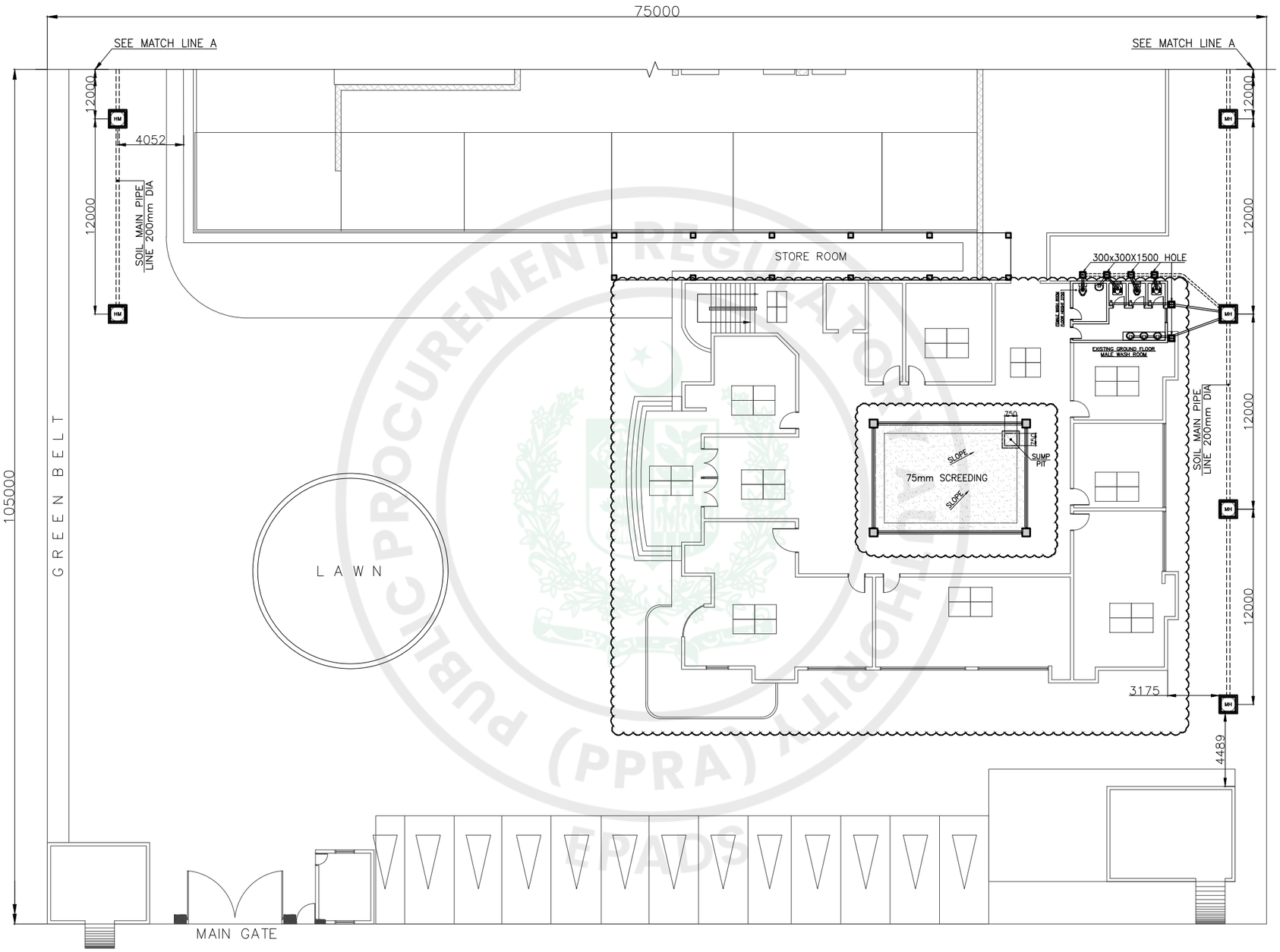
TITLE: TYP. PLAN OF WATER PROOFING MEMBRANE (WORKSHOP'S PEB SHED ROOF.)

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	16-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: AHSAN MUGHAL
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: WPM-SK-801
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:20pm
rahim 3) WPM-SK-801.dwg



MASTER LAYOUT PLAN

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

Y:\Mushtaque 2026\Canteen arch Drawings\Logix-Final-Logo.png

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

DESIGN OF DRAINAGE LINE IN THE OPEN COURTYARD AREA OF ADMIN BLOCK

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	02-01-2026

APPROVED	TAHSEEN AHMED
CHECKED:	SUMAIRA FATIMA
DESIGNED:	SUMAIRA FATIMA
DRAWN:	RAHEEM SHEIKH

PROJECT CODE:	2529
SCALE	1:50
DRG. NO.	MPP-302
DATE:	JAN, 2026
REV.	0

Sat, 09 May 2026 - 10:59am
rahim KTDMC MASTER LAYOUT PLAN last.dwg

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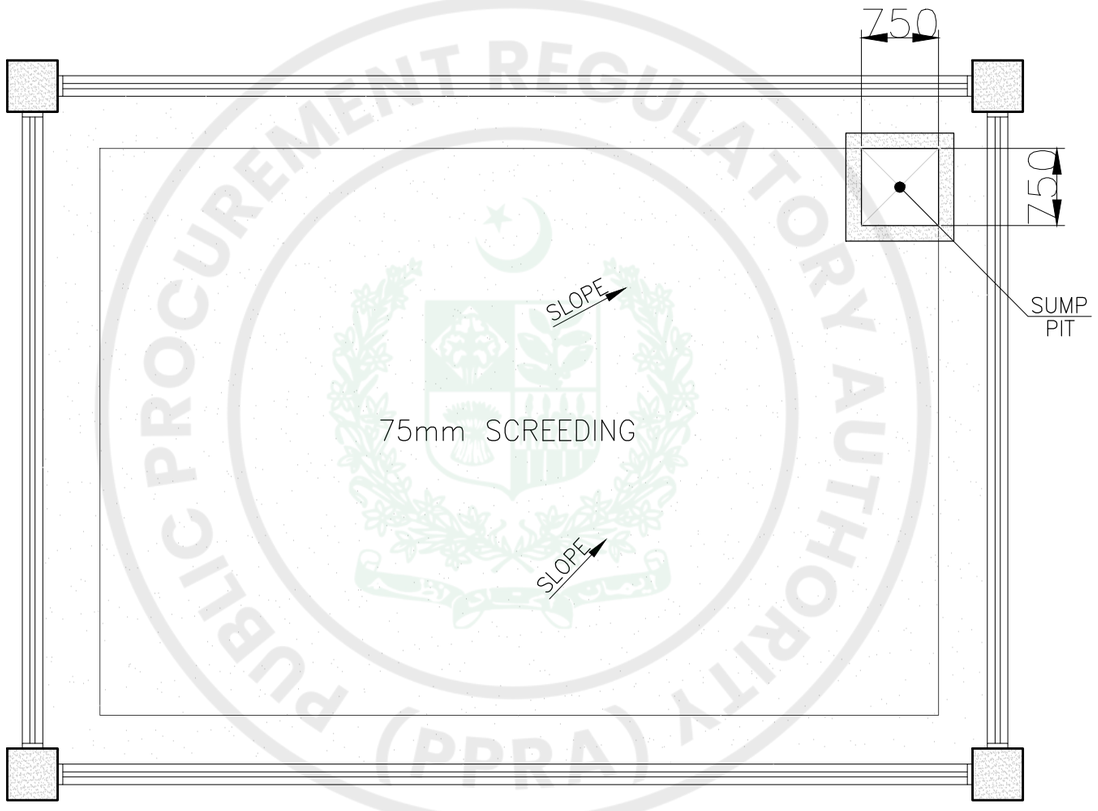

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

KTDMC

CONSULTANT

Y:\Mushtaque 2026\Canteen arch Drawings\Logix-Final-Logo.png

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

SCREEDING PLAN

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	02-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: SCDG-01
DATE: JAN, 2026
REV.: 0

Sat, 09 May 2026 - 10:58am
rahim SCDG-01.dwg

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PROJECT: REFURBISHMENT WORKS AT KTDMC.

REHABILITATION OF EXISTING BUILDING CRACKS

ISSUED FOR TENDER DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

JAN- 2026

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LIST OF STRUCTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	EBG-SK-1101	REHABILITATION OF EXISTING BUILDING CRACKS	

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING
(REHABILITATION OF EXISTING BUILDING CRACKS)

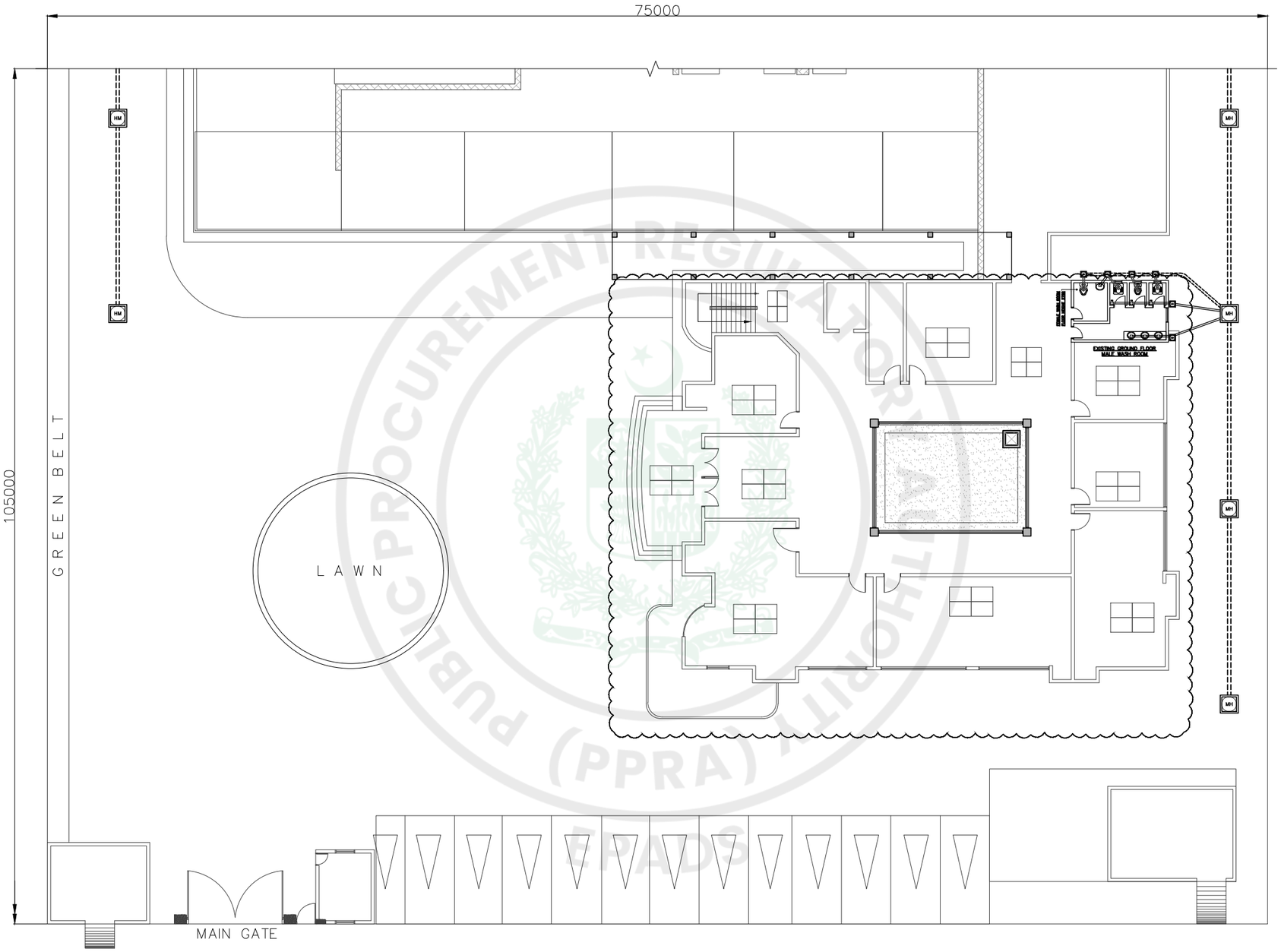
REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: EBG-LST-1101
DATE: JAN, 2026
REV.: 0

Wed, 08 Apr 2026 - 2:19pm
rahim 2) EBG-LST-1101.dwg

e-Pak Acquisition and Disposal System (EPADS) generated document | © 2026



ADMIN BLOCK CRACK PLAN

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

ADMIN BLOCK CRACK PLAN

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	02-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: ADMN-S-01
DATE: JAN, 2026
REV.: 0

Wed, 08 Apr 2026 - 2:20pm
rahim KTDMC MASTER LAYOUT PLAN last.dwg

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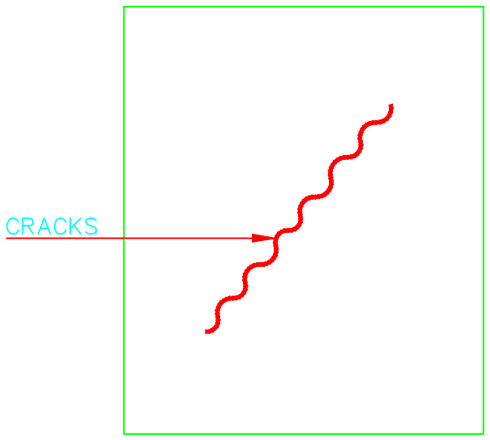

REHABILITATION OF EXISTING BUILDING CRACKS

CRACK FILLING METHODOLOGY:

1) **CRACK PREPARATION:** THE EXISTING CRACK SHALL BE CHISELED AND ENLARGED TO APPROXIMATELY 20mm x 20mm TO CREATE A UNIFORM GROOVE THAT ALLOWS PROPER PLACEMENT AND BONDING OF THE REPAIR MATERIAL.

2) **SURFACE CLEANING:** AFTER CHISELING, THE PREPARED GROOVE AND SURROUNDING SURFACE SHALL BE THOROUGHLY CLEANED TO REMOVE DUST, LOOSE PARTICLES, AND DEBRIS USING SUITABLE TOOLS SUCH AS A WIRE BRUSH, AIR BLOWER, OR COMPRESSED AIR.

3) **GROUT APPLICATION:** THE CLEANED GROOVE SHALL BE FILLED WITH APPROVED NON-SHRINK GROUT, MIXED AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ENSURE FULL COMPACTION AND PROPER BONDING WITHIN THE CRACK. ONCE THE GROUT HAS BEEN PLACED, THE SURFACE SHALL

4) **SURFACE FINISHING:** BE LEVELED AND FINISHED SMOOTHLY TO MATCH THE ADJACENT SURFACE, MAKING IT SUITABLE FOR SUBSEQUENT SURFACE PREPARATION AND PAINTING.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

CLIENT: Karachi Tools Dies & Moulds Center, Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh (KTDMC)

CONSULTANT: logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT: REFURBISHMENT WORKS AT KTDMC

TITLE: REHABILITATION OF EXISTING BUILDING CRACKS

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	16-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: AHSAN MUGHAL
DESIGNED: HAMDAN BAKHOL
DRAWN: RAHEEM SHEIKH

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: EBG-SK-1101
DATE: JAN, 2026
REV.: 0

REFURBISHMENT WORKS AT KTDMC.

CONSTRUCTION & RENOVATION OF MASJID

ISSUED FOR TENDER ARCHITECTURE DRAWING

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh

KTDMC

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

JAN- 2026

Fri, 17 Apr 2026 - 2:24pm
rahim 1) TITLE.dwg

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ARCHITECTURE DRAWINGS

LIST OF ARCHITECTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	MSQ-S-1001	GROUND FLOOR PLAN	
2	MSQ-S-1002	SECTION-1	
3	MSQ-S-1003	3D VIEW FOR MASJID	

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING
CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: KAPIL DAVE
DESIGNED: KAPIL DAVE
DRAWN: RAHEEM

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-LST-1001
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:25pm
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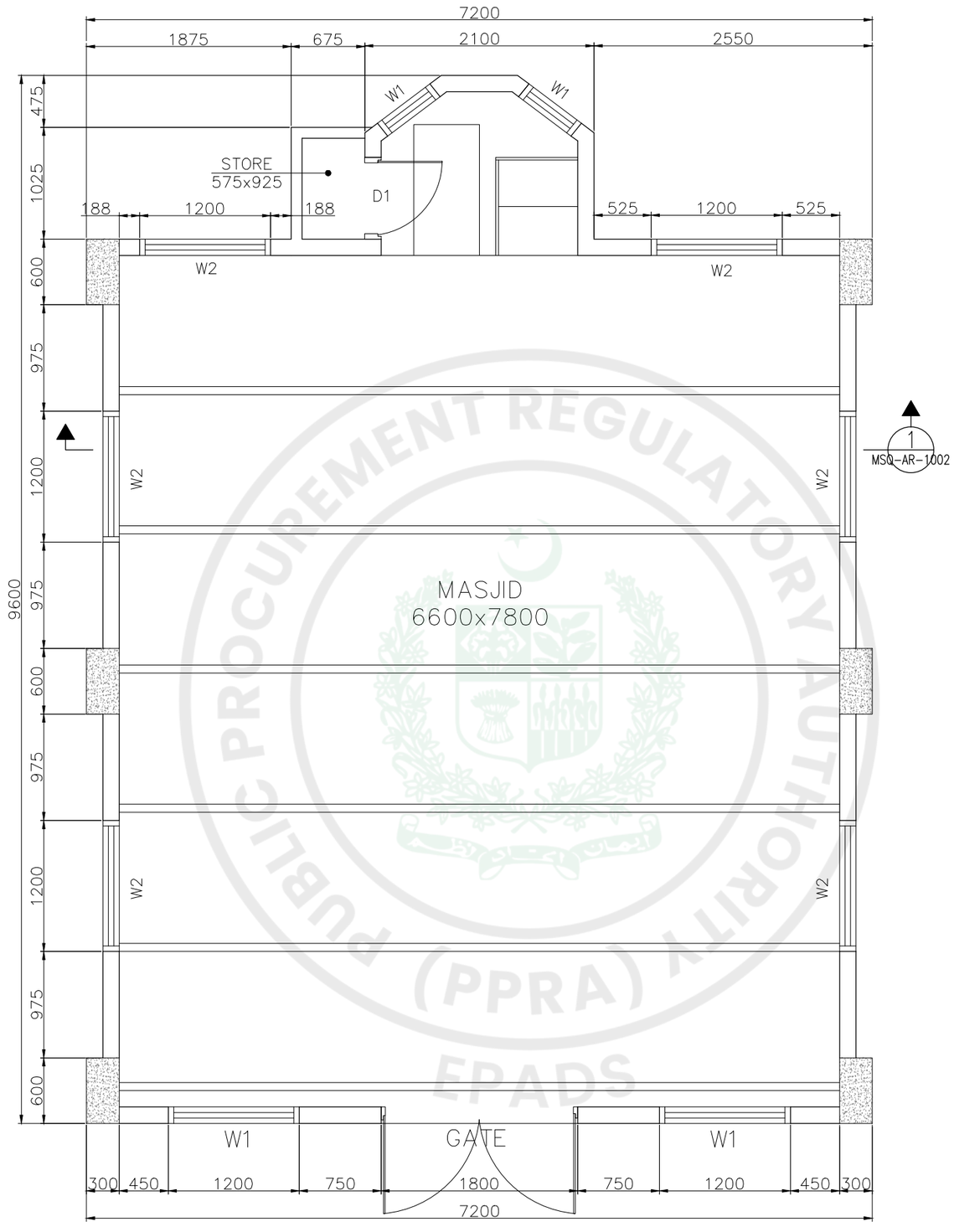


GROUND FLOOR PLAN

SCALE:-1:50

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

GROUND FLOOR PLAN
CONSTRUCTION & RENOVATION OF MASJID

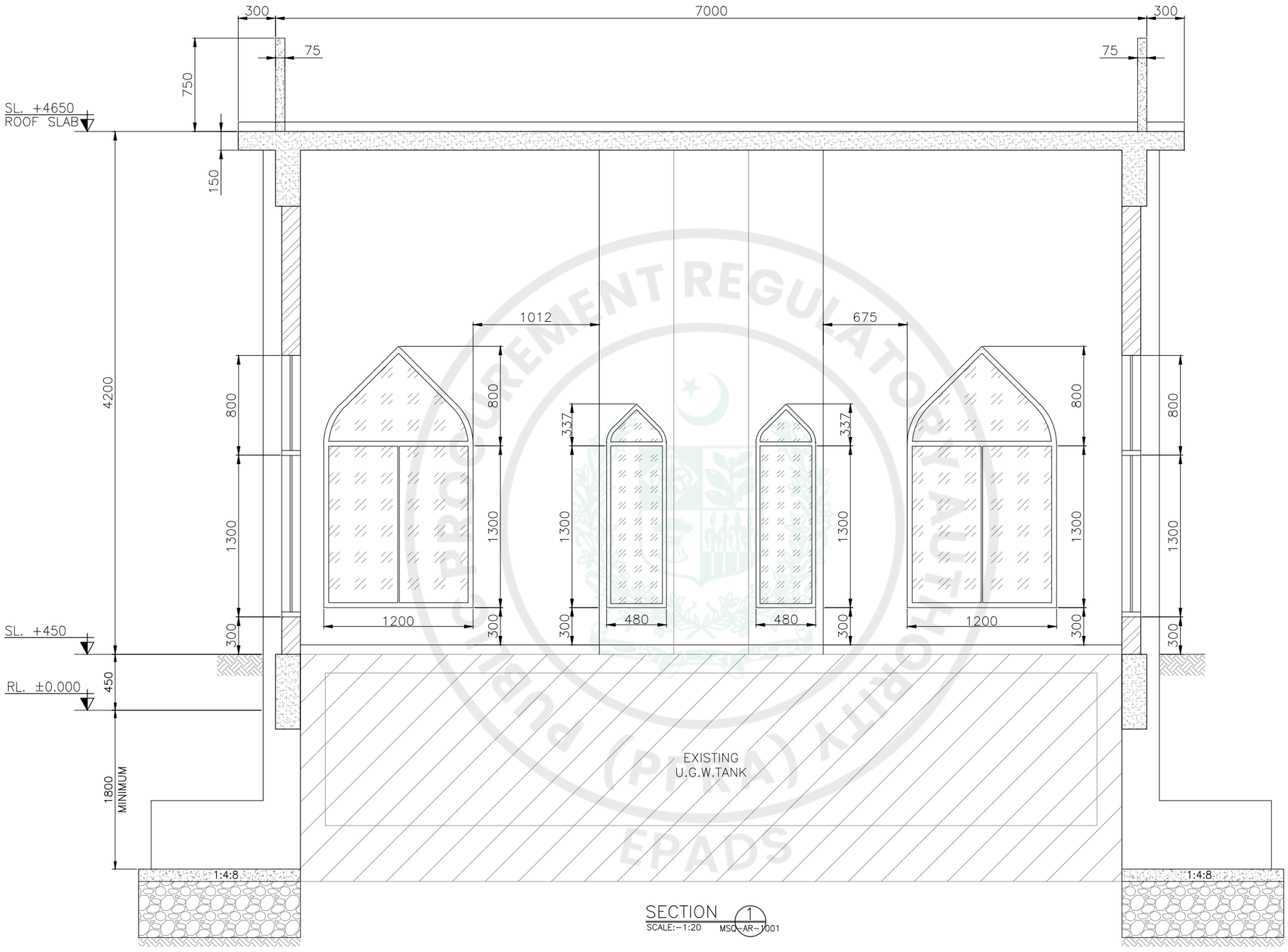
REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: PERVEZ

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-AR-1001
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:26pm
rahim 3) MSQ-AR-1001 AND MSQ-AR-1002.dwg

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



SECTION 1
SCALE:–1:20 MSQ–AR–1001

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38,
Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

SECTION–1

CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: SUMAIRA FATIMA
DESIGNED: SUMAIRA FATIMA
DRAWN: PERVEZ

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-AR-1002
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:27pm
rahim 9) MSQ-AR-1001 AND MSQ-AR-1002.dwg

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CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

3D VIEW FOR MASJID

CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED

CHECKED: SUMAIRA FATIMA

DESIGNED: SUMAIRA FATIMA

DRAWN: PERVEZ

PROJECT CODE: 2529

SCALE: 1:50

DRG. NO. MSQ-AR-1003

DATE: MARCH, 2026

REV. 0

Fri, 17 Apr 2026 - 2:28pm
rahim 3) MSQ-AR-1001 AND MSQ-AR-1003.dwg

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STRUCTURE DRAWINGS

REFURBISHMENT WORKS AT KTDMC.

CONSTRUCTION & RENOVATION OF MASJID

ISSUED FOR TENDER

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

JAN- 2026

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LIST OF STRUCTURE DRAWINGS

S.NO.	DRAWING NO.	T I T L E	REV.
1	MSQ-S-1001	FOUNDATION LAYOUT PLAN SECTION AND DETAILS	
2	MSQ-S-1002	PLINTH BEAM LAYOUT PLAN SECTION AND DETAILS	
3	MSQ-S-1003	ROOF BEAM SLAB FRAMING AND REINFORCEMENT PLAN AND DETAILS	

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

LIST OF DRAWING

CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: KAPIL DEV
DESIGNED: KAPIL DEV
DRAWN: RAHEEM

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-LST-1001
DATE: JAN, 2026
REV.: 0

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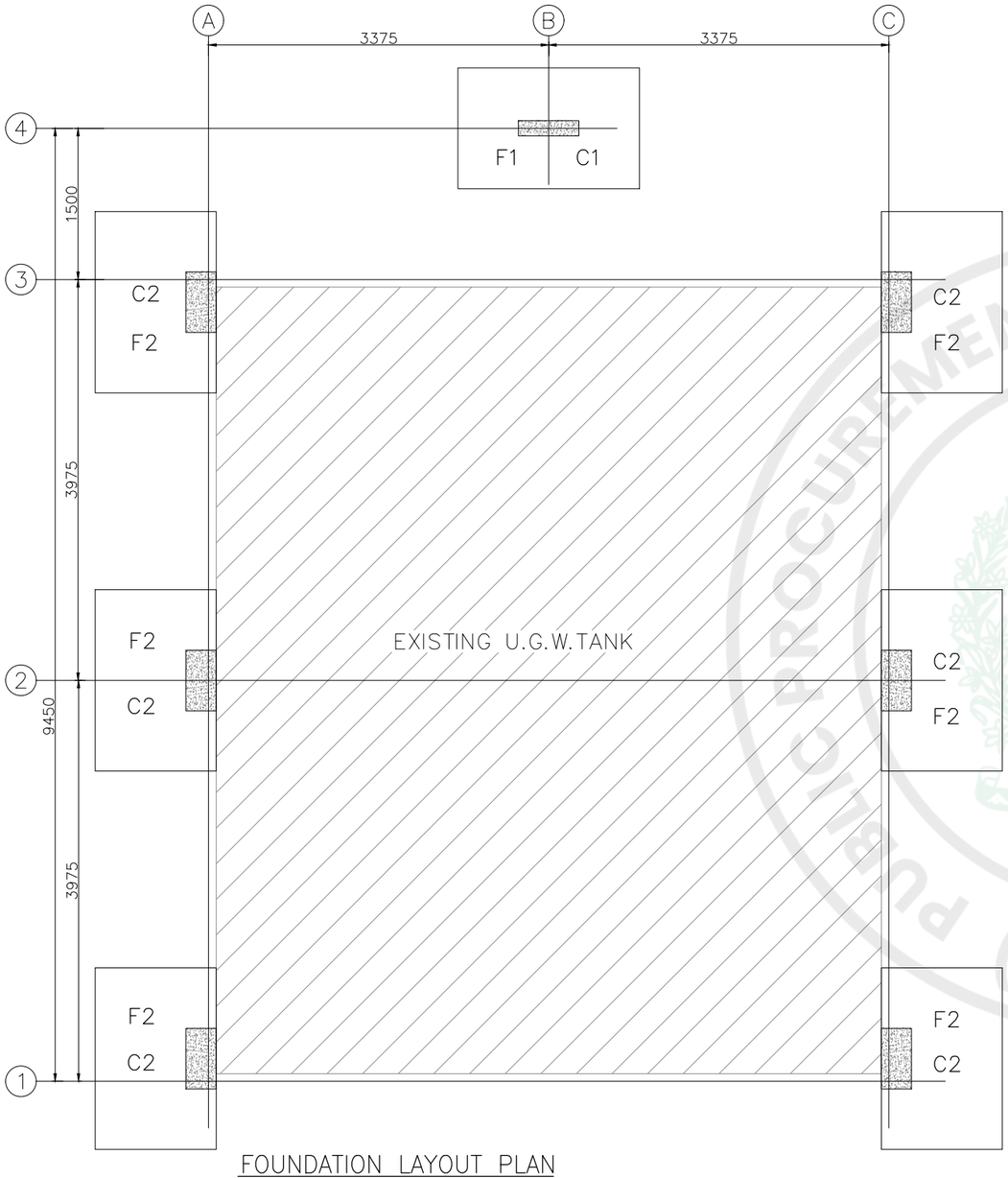
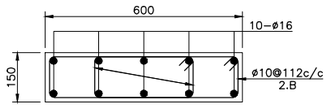
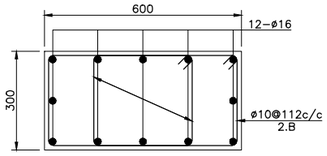


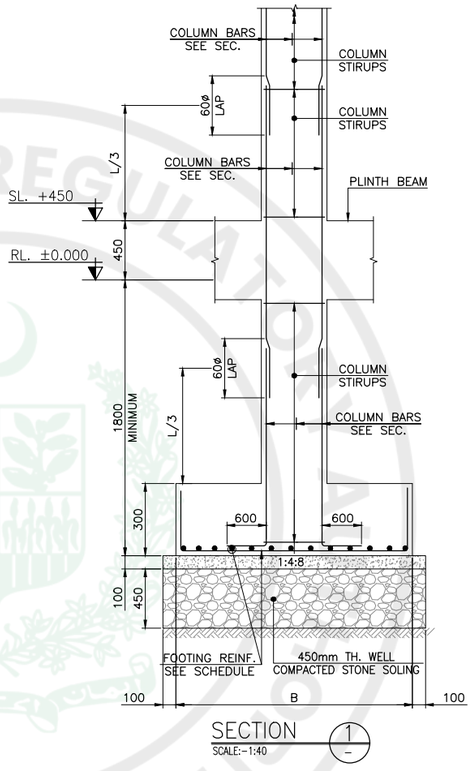
FOUNDATION LAYOUT PLAN
SCALE:-1:50



TYP. SEC. OF COLUMN C-1
SCALE:-1:50



TYP. SEC. OF COLUMN C-2
SCALE:-1:50



SECTION 1
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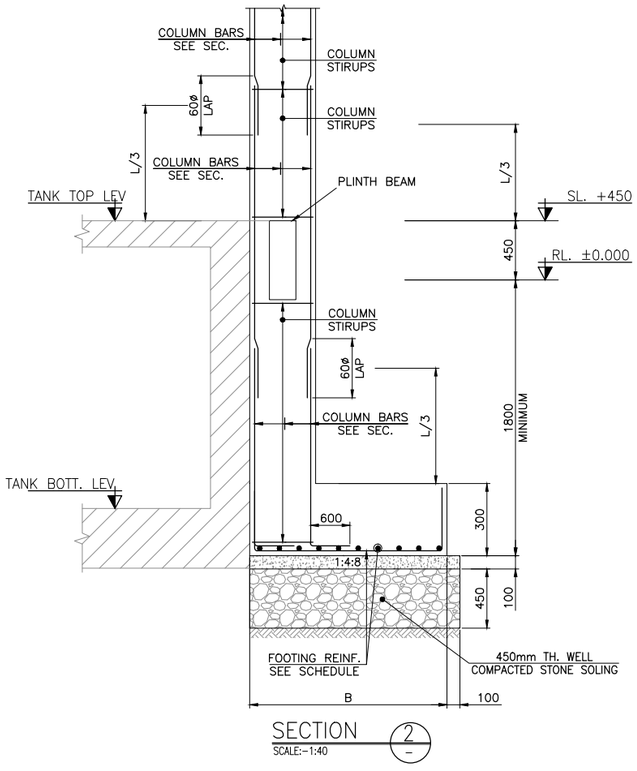
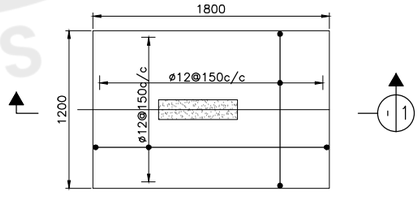
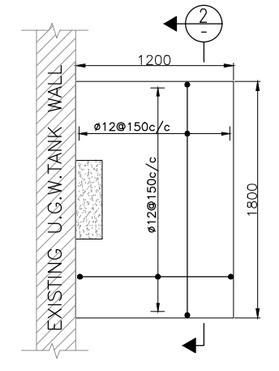


SECTION 2
SCALE:-1:40



PART PLAN OF FOOTING
SCALE:-1:50



PART PLAN OF FOOTING
SCALE:-1:50

CLIENT
KTDMC
Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT
logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT
REFURBISHMENT WORKS AT KTDMC.

TITLE
FOUNDATION LAYOUT PLAN SECTION AND DETAILS
CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: KAPIL DEV
DESIGNED: KAPIL DEV
DRAWN: RAHEEM

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-ST-1001
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:31pm
rahim 3) MSQ-ST-1001 AND MSQ-ST-1003.dwg

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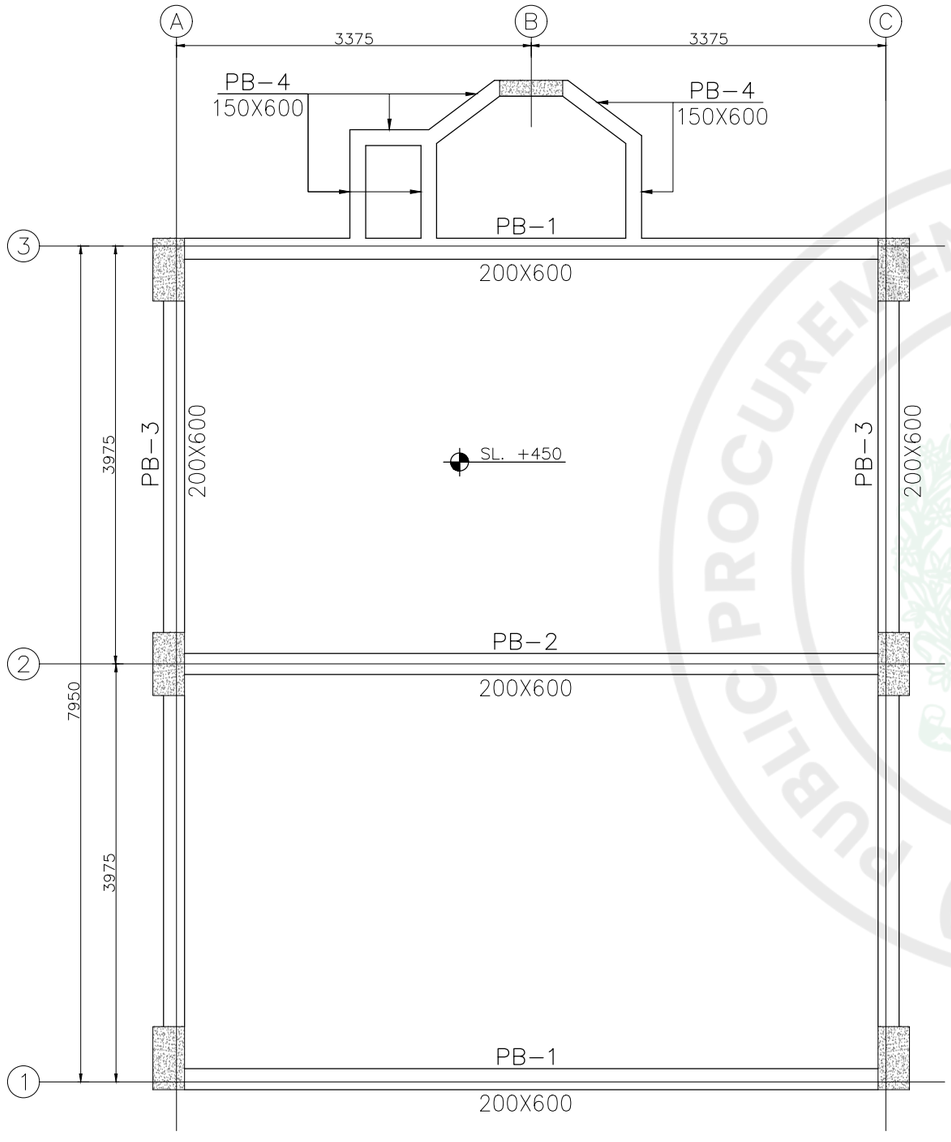
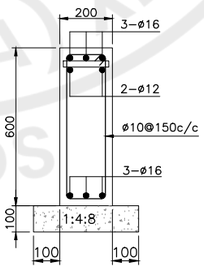


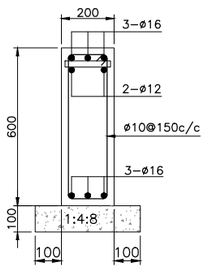
PLINTH BEAM LAYOUT PLAN

SCALE:–1:50



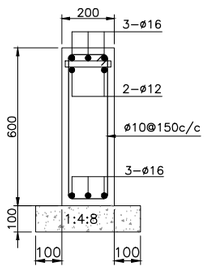
TYP. SEC. OF BEAM PB–1

SCALE:–1:20



TYP. SEC. OF BEAM PB–2

SCALE:–1:20



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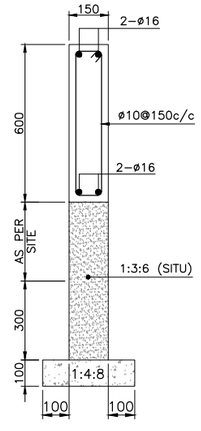
SCALE:–1:20



TYP. SEC. OF BEAM PB–4

SCALE:–1:20

CLIENT	CONSULTANT	PROJECT
Karachi Tools Dies & Moulds Center Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh KTDMC	logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD	REFURBISHMENT WORKS AT KTDMC.
		TITLE
		PLINTH BEAM LAYOUT PLAN SECTION AND DETAILS
		CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED	TAHSEEN AHMED
CHECKED:	KAPIL DEV
DESIGNED:	KAPIL DEV
DRAWN:	RAHEEM

PROJECT CODE: 2529	SCALE 1:50
DRG. NO.	MSQ-ST-1002
DATE: JAN, 2026	REV. 0

Fri, 17 Apr 2026 - 2:31pm
rahim 3) MSQ-ST-1001 AND MSQ-ST-1003.dwg

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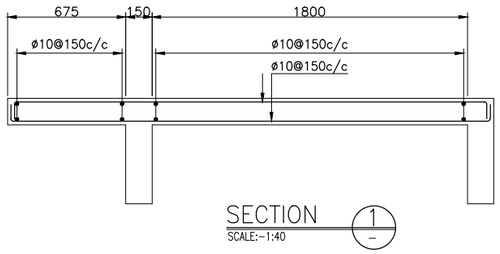
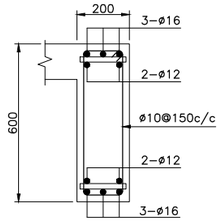


SECTION 1
SCALE:-1:40



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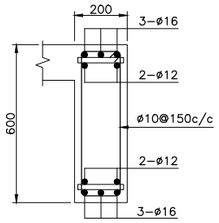

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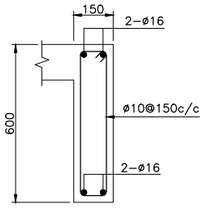

TYP. SEC. OF BEAM RB-3
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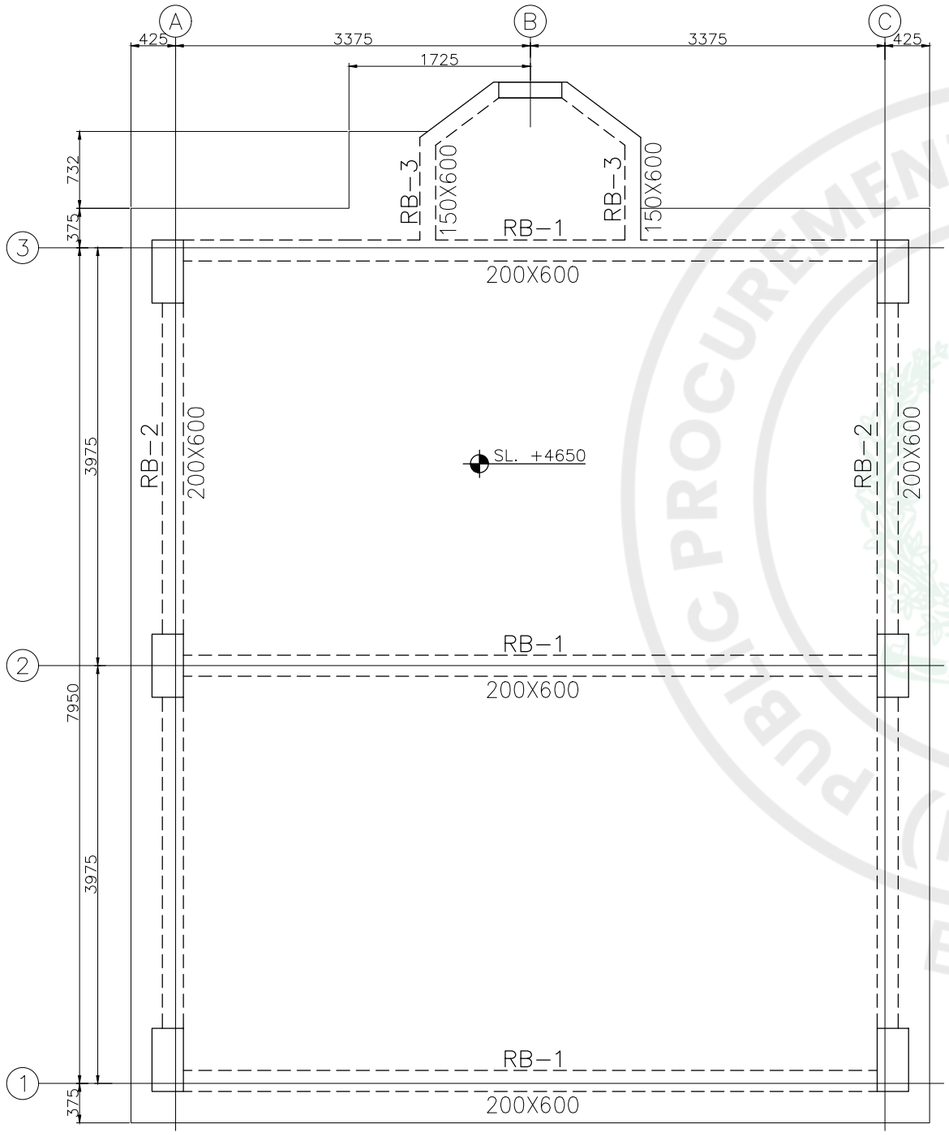
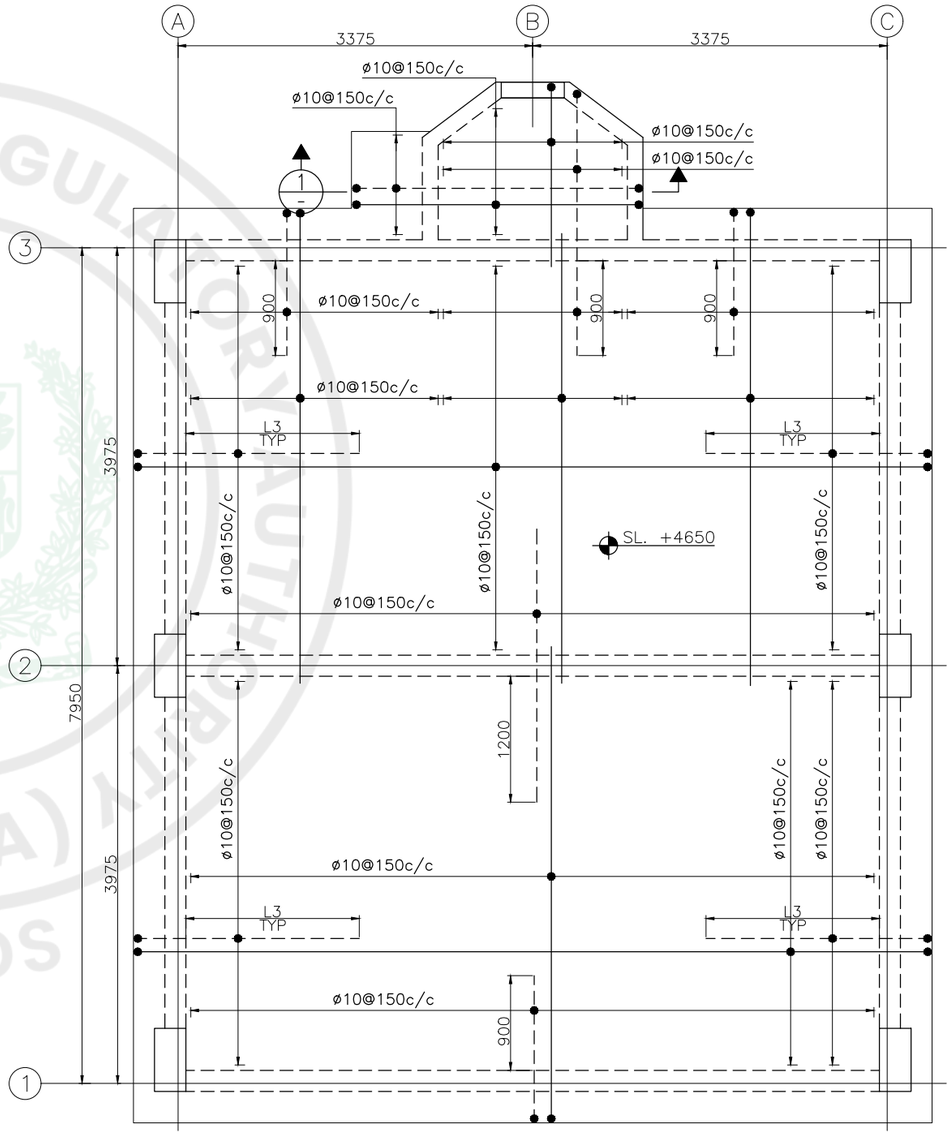


ROOF BEAM SLAB FRAMING PLAN
SCALE:-1:50 (SLABS ARE 150mm TH. OTHER WISE NOTED)



ROOF SLAB REINFORCEMENT PLAN
SCALE:-1:50

CLIENT

Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh
KTDMC

CONSULTANT

logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT

REFURBISHMENT WORKS AT KTDMC.

TITLE

ROOF BEAM SLAB FRAMING AND REINFORCEMENT PLAN AND DETAILS
CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: KAPIL DEV
DESIGNED: KAPIL DEV
DRAWN: RAHEEM

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-ST-1003
DATE: JAN, 2026
REV.: 0

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rahim 3) MSQ-ST-1001 AND MSQ-ST-1003.dwg

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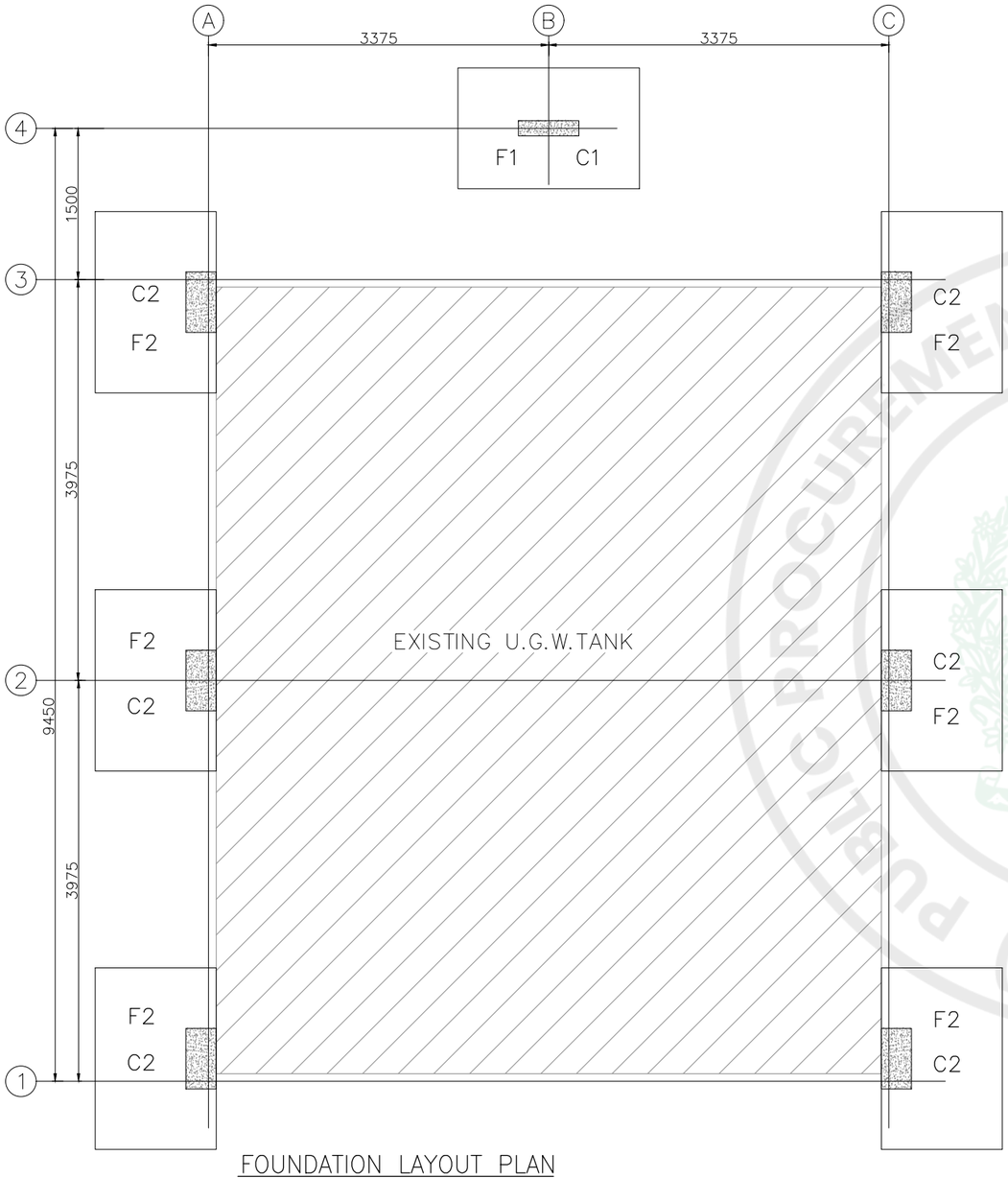
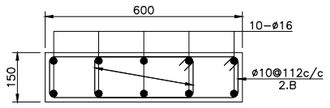
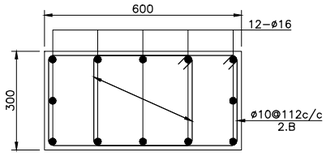


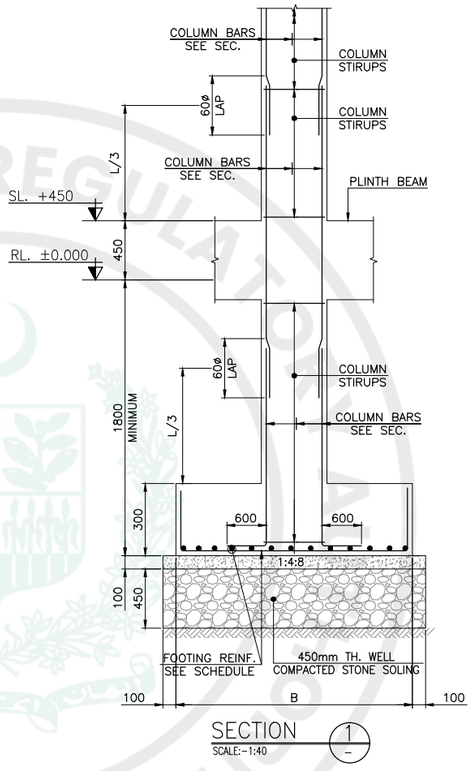
FOUNDATION LAYOUT PLAN
SCALE:-1:50



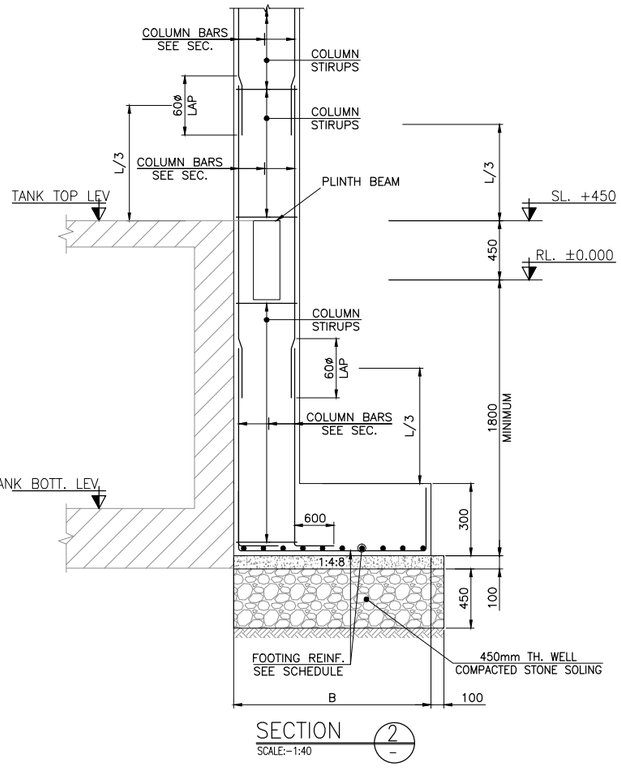
TYP. SEC. OF COLUMN C-1
SCALE:-1:50



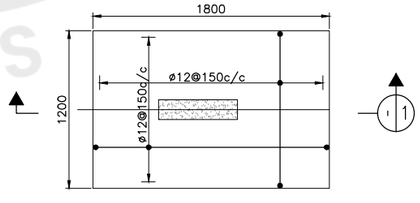
TYP. SEC. OF COLUMN C-2
SCALE:-1:50



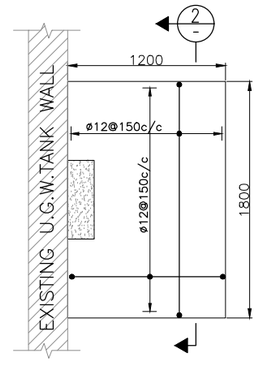
SECTION 1
SCALE:-1:40



SECTION 2
SCALE:-1:40



PART PLAN OF FOOTING
SCALE:-1:50



PART PLAN OF FOOTING
SCALE:-1:50

CLIENT
KTDMC
Karachi Tools Dies & Moulds Center
Korangi Creek Industrial Park, Sector-38, Korangi Creek Rd, Karachi City, Sindh

CONSULTANT
logix CONSULTANTS ADVISORS PROJECT MANAGEMENT (PVT) LTD

PROJECT
REFURBISHMENT WORKS AT KTDMC.

TITLE
FOUNDATION LAYOUT PLAN SECTION AND DETAILS
CONSTRUCTION & RENOVATION OF MASJID

REV.	DESCRIPTION	DATE
0	ISSUED FOR TENDER	12-01-2026

APPROVED: TAHSEEN AHMED
CHECKED: KAPIL DEV
DESIGNED: KAPIL DEV
DRAWN: RAHEEM

PROJECT CODE: 2529
SCALE: 1:50
DRG. NO.: MSQ-ST-1001
DATE: JAN, 2026
REV.: 0

Fri, 17 Apr 2026 - 2:32pm
rahim 3) MSQ-ST-1001 AND MSQ-ST-1003.dwg

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CONSTRUCTION EXPERIENCE

Form EXP - 4.1
General Construction Experience

Bidder's Name: _____
Date: _____
JV Member's Name_____
Bid Reference No. (if any) and title: _____
Page _____of _____pages

Starting Year	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of EMPLOYER: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of EMPLOYER: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of EMPLOYER: _____ Address: _____	

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Form EXP - 4.2(a)

Specific Construction and Contract Management Experience

Bidder's Name: _____
Date: _____
JV Member's Name_____
Bid Reference No. (if any) and title: _____
Page _____of _____pages

Similar Contract No.	**Information**			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-contractor ☐
Total Contract Amount			PKR equivalent	
If member in a JV or sub-contractor, specify participation in total Contract amount				
EMPLOYER's Name:				
Address: Telephone/fax number E-mail:				

Form EXP - 4.2(a) (cont.)
Specific Construction and Contract Management Experience (cont.)

Similar Contract No.	**Information**
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Form EXP - 4.2(b)
Construction Experience in Key Activities

Bidder's Name: _____
Date: _____
Bidder's JV Member Name: _____
Sub-contractor's Name (if any): _____
Bid Reference No. (if any) and title: _____

Page _____of _____pages

All Sub-contractors for key activities must complete the information and Qualification Criteria and Requirements, Sub-Factor 4.2.

1. Key Activity No One: _____

	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-contractor ☐
Total Contract Amount			PKR equivalent	
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)		Actual Quantity Performed (i) x (ii)
Year 1				
Year 2				
Year 3				
Year 4				
EMPLOYER's Name:				
Address: Telephone/fax number				

	Information
E-mail:	

2. Activity No. Two

3. ……

	Information
Description of the key activities in accordance with Section III:	

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Form EXP - 4.2 (c)
Specific Experience in Managing ES aspects

[The following table shall be filled in for contracts performed by the Bidder, and each member of a Joint Venture]

Bidder's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member Name: *[insertfull name]*
Bid Reference No. (if any) and title: *[insert ICB/NCB number and title]*
Page *[insert page number]* of *[insert total number]* pages

1. Key Requirement no 1 in accordance with 4.2 (c): _____

Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Subcontractor ☐
Total Contract Amount			PKR	
Details of relevant experience				

2. Key Requirement no 2 in accordance with 4.2 (c): _____

3. Key Requirement no 3 in accordance with 4.2 (c): _____

4. [PA define key requirements]

Contractor's Representative and Key Personnel Schedule

Bidders should provide the names and details of the suitably qualified Contractor's Representative and Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Contractor' Representative and Key Personnel

1.	**Title of position:**	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
2.	**Title of position:**	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
3.	**Title of position:**	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
4.	**Title of position:**	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]

	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
5.	**Title of position:**	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
6.	**Title of position:** *[insert title]*	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]

Form PER-2:
Resume and Declaration
Contractor's Representative and Key Personnel

Name of Bidder

Position [*#1*]: [*title of position from Form PER-1*]		
Personnel information	**Name:**	**Date of birth:**
	Address:	**E-mail:**
	Professional qualifications:	
	Academic qualifications:	
	Language proficiency:*[language and levels of speaking, reading and writing skills]*	
details		
	Address of Employer:	
	Telephone:	**Contact (manager / personnel officer):**
	Fax:	
	Job title:	**Years with present Employer:**

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

Project	**Role**	**Duration of involvement**	**Relevant experience**
[main project details]	*[role and responsibilities on the project]*	*[time in role]*	*[describe the experience relevant to this position]*

Declaration

I, the undersigned *[insert either "Contractor's Representative" or "Key Personnel" as applicable]* , certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	**Details**
Commitment to duration of contract:	*[insert period (start and end dates) for which this Contractor's Representative orKey Personnel is available to work on this contract]*
Time commitment:	*[insert period (start and end dates) for which this Contractor's Representative orKey Personnel is available to work on this contract]*

I understand that any misrepresentation or omission in this Form may:

(a) be taken into consideration during Bid evaluation;

(b) result in my disqualification from participating in the Bid;

(c) result in my dismissal from the contract.

Name of Contractor's Representative or **Key Personnel: [*insert name*]**

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day/month/year): _____

Average Annual Turnover (Annual Sales Value)

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member Name: *[insert full name]*
IFP No. and title: *[insert IFP number and title]*
Page *[insert page number]* of *[insert total number]* pages

Annual Turnover Data			
Year	**Amount** **Currency**	**Exchange rate*** **(If applicable)**	**PKR equivalent**
[indicate calendar year]	*[insert amount and indicate currency]*		
		Average Annual Turnover **	

* Refer ITA for date and source of exchange rate.

** Total PKR equivalent for all years divided by the total number of years. See Section III, Qualification Criteria and Requirements, ITA.